

# **Lady Doak College, Madurai – 2**

*(An Autonomous Institution Affiliated to Madurai Kamaraj University)*

COLLEGE WITH POTENTIAL FOR EXCELLENCE  
Re-accredited (3<sup>rd</sup> cycle) by NAAC with Grade 'A'  
CGPA 3.44 on a 4 point scale



## **SCIENCES**

**ACADEMIC COUNCIL MEETING**

**3<sup>rd</sup> April, 2019**

**Revised copy**

**APPENDIX 'BB'**

# Lady Doak College, Madurai

*(An Autonomous Institution Affiliated to Madurai Kamaraj University)*

## 59<sup>th</sup> Academic Council Meeting

3<sup>rd</sup> April 2019, Dr. Betty Chinniah Multimedia Theatre

CHAIRPERSON: Dr. Christianna Singh  
Principal & Secretary

### A G E N D A

1. Prayer
2. Introductory Remarks - Chairperson
3. Confirmation of minutes of the 58<sup>th</sup> Academic Council Meeting  
held on 3<sup>rd</sup> April, 2018
4. Introduction of Programmes and Norms
  1. Tamil
  2. English
  3. History
  4. Social Sciences
  5. Economics
  6. Commerce
  7. Business Administration
  8. Mathematics
  9. Physics
  10. Chemistry
  11. Botany
  12. Zoology
  13. Biotechnology
  14. Computer Science
  15. Fashion Designing
  16. Psychology
  17. Centre for Entrepreneurship  
Development
  18. Value Based Course
  19. Curriculum Planning and  
Evaluation Cell
5. Concluding Remarks - Chairperson

DEANS OF ACADEMIC AFFAIRS

PRINCIPAL

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## DEPARTMENT OF MATHEMATICS

### PREAMBLE

The present curriculum of B.Sc. Mathematics (Aided), B.Sc. Mathematics with Computer Applications (SF) and M.Sc. Mathematics were reviewed and based on which it is found necessary to introduce a few changes in the following courses:

**Undergraduate:**

The course MAT4501CT PROGRAMMING WITH C ++ is changed to MATQ4501CT OBJECT ORIENTED PROGRAMMING WITH C++.

Besides this, the department introduces the following courses

**Core, Support and Self-learning Courses:**

- MATQ2401AA NUMERICAL ANALYSIS
- MATQ4502CT OBJECT ORIENTED PROGRAMMING WITH JAVA
- MAT0409CD FORMAL LANGUAGES AND AUTOMATA

**Interdisciplinary Courses:**

- MAPH6401DT DIFFERENTIAL EQUATIONS FOR COMPUTATIONAL PHYSICS is offered to B.Sc. Mathematics (Aided) and B.Sc. Physics (Aided) students
- ITMA5401DT DISCRETE MATHEMATICS WITH PYTHON is offered to B.Sc. Mathematics with Computer Applications (SF) and B.Sc. Information Technology and Management (SF) students

The course profile along with the syllabi of the modified and the new courses of B.Sc. Mathematics (Aided & SF) are presented.

**Postgraduate:**

The department has revised the M.Sc. curriculum enabling the students to meet with the challenges in pursuing higher studies and career in today's world.

- PGM0423E ANALYTICAL SKILLS FOR COMPETITIVE EXAMINATIONS is changed to PGM0424E ANALYTICAL SKILLS FOR COMPETITIVE EXAMINATIONS.

The course profile for semesters I to IV along with the syllabi of the modified and new courses for the first two semesters of M.Sc. Mathematics is presented.

### COURSE PROFILE

#### B.Sc. (Spl.) MATHEMATICS – AIDED

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	MAT3401CM	VECTOR ANALYSIS AND DIFFERENTIAL GEOMETRY	TH	4		4	AV2014	AUMAT	MAT
	MAT3501CM	MODERN ALGEBRA	TH	6		5	AV2014	AUMAT	MAT
	MAT3502CM*	STATISTICS	TH	6		5		AUMAT	MAT

	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	MAT3504CM	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	TH	6		5	BA2018	AUMAT	MAT
	MAT3401AT	PROGRAMMING IN C	LT	3	2	4	AV2014	AUMAT	MAT
	NON-MAJOR ELECTIVE		TH / LA	2		2			
	VOCATIONAL COURSE					2		ALLM	CED
	VBC0102FV / VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH / SUCH	
	TOTAL				30	28			
	IV	MAT4501CM	LINEAR ALGEBRA	TH	6		5	AV2014	AUMAT
MAT4503CM		REAL ANALYSIS	TH	6		5	AV2014	AUMAT	MAT
MAT4504CM		ADVANCED STATISTICS	TH	6		5	BA2018	AUMAT	MAT
MATQ4501CT/ MATQ4502CT		OBJECT ORIENTED PROGRAMMING WITH C++ / OBJECT ORIENTED PROGRAMMING WITH JAVA	LT	4	2	5		AUMAT	MAT
MAT4201SS		QUANTITATIVE APTITUDE	TH	2		2	AV2014	AUMAT	MAT
NON-MAJOR ELECTIVE		TH / LA	2		2				
VBC0202FV / VBC0203FV		HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
UIV4201FI		HUMAN RIGHTS IN THE BIBLE						AUCH / SUCH	
TOTAL				30	26				

\* Content remains the same, hours have been changed

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	MAT5501CM	ADVANCED CALCULUS – II	TH	6		5	AW2015	AUMAT	MAT
	MAT5503CM	OPERATIONS RESEARCH – I	TH	6		5	BA2018	AUMAT	MAT
	MAT5504CM	GRAPH THEORY	TH	6		5	BA2018	AUMAT	MAT

	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	MAT5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	AUMAT	MAT
	MAT0601LM	ANALYSIS OF SOCIAL ISSUES IN VILLAGES USING MATHEMATICAL TOOLS		4		-	AW2015	AUMAT	MAT
	INTERDISCIPLINARY COURSE		TH	4		4			
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN						AUCH / SUCH	
	TOTAL				30	23			
	VI	MAT6501CM**	COMPLEX ANALYSIS	TH	5		5		AUMAT
MAT6502CM*		OPERATIONS RESEARCH - II	TH	6		5		AUMAT	MAT
MAT6503CM		MECHANICS	TH	6		5	AW2015	AUMAT	MAT
MATQ6401CM / MATQ6402CM		FUZZY SETS / COMBINATORICS	TH	4		4	BA2018	AUMAT	MAT
MAT0601LM		ANALYSIS OF SOCIAL ISSUES IN VILLAGES USING MATHEMATICAL TOOLS		4		6		AUMAT	MAT
INTERDISCIPLINARY COURSE		TH	4		4				
VBC6101FV		ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
UIV6101FI		BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCHE / SUCH	
TOTAL				30	30				

\*\* Content remains the same, but the details of the subunits have been included

\* Content remains the same, hours have been changed

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PART I	TAMIL / HINDI / FRENCH	TH	6		3 / 4	AV2014	ALLM	TAM/ HIN/ FRE
	PART II	ENGLISH	TH	6		3 / 4	AV2014	ALLM	ENG
	MAT1301FM	TRIGONOMETRY AND THEORY OF EQUATIONS	TH	4		3	AU2013	AUMAT	MAT
	MAT1502CM	ADVANCED CALCULUS I	TH	5		5	BA2018	AUMAT	MAT
		ALLIED COURSE	TH	5		4		AUMAT	PHY
	MAT1202FS	COMMUNICATION SKILLS THROUGH MATHEMATICS	TH	2		2	AZ2017	AUMAT	MAT
	VBC1101FV	HEALTHY TRANSITION FROM ADOLESCENCE TO ADULTHOOD	TH	2		1	BA2018	ALLM	Centre for VE
	UIV1101FI	BIBLICAL ESSENTIALS FOR EMERGING ADULTS	TH	2		1	BA2018	AUCH / SUCH	
	TOTAL			30		21 / 23			
II	PART I	TAMIL / HINDI / FRENCH	TH	6		3 / 4	AV2014	ALLM	TAM/ HIN/ FRE
	PART II	ENGLISH	TH	6		3 / 4	AV2014	ALLM	ENG
	MAT2402CM	SEQUENCES AND SERIES	TH	4		4	AU2013	AUMAT	MAT
	MAT2403CM**	ANALYTICAL GEOMETRY OF 3D	TH	4		4		AUMAT	MAT
	MATQ2401AA / COMQ2401AA	NUMERICAL ANALYSIS / FUNDAMENTALS OF ACCOUNTING	TH	5		4		AUMAT	MAT
									COM
	MAT2201FS	COMMUNICATION SKILLS FOR MATHEMATICS	TH	2		2	BA2018	AUMAT	MAT
		ENVIRONMENTAL ELECTIVES	TH	2		2	AU2013	ALLM	CES
	VBC0102FV / VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV2101FI	BIBLICAL FOUNDATION FOR FAMILY LIFE					BA2018	AUCH / SUCH	
	TOTAL			30		23 / 25			

\*\* Content remains the same, but the details of the subunits have been included

Extra Credit Courses – Refer Pg. No. 292

**COURSES OFFERED TO OTHER DEPARTMENT STUDENTS  
NON-MAJOR ELECTIVES**

Sem.	Course Code	Course Title	Course Type	Hrs./ Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	ECMA3201EI	BASICS OF PERSONAL FINANCE	TH	2		2	AV2014	AUALLM	ECO & MAT
	ENMA3201EI	BASIC COURSE IN MATHEMATICS AND ENGLISH FOR COMPETITIVE EXAMINATIONS	TH	2		2	BA2018	AUALLM	ENG & MAT
	COMA3201EI	FOUNDATION COURSE IN MATHEMATICS AND COMMERCE FOR COMPETITIVE EXAMINATIONS	TH	2		2	AV2017	AUALLM	MAT & COM
IV	BOMA4201EI	MATHEMATICS IN PLANT SCIENCE	TH	2		2	AV2014	AUALLM	MAT & BOT
	ECMA4201EI	LINEAR PROGRAMMING AND NETWORK ANALYSIS	TH	2		2	AV2014	AUALLM	MAT & ECO
	HIMA4201EI	HISTORY AND MATHEMATICS FOR COMPETITIVE EXAMINATIONS	TH	2		2	BA2018	AUALLM	HIS & MAT

**INTERDISCIPLINARY COURSES**

Sem.	Course Code	Course Title	Course Type	Hrs./ Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	MAPH5401DM	FOURIER TRANSFORM AND ITS APPLICATIONS	TH	4		4	AW2015	AUMAT & AUPHY	MAT & PHY
	MAZO5401DM	MEDICAL STATISTICS	TH	4		4	BA2018	AUMAT & AUZOO	MAT & ZOO
VI	BOMA6401DM	MATHEMATICAL APPLICATIONS IN LIFE SCIENCES	TH	4		4	BA2018	AUMAT & AUBOT	MAT & BOT
	CHMA6401DM	APPLICATIONS OF GRAPH THEORY IN CHEMISTRY	TH	4		4	AW2015	AUMAT & AUCHE	MAT & CHE

	MAPH6401DT	DIFFERENTIAL EQUATIONS FOR COMPUTATIONAL PHYSICS	LT	3	1	4		AUMAT & AUPHY	MAT & PHY
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### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II / III / IV / V	MAT0401CD	NUMBER THEORY	TH	4	AU2013	ALLM	MAT
	MAT0402CD	TRANSFORMATION GEOMETRY	TH	4	AV2014	ALLM	MAT
	MAT0403CD	CODING THEORY	TH	4	AV2014	ALLM	MAT
	MAT0404CD	SET THEORY AND NUMBER SYSTEM	TH	4	AV2014	ALLM	MAT
	MAT0405CD	FUZZY SETS AND FUZZY LOGIC	TH	4	AV2014	ALLM	MAT
	MAT0406CD	ASTRONOMY	TH	4	AZ2017	ALLM	MAT
	MAT0407CD	NUMERICAL METHODS	TH	4	AZ2017	ALLM	MAT
	MAT0408CD	DISCRETE MATHEMATICS	TH	4	AZ2017	ALLM	MAT
	MAT0409CD	FORMAL LANGUAGES AND AUTOMATA	TH	4		ALLM	MAT

### B.Sc. MATHEMATICS WITH COMPUTER APPLICATIONS – SELF FINANCED

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	MAT3401CM	VECTOR ANALYSIS AND DIFFERENTIAL GEOMETRY	TH	4		4	AV2014	SUMAT	MAT
	MAT3501CM	MODERN ALGEBRA	TH	6		5	AV2014	SUMAT	MAT
	MAT3502CM*	STATISTICS	TH	6		5		SUMAT	MAT
	MAT3504CM	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	TH	6		5	BA2018	AUMAT	MAT

	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	MAE3401AT	PROGRAMMING WITH C++	LT	3	2	4	AV2014	SUMAT	MAT
		NON-MAJOR ELECTIVE	TH	2		2			
		VOCATIONAL COURSE				2			
	VBC0102FV / VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH / SUCH	
		TOTAL		30		28			
IV	MAT4501CM	LINEAR ALGEBRA	TH	6		5	AV2014	SUMAT	MAT
	MAT4503CM	REAL ANALYSIS	TH	6		5	AV2014	SUMAT	MAT
	MAT4504CM	ADVANCED STATISTICS	TH	6		5	BA2018	SUMAT	MAT
	MAE4501CM	DATA STRUCTURES AND ALGORITHMS	TH	6		5	BA2018	SUMAT	MAT
	MAT4201SS	QUANTITATIVE APTITUDE	TH	2		2	AV2014	SUMAT	MAT
		NON-MAJOR ELECTIVE	TH / LA	2		2			
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH / SUCH	
		TOTAL		30		25			

\* Content remains the same, hours have been changed

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	MAT5501CM	ADVANCED CALCULUS - II	TH	6		5	AW2015	SUMAT	MAT
	MAE5501CT	RDBMS WITH VISUAL BASIC	LT	3	3	5	AW2015	SUMAT	MAT
	MAT5504CM	GRAPH THEORY	TH	6		5	BA2018	SUMAT	MAT
	MAT5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	SUMAT	MAT
	MAT0601LM	ANALYSIS OF SOCIAL ISSUES IN VILLAGES USING MATHEMATICAL TOOLS	TH	4			AW2015	SUMAT	MAT
		INTERDISCIPLINARY COURSE	TH	4		4			

	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN					AUCH / SUCH		
		Total		30		23			
VI	MAT6501CM**	COMPLEX ANALYSIS	TH	5		5		SUMAT	MAT
	MAE6501CM	OPERATIONS RESEARCH	TH	6		5	AW2015	SUMAT	MAT
	MAE6502CM	MECHANICS	TH	5		5	AW2015	SUMAT	MAT
	MAE6401CT	OBJECT ORIENTED PROGRAMMING - II	LT	3	2	4	AW2015	SUMAT	MAT
		INTERDISCIPLINARY COURSE	TH	4		4			
	MAT0601LM	ANALYSIS OF SOCIAL ISSUES IN VILLAGES USING MATHEMATICAL TOOLS	TH	4		6		SUMAT	MAT
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		SUMAT	Centre for VE
UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP	AUCH / SUCH							
		Total		30		30			

\*\* Content remains the same but the details of the subunits have been included

Extra Credit Courses – Refer Pg. No. 292

### COURSES OFFERED TO OTHER DEPARTMENT STUDENTS

#### NON-MAJOR ELECTIVES

Se m.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	CSMA3201EI	BASICS IN DISCRETE MATHEMATICS	TH	2		2	AV2014	SUALLM	MAT & CSC
	CRMA3201EI	FOUNDATION COURSE IN MATHEMATICS AND COMMERCE FOR COMPETITIVE EXAMINATIONS	TH	2		2	AZ2017	SUALLM	MAT & COR
	BAMA3201EI	OPTIMIZATION TECHNIQUES IN MANAGEMENT	TH	2		2	BA2018	SUALLM (Except Maths, Computer Science and Information Technology)	BBA & MAT
IV	ENMA4201EI	BASIC COURSE IN MATHEMATICS AND ENGLISH FOR COMPETITIVE EXAMINATIONS	TH	2		2	AV2014	SUALLM	MAT & ENG

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	CSMA4201EP	NUMERICAL METHODS USING SCILAB	LA		2	2	BA2018	SUALLM	CSC & MAT
	BTMA4201EI	DEMOGRAPHY AND VITAL STATISTICS	TH	2		2	BA2018	SUALLM	BTE & MAT

### INTERDISCIPLINARY COURSE

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	BTMA5401DM	APPLICATION OF STATISTICS IN GENETICS	TH	4		4	AW2015	SUBTY & SUMAT	BTY & MAT
	ITMA5402DM	PARALLEL INTERCONNECTION NETWORKS	TH	4		4	AZ2017	SUMAT & SUITM	MAT & ITM
	ITMA5403DM	FORMAL LANGUAGES AND AUTOMATA THEORY	LA	4		4	BA2018	SUMAT & SUITM	MAT & ITM
	MAPH5402DM	INTRODUCTION TO ASTROPHYSICS	TH	4		4	AZ2017	SUMAT & SUPHY	MAT & PHY
	ITMA5401DT	DISCRETE MATHEMATICS WITH PYTHON	LT	3	1	4		SUMAT & SUITM	MAT & ITM
VI	ITMA6401DT / CSMA6401DT	APPLICATION OF FUZZY SETS USING MAT LAB	LT	3	1	4	BA2018	SUMAT, SUCSC & SUITM	MAT, CSC & ITM

### MATQ4501CT OBJECT ORIENTED PROGRAMMING WITH C++

(LAB CUM THEORY)

#### LEARNING OUTCOME

4T+2L hrs./wk.

On successful completion of the course, the student will be able to

- recognize the concept of object oriented programming
- develop programming skills using the syntax involved in C++ programming
- analyze logically and write programs

#### COURSE CONTENT:

##### UNIT I: PRINCIPLES OF OBJECT ORIENTED PROGRAMMING

10T + 4L hrs.

Introduction to OOP concepts – tokens – keywords – identifiers – constants – expressions – if statement – switch statement – while loop – do...while loop – for loop.

##### UNIT II: FUNCTIONS IN C++

13T + 6L hrs.

Main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – recursion – function overloading – friend and virtual functions – math library functions.

**UNIT III: CLASSES, OBJECTS, CONSTRUCTORS AND DESTRUCTORS** 13T + 7L hrs.

Defining a class – member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – static data members – static member functions – arrays of objects – objects as function arguments – friend functions – constructors – parameterized constructors – constructors with default arguments – destructors.

**UNIT IV: OPERATOR OVERLOADING AND INHERITANCE** 13T + 7L hrs.

Operator overloading – overloading unary and binary operators – overloading binary operators using friend functions – rules for overloading operators – Inheritance: defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritance – abstract classes.

**UNIT V: POINTERS, VIRTUAL FUNCTIONS AND FILES** 11T + 6L hrs.

Pointers – pointers to objects – this pointer – pointers to derived classes – virtual functions – files: classes for file stream operations – opening and closing a file.

**EXPERIMENTS / LAB EXERCISES:**

- Programs which deal with conditional and looping statements
- Programs using functions and its types
- Programs using classes and objects
- Programs which deal with array of objects
- Programs involving inheritance
- Programs which deal with overloading and its types
- Program that uses constructors and destructors
- Programs that uses pointers and files

**TEXT BOOK(S):**

Balagurusamy, E., (2015), *Object Oriented Programming with C++*, (4<sup>th</sup> ed.), New Delhi: Tata McGraw – Hill Education Private Limited, Print. (Chapter: 1, 3 (3.1 to 3.4, 3.20, 3.25), 4, 5 (5.3 to 5.9, 5.11 to 5.15), 6 (6.2, 6.3, 6.5, 6.11), 7 (7.2 to 7.5, 7.8), 8 (8.2 to 8.6, 8.10), 9 (9.1 to 9.6), 11 (11.1 to 11.3)).

**REFERENCE BOOK(S):**

Ravichandran D, (2012), *Programming with C++*, New Delhi: Tata McGraw-Hill publishing company limited, Print.

Yashwant Kanetkar, (2006), *Let us C++*, New Delhi: BPB Publications, Print.

**MATQ4502CT OBJECT ORIENTED PROGRAMMING WITH JAVA**

**(LAB CUM THEORY)**

**LEARNING OUTCOME**

4T + 2L hrs./wk.

On successful completion of the course the student will be able to

- apply object-oriented programming concepts for logic building activities
- design and develop platform independent applications
- develop Java programs using the syntax

**COURSE CONTENT:**

**UNIT I: OVERVIEW OF JAVA**

15T + 5L hrs.

Fundamentals of OOP concepts – basics of Java: history – Java features – Java environment – Java tokens – constants – variables – data types – operators – expressions – control statements.

**UNIT II: CLASSES, ARRAYS AND STRINGS**

14T + 10L hrs.

Classes and objects: defining a class – methods – creating objects – accessing class members – constructors – methods overloading – static members – nesting of methods – arrays: one dimensional array – creating an array – two-dimensional array – strings: string arrays – string methods.

**UNIT III: INHERITANCE AND INTERFACES**

8T + 5L hrs.

Inheritance: defining a subclass – multilevel inheritance – hierarchical inheritance – overriding methods – final variables and methods – final classes – finalizer methods – abstract methods and classes – visibility control. Interfaces: defining interface – extending interface – implementing interface – accessing interface variables.

**UNIT IV: PACKAGES, EXCEPTIONS AND MULTITHREADING**

15T+ 5L hrs.

Packages: Java API packages – system packages – naming conventions – creating and accessing a packages – adding class to a package – hiding classes. Exception: types of errors – basics of exception handling – multiple catch statements – finally statement – user defined exception. Multithreading: creating threads – life cycle of a thread – thread methods – thread exceptions – thread priority – implementing runnable interface.

**UNIT V: APPLET**

8T + 5L hrs.

Introduction – applet life cycle – creating and executing an applet. Graphics: drawing and filling lines – rectangles – polygon – circles – arcs – line graphs.

**EXPERIMENTS / LAB EXERCISES:**

Programs which read, process and display different data types

Programs which deal with looping and control statements

Programs designed to read and process single and multidimensional arrays

Programs for designing a class

Programs which deal with constructors and finalizer

Programs involving applications using pre-defined Java exceptions

Programs involving graphics using Applet

**TEXT BOOK(S):**

Balagurusamy, E., (2008). *Programming with Java*, (3<sup>rd</sup> ed.), New Delhi: Tata McGraw-Hill publishing Company limited. Print. (Chapter: 1, 2 (2.1, 2.2, 2.9), 3 (3.2,3.6), 4, 5, 6, 7, 8 (8.1 – 8.16,8.18), 9 (9.1 – 9.5), 10, 11 (11.1 – 11.9),12 (12.1 – 12.8,12.10), 13, 14, 15 (15.1 – 15.7)).

**REFERENCE BOOK(S):**

Card Strocker and Thomas Plew, G., (2002). *Java Programming*, Galgotia Publications. Print.

Herbert Schildt, (2008). *The Complete Reference Java 2*, (5<sup>th</sup> ed.), New Delhi: Tata McGraw – Hill Publishing Company Limited. Print.

Patrick Naughton, (2002). *Java Handbook*, New Delhi: Tata McGraw Hill. Print.

Willtrain, (2000). *Java 1.2*, New Delhi: BPB Publications. Print.

Xavier, C., (2006). *Projects on Java*, Chennai: Scitech Publications. Print.

## MATQ2401AA NUMERICAL ANALYSIS

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- acquire approximate solutions to mathematical problems
- use different interpolation formulae to find approximate numerical values of derivatives
- apply numerical techniques to solve ordinary differential equations

#### COURSE CONTENT:

#### UNIT I: NUMERICAL SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS 15 hrs.

Bisection method – iteration method – method of false position – Newton-Raphson method.

#### UNIT II: FINITE DIFFERENCES 15 hrs.

First and higher differences – backward differences – central differences – properties of the operator  $\Delta$  – differences of a polynomial – factorial polynomial – operator E – relationship between the operators – summation of series.

#### UNIT III: INTERPOLATION WITH EQUAL AND UNEQUAL INTERVALS 17 hrs.

Gregory-Newton's forward and backward interpolation formulae – equidistant terms with one or more missing values – Gauss's forward and backward interpolation formulae – Stirling's formula – Bessel's formula – Laplace-Everett formula – relation between Bessel's and Everett's formulae – divided difference – properties – Newton's divided difference formula – Lagrange's interpolation formula – inverse interpolation.

#### UNIT IV: NUMERICAL DIFFERENTIATION AND INTEGRATION 14 hrs.

Newton's forward and backward difference formulae to compute derivatives – Stirling's formula – Bessel's formula – maxima and minima of a tabulated function – Numerical integration: Trapezoidal rule – Simpson's rule.

#### UNIT V: NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER

14 hrs.

Power series approximations – solution by Taylor series – Picard 's method – Euler's methods.

#### TEXT BOOK(S):

Venkataraman, M.K., (2004). *Numerical methods in Science and Engineering*, (5<sup>th</sup> ed.), Chennai: The National Publishing Company. Print. (Chapter: 3 (1 – 5), 5, 6 (1 – 5), 7(1–8), 8(1 –4, 9), 9(1-8, 10), 11(1– 6, 9 – 12)).

#### REFERENCE BOOK(S):

Gupta, B.D., (1995). *Numerical Analysis*, Delhi: Konark Publishers Pvt. Ltd. Print.

Sastry, S.S., (2012). *Introduction Methods of Numerical Analysis*, New Delhi: Prentices Hall of India Pvt. Ltd. Print.

Goeland Mittal, (2006). *Numerical Analysis*, Meerut: Pragati Prakashan Educational Publisher. Print.

## MAT0409CD FORMAL LANGUAGES AND AUTOMATA (THEORY)

### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- construct grammars for languages
- convert the grammar to the required normal form
- develop automata for languages

### COURSE CONTENT:

#### UNIT I: FINITE AUTOMATA (FA)

Definition – representation of a finite automaton – acceptability of a string and language accepted by a finite automaton.

#### UNIT II: NON-DETERMINISTIC FINITE AUTOMATA (NFA)

Definition – acceptability of a string by NFA – equivalence of FA and NFA – procedure for finding a FA equivalent to a given NFA – properties of regular sets – decision algorithms for regular sets – finite state machines – monoid of a finite state machine – machine of a monoid.

#### UNIT III: PHRASE STRUCTURE GRAMMARS

Definition and examples – Chomsky hierarchy of languages – finite automata and regular languages – derivation trees for context free grammars – normal forms for context free grammars – ambiguity – parsing and polish notation – simple precedence grammar – algorithm.

#### UNIT IV: PUSHDOWN AUTOMATA (PDA)

Definition – instantaneous descriptions of a PDA – important properties of move relation – acceptance by PDA – equivalence of two types of acceptance by PDA – context free languages and PDA's.

### TEXT BOOK(S):

Venkataraman M.K., Sridharan N. and Chandrasekaran N., (2001). *Discrete Mathematics*, Chennai: The National Publishing Company. Print. (Chapter XII (1-29)).

### REFERENCE BOOK(S):

Sundaresan V., Ganapathy Subramanian K.S. and Ganesan K., (2001). *Discrete Mathematics*, Sirkali: A.R. Publications. Print.

(For the following course, content remains the same but the contact hours have been changed and the content is presented in this Academic Council booklet)

## MAT3502CM STATISTICS (THEORY)

### LEARNING OUTCOME

6 hrs./wk.

On successful completion of the course, the student will be able to

- compute measures of central tendency and measures of dispersion
- fit a straight line and a second degree parabola for the given data
- apply the concepts of correlation, regression and probability in real life situations

## COURSE CONTENT:

- UNIT I: FREQUENCY DISTRIBUTIONS AND MEASURES OF CENTRAL TENDENCY** 20 hrs.  
Frequency distributions – graphic representation of a frequency distribution – measures of central tendency -requisites for an ideal measure of central tendency – arithmetic mean – median – mode – geometric mean – harmonic mean – selection of an average – partition values.
- UNIT II: MEASURES OF DISPERSION, SKEWNESS AND KURTOSIS** 25 hrs.  
Dispersion – characteristics for an ideal measure of dispersion – measures of dispersion – range – quartile deviation – mean deviation – standard deviation and root mean square deviation – coefficient of dispersion – moments – Pearson's  $\beta$  and  $\gamma$  co-efficient – skewness – kurtosis.
- UNIT III: CURVE FITTING AND PRINCIPLE OF LEAST SQUARES** 10 hrs.  
Curve fitting – most plausible solution of a system of linear equations – conversion of data to linear form.
- UNIT IV: CORRELATION AND REGRESSION** 15 hrs.  
Bivariate distribution – correlation - scatter diagram- Karl Pearson's coefficient of correlation – calculation of the correlation coefficient for a bivariate frequency distribution – probable error of correlation coefficient – rank correlation – regression.
- UNIT V: THEORY OF PROBABILITY AND MATHEMATICAL EXPECTATION** 20 hrs.  
Introduction – short history – definitions of various terms –Mathematical tools: preliminary notion of sets – axiomatic approach to probability – probability – Mathematical notion – law of multiplication or theorem of compound probability – Baye's theorem - Mathematical expectation – addition theorem of expectation – multiplication theorem of expectation – co-variance – expectation of linear combination of random variables – variance of a linear combination of random variables – expectation of a continuous random variable – conditional expectation and conditional variance.

## TEXT BOOK(S):

Gupta S.C. and Kapoor V.K., (2009). *Elements of Mathematical Statistics*, New Delhi: Sultan Chand and Sons. Print. (Chapter: 2, 3, 4, 6 (6.1 to 6.8) 9, 10).

## REFERENCE BOOK(S):

Arumugam S. and Thangapandi Isaac A., (2007). *Statistics*, Palayamkottai: New Gamma Publishing House. Print.

Gupta S.P., (2006). *Statistical Methods*, New Delhi: Sultan Chand and sons. Print.

## MAT6502CM OPERATIONS RESEARCH - II

### (THEORY)

## LEARNING OUTCOME

6 hrs./wk.

On successful completion of the course, the student will be able to

- explore, understand and compare various queueing situations
- identify the optimal strategies for the players in a two-person zero-sum game
- plan, schedule and determine the minimum time of completion for projects

**COURSE CONTENT:**

- UNIT I: GAMES AND STRATEGIES** 18 hrs.  
Two-person zero sum games – basic terms – maximin-minimax principle – games without saddle point – mixed strategies – graphic solution of  $2 \times n$  and  $m \times 2$  games – dominance property – general solution of  $m \times n$  rectangular games.
- UNIT II: REPLACEMENT PROBLEM** 18 hrs.  
Replacement of equipment / asset that deteriorates gradually – replacement policy when value of money does not change with time – replacement policy when value of money changes with time.
- UNIT III: QUEUEING THEORY** 18 hrs.  
Queueing system – elements of queueing system – operating characteristics of queueing system – probability distribution in queueing systems – classification of queueing models – definition of transient and steady states – Poisson queueing system – Models: (M/M/1): (infinity/FIFO) – (M/M/1): (N/FIFO) – (M/M/C): (infinity/FIFO).
- UNIT IV: INVENTORY CONTROL** 18 hrs.  
The inventory decisions – costs associated with inventories – factors affecting inventory control – economic order quantity (EOQ) – deterministic inventory problems with no shortages – deterministic inventory problem with shortages.
- UNIT V: NETWORK SCHEDULING BY PERT/CPM** 18 hrs.  
Network and basic components – logical sequencing – rules of network construction – critical path analysis – probability consideration in PERT.

**TEXT BOOK(S):**

Man Mohan, Kanti Swarup and P.K.Gupta, (2006). *Operations Research*, New Delhi: Sultan Chand & Sons, Print. (Chapters: 17(17.1 – 17.7,17.9(LP method only)), 18(18.1,18.2), 19(19.1-19.7), 20(20.1-20.8), 21(21.1 – 21.6)).

**REFERENCE BOOK(S):**

Gupta P.K, Man Mohan, (2003). *Problems in Operations Research*, New Delhi: Sultan Chand & Sons, Print.

Hamdy, A.Taha, (1987). *Operations Research*, New York: Macmillan Publishing Company, Print.

(For the following course, content remains the same but the details of the subunits have been included and the content is presented in this Academic Council booklet)

**MAT2403CM ANALYTICAL GEOMETRY OF 3D**

(THEORY)

**LEARNING OUTCOME** 4 hrs./wk.

On successful completion of the course, the student will be able to

- acquire the basic concepts in three-dimensional geometry
- express the equations of straight lines and planes in different forms
- apply the concepts in three-dimensional geometry to solve problems

**COURSE CONTENT:**

**UNIT I: CARTESIAN CO-ORDINATES AND PLANE** 13 hrs.

Rectangular cartesian co-ordinates: direction cosines of a line – equation of a plane – intercept form – normal form – angle between the planes – equation of a plane through the line of intersection of two given planes – length of the perpendicular from a point on the plane – equation of the planes bisecting the angle between the planes.

**UNIT II: STRAIGHT LINE** 12 hrs.

Equation of a straight line in symmetrical form – planes and straight lines.

**UNIT III: COPLANAR LINES** 15 hrs.

Coplanar lines – shortest distance between two lines – intersection of three planes – volume of a tetrahedron.

**UNIT IV: SPHERE** 12 hrs.

General equation of a sphere – length of the tangent from the point to the sphere – plane section of a sphere – intersection of two spheres – equation of a tangent plane to the sphere at a point.

**UNIT V: CONE AND CYLINDER** 8 hrs.

Cone – right circular cone – cylinder – right circular cylinder – simple problems.

**TEXT BOOK(S):**

Manicavachagom Pillay T.K. and Natarajan T., (2008). *A textbook of Analytical Geometry, Part II – 3 dimensions*, Chennai: S. Viswanathan Printers & Publishers Pvt. Ltd., Print. (Chapter: I, II, III (Page 46 to 71, 84 to 91), IV, V (Page 115 to 123, 134 to 139)).

**REFERENCE BOOK(S):**

Dipak Chatterjee, (2003). *Analytic solid geometry*, New Delhi: Prentice Hall of India, Print.  
Duraipandian P., Laxmi Duraipandian and Muhilan D, (1984). *Analytical Geometry (3-D)*, Chennai: Emerald Publishers, Print.

Mathew K.C., Veeraragavan S. and Ragavan T., (1984). *A text Book of Co-ordinate Geometry of Two and Three Dimensions*, New Delhi: Chand S and Company Ltd., Print.

## **MAT6501CM COMPLEX ANALYSIS**

### **(THEORY)**

**LEARNING OUTCOME** 5 hrs. / wk.

On successful completion of the course, the student will be able to

- describe the concepts of complex numbers and the geometrical representation of the extended complex plane
- apply the concept and consequence of analytic functions and CR equations in different branches of Science
- evaluate line integrals using Cauchy's theorem and definite integrals using residues

**COURSE CONTENT:**

**UNIT I: COMPLEX NUMBERS AND ANALYTIC FUNCTIONS** 15 hrs.

Circles and straight lines – regions in the complex plane – the extended complex plane – functions of a complex variable – limits - continuous functions – differentiability – Cauchy Riemann's equations – analytic functions – harmonic functions – conformal mapping.

**UNIT II: BILINEAR TRANSFORMATIONS**

15 hrs.

Elementary transformations – bilinear transformations – cross ratio – fixed points of bilinear transformations – some special bilinear transformations

**UNIT III: COMPLEX INTEGRATION**

15 hrs.

Definite integral – Cauchy’s theorem – Cauchy’s integral formula – higher derivatives.

**UNIT IV: SERIES EXPANSIONS**

15 hrs.

Taylor’s series – Laurent’s series – zeros of an analytic function – singularities.

**UNIT V: CALCULUS OF RESIDUES**

15 hrs.

Residues – Cauchy’s residue theorem – evaluation of definite integrals.

**TEXT BOOK(S):**

Arumugam S. Thangapandi Isaac A. and Somasundaram A., (2005). *Complex Analysis*. Chennai: Scitech Publications (India) Pvt. Ltd., Print. (Chapter- 1 (1.7 to 1.9), 2, 3, 6, 7, 8)

**REFERENCE BOOK(S):**

Narayan Shanti, (2001). *Theory of functions of a complex variable*, New Delhi: Chand. S and Company Ltd., Print.

Churchill, V. (1960). *Theory of complex variables*, Oxford: Mcgraw Hill University Press. Print.

Copson, E.T. (1960). *An introduction to the theory functions of a complex variable*, London: Oxford University Press. Print.

**COURSE PROFILE****M.Sc. Mathematics**

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PGM3521M	DIFFERENTIAL GEOMETRY	TH	7		5	BA2018	APMAT	MAT
	PGM3522M	COMPLEX ANALYSIS	TH	6		5	BA2018	APMAT	MAT
	PGM3523M	GRAPH THEORY	TH	6		5	BA2018	APMAT	MAT
	PGM3521O	FLUID DYNAMICS	TH	5		5	BA2018	APMAT	MAT
	PGM0424E	ANALYTICAL SKILLS FOR COMPETITIVE EXAMINATIONS	TH	4		4		APALLS	MAT
	PGM3421E	NUMBER THEORY					AQ2009		
		LIBRARY		1					
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH/ SPCH	
	TOTAL		30		25				

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
IV	PGM4621M	MODULE THEORY	TH	7		6	BA2018	APMAT	MAT
	PGM4622M	FUNCTIONAL ANALYSIS	TH	7		6	AM2005	APMAT	MAT
	PGM4524M	STOCHASTIC PROCESSES	TH	6		5	BA2018	APMAT	MAT
	PGM4521O	COMBINATORIAL THEORY	TH	5		5	BA2018	APMAT	MAT
	PGM0621M	PROJECT	PR	2		6			
		LIBRARY		1					
	PGV4103PV	IN TUNE WITH NATURE	TH	2		1		ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER						APCH/SPCH	
		TOTAL		30		29			

#### EXTRA CREDIT COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Offered to	Offered by
II	PGM2321MT	TERM PAPER	MT	3	APMAT	MAT
IV	PGM4321MT	TERM PAPER	MT	3	APMAT	MAT
IV	PGM4321MV	COMPREHENSIVE VIVA	MV	3	APMAT	MAT
IV	PGM4221CE	COMPREHENSIVE e-ASSESSMENT	CE	2	APMAT	MAT

From 2019 batch onwards

Se m.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PGM1501CM	ALGEBRA I	TH	6		5		APMAT	MAT
	PGM1502CM	REAL ANALYSIS	TH	6		5		APMAT	MAT
	PGM1503CM	ORDINARY DIFFERENTIAL EQUATIONS	TH	5		5		APMAT	MAT
	PGM1504CM	MATHEMATICAL STATISTICS	TH	6		5		APMAT	MAT
	PGM1401CM	CLASSICAL MECHANICS	TH	4		4		APMAT	MAT
	PGV1101PV	FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE

Se m.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by			
				TH	LA							
	PGV1102PV	PERSPECTIVES ON GENDER					AV2014 as PGV2101V	LDC ALLM	Centre for VE			
	PIV1102PI	THE BIBLE AND SCIENCE						APCH/ SPCH				
		LIBRARY					1					
	TOTAL						30	25				
	II											
	PGM2501CM	ALGEBRA II	TH	6		5		APMAT	MAT			
	PGM2502CM	MEASURE AND INTEGRATION	TH	6		5		APMAT	MAT			
	PGM2503CM	TOPOLOGY	TH	6		5		APMAT	MAT			
	PGM2504CM	PARTIAL DIFFERENTIAL EQUATIONS	TH	5		5		APMAT	MAT			
	PGM2401EI	ANALYTICAL SKILLS FOR COMPETITIVE EXAMINATIONS	TH	4		4		APALLS (except Maths)	MAT			
	PGM2402EI	DISCRETE MATHEMATICS										
	PGV2103PV	HUMAN RIGHTS AND DUTIES	TH	2		1	AM2005 as PGV0104V	NON LDC ALLM	Centre for VE			
	PGV2102PV	PRACTICING HUMAN RIGHTS					AM2005 as PGV0107V	LDC ALLM				
	PIV2102PI	RIGHTS, RESPONSIBILITIES AND THE BIBLE					APCH/ SPCH					
		LIBRARY					1					
TOTAL				30	25							

Profile of semesters III and IV (Content to be passed in the Academic Council Meeting for 2019-20)

Sem.	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Offered to	Offered by
				TH	LA			
III	PGM3501CM	DIFFERENTIAL GEOMETRY	TH	6		5	APMAT	MAT
	PGM3502CM	COMPLEX ANALYSIS	TH	6		5	APMAT	MAT
	PGM3503CM	GRAPH THEORY	TH	6		5	APMAT	MAT
	PGM3501MO/ PGM3502MO	FLUID DYNAMICS / ADVANCED OPERATIONS RESEARCH	TH	5		5	APMAT	MAT

Sem.	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Offered to	Offered by
				TH	LA			
III	PGM3401EE	ANALYTICAL SKILLS FOR COMPETITIVE EXAMINATIONS	TH	4		4	APALLS	MAT
	PGM3402EE	FUZZY SETS						
		LIBRARY		2				
	PGV3101PV / PGV3102PV / PGV3103PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA / PROFESSIONAL ETHICS	TH	1		1	ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS					APCH/ SPCH	
	TOTAL				30		25	
IV	PGM4601CM	MODULE THEORY	TH	6		6	APMAT	MAT
	PGM4602CM	FUNCTIONAL ANALYSIS	TH	6		6	APMAT	MAT
	PGM4501CM	STOCHASTIC PROCESSES	TH	6		5	APMAT	MAT
	PGM4401CM	NUMBER THEORY	TH	4		4		
	PGM4501MO/ PGM4502MO	COMBINATORIAL THEORY / NUMERICAL ANALYSIS	TH	5		5	APMAT	MAT
	PGM0601PR	PROJECT	PR	1		6	APMAT	MAT
	PGV4101PV/ PGV4102PV/ PGV4103PV	UNIVERSAL VALUES / PEACE STUDIES AND PEACE MAKERS / IN TUNE WITH NATURE	TH	2		1	ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER					APCH/ SPCH	
TOTAL				30		33		

### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PGM2301MT	-	PGM4301MT	MT	3	APMAT	MAT
COMPREHENSIVE VIVA	-	-	PGM4301MV	MV	3	APMAT	MAT
COMPREHENSIVE e-ASSESSMENT	-	-	PGM4201CE	CE	2	APMAT	MAT

## COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

### ELECTIVE COURSES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PGM3421E	NUMBER THEORY	TH	4		4	AQ2009	APALLS	MAT
II / III	PGM0424E / PGM2401EI / PGM3401EE	ANALYTICAL SKILLS FOR COMPETITIVE EXAMINATIONS	TH	4		4		APALLS/ APALLM	MAT
II	PGM2402EI	DISCRETE MATHEMATICS	TH	4		4		APALLM	MAT

### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II / III	PGM0423D	CODING THEORY AND CRYPTOGRAPHY	TH	4	AQ2009	APALL	MAT
	PGM0401CD	SPECIAL FUNCTIONS	TH	4		APALL	MAT
	PGM0402CD	ADVANCED TOPICS IN GRAPH THEORY	TH	4		APALL	MAT

### PGM1501CM ALGEBRA I

(THEORY)

#### LEARNING OUTCOME

6 hrs./wk.

On successful completion of the course, the student will be able to

- analyze the structure of the groups and rings
- explain the different steps involved in proving the Sylow's theorem
- identify the different types of polynomials

#### COURSE CONTENT:

##### UNIT I: GROUPS AND HOMOMORPHISMS

20 hrs.

Definition of a group – some examples of groups – some preliminary lemmas – subgroups – a counting principle – normal subgroups and quotient groups – homomorphisms – automorphisms.

##### UNIT II: SYLOW'S THEOREM AND FINITE ABELIAN GROUPS

20 hrs.

Cayley's theorem – permutation groups – another counting principle – Sylow's theorem – direct product – finite abelian groups.

##### UNIT III: SOLVABLE GROUPS

15 hrs.

Generators of a subgroup and derived subgroups – normal series – solvable groups and Jordan Holder theorem.

##### UNIT IV: RING THEORY

15 hrs.

Euclidean rings – a particular Euclidean ring.

**UNIT V: POLYNOMIAL RINGS**

20 hrs.

Polynomials over the rational field – polynomial rings over commutative rings.

**TEXT BOOK(S):**

Herstein I.N., (2002). *Topics in algebra*, (2<sup>nd</sup> ed.), Singapore: Wiley Eastern Limited. Print.  
(Chapter 2,3(3.7-3.11))

Surjeet Singh and Qazi Zameeruddin, (2001). *Modern algebra*, New Delhi: Vikas Publishing House Pvt. Limited. Print. (Chapter 5)

**REFERENCE BOOK(S):**

Jacobson, (1953). *Lectures in abstract algebra*, (Vol. I), New Delhi: Narosa Publishing House. Print.

John Fraleigh, (1982). *A first course in abstract algebra*, New Delhi: Narosa Publishing House. Print.

Vijay K Khanna, Bhambri S.K., (2018). *A course in abstract algebra*, (5<sup>th</sup> ed.), New Delhi: Vikas Publishing House Pvt. Ltd. Print.

**PGM1502CM REAL ANALYSIS****(THEORY)****LEARNING OUTCOME**

6 hrs./wk.

On successful completion of the course, the student will be able to

- identify the behavior of series of numbers
- apply the properties of Riemann-Stieltjes integral to solve problems
- relate the concepts of integration and differentiation to sequences and series of functions

**COURSE CONTENT:****UNIT I: NUMERICAL SERIES**

20 hrs.

Series – series of nonnegative terms – number  $e$  – root and ratio tests – power series – summation by parts – absolute convergence – addition and multiplication of series – rearrangements.

**UNIT II: CONTINUITY**

20 hrs.

Limits of functions – continuous functions – continuity and compactness – continuity and connectedness – discontinuities – monotonic functions – infinite limits and limits at infinity.

**UNIT III: DIFFERENTIATION**

15 hrs.

Derivative of a real function – mean value theorems – continuity of derivatives – L' Hospital's rule – derivatives of higher order – Taylor's theorem – differentiation of vector-valued functions.

**UNIT IV: RIEMANN-STIELTJES INTEGRAL**

15 hrs.

Definition and existence of the integral – properties of the integral – integration and differentiation – integration of vector-valued functions.

**UNIT V: SEQUENCES AND SERIES OF FUNCTIONS**

20 hrs.

Discussion of main problem – uniform convergence – uniform convergence and continuity – uniform convergence and integration – uniform convergence and differentiation – equicontinuous families of functions – Stone Weierstrass theorem.

**TEXT BOOK(S):**

Walter Rudin, (2013). *Principles of Mathematical Analysis*, (3<sup>rd</sup> ed.), New Delhi: McGraw Hill Education (India) Private Limited. Print. (Chapter 3 (3.21 – 3.55), 4,5,6 (up to 6.25), 7)

**REFERENCE BOOK(S):**

Apostol, (1990). *Mathematical Analysis*. New Delhi: Narosa Publishing House, Print.

Karunakaran V., (2012). *Real Analysis*, New Delhi: Dorling Kindersley Pvt. Ltd., Print.

Richard R. Goldberg, (2012). *Methods of Real Analysis*, New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd., Print.

## PGM1503CM ORDINARY DIFFERENTIAL EQUATIONS

(THEORY)

### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- classify the differential equations with respect to their order and linearity
- interpret the theory behind the ordinary differential equations with constant and variable coefficients
- deduce the solution of the homogeneous and non-homogeneous linear differential equations

### COURSE CONTENT:

#### UNIT I: FIRST ORDER LINEAR EQUATIONS WITH CONSTANT COEFFICIENTS

15 hrs.

Differential equations – problems associated with differential equations – linear equations of the first order – equation  $y' + ay = 0$  – equation  $y' + ay = b(x)$  – general linear equation of the first order.

#### UNIT II: SECOND ORDER LINEAR EQUATIONS WITH CONSTANT COEFFICIENTS

15 hrs.

Second order homogeneous equations – initial value problems – linear dependence and independence – a formula for Wronskian – non-homogeneous equation of order two.

#### UNIT III: HIGHER ORDER LINEAR EQUATIONS WITH CONSTANT COEFFICIENTS

15 hrs.

Homogeneous and nonhomogeneous equations of order  $n$  – initial value problems for  $n^{\text{th}}$  order equations – equations with real constants.

#### UNIT IV: LINEAR EQUATION WITH VARIABLE COEFFICIENTS

15 hrs.

Initial value problems for the homogeneous equation – solutions of the homogeneous equation – the Wronskian and linear independence – reduction of the order of a homogeneous equation – non-homogeneous equation – homogeneous equations with analytic coefficients.

#### UNIT V: EXISTENCE AND UNIQUENESS OF SOLUTIONS TO FIRST ORDER EQUATIONS

15 hrs.

Equations with variables separated – exact equations – method of successive approximations – Lipschitz condition.

### TEXT BOOK(S):

Earl A. Coddington, (2003). *An Introduction to Ordinary Differential Equations*, New Delhi: Prentice Hall of India Ltd. Print. (Chapter 1,2(1 – 10), 3(1 – 7), 5 (1 –5)).

### REFERENCE BOOK(S):

Frank Ayres Jr., (2000). *Differential Equations*. Singapore: Schaum outline series McGraw Hill Company. Print.

Garrett Birkoff and Gian – Carlo Rota, (1978). *Ordinary Differential Equation*, (3<sup>rd</sup> ed.), New York: John Wiley. Print.

## PGM1504CM MATHEMATICAL STATISTICS

(THEORY)

### LEARNING OUTCOME

6 hrs./wk.

On successful completion of the course, the student will be able to

- distinguish between marginal joint and conditional probabilities
- construct probability density function of a transformed random variable
- derive the properties of different distributions

**COURSE CONTENT:**

**UNIT I: PROBABILITY AND DISTRIBUTION** 20 hrs.

Probability set function – conditional probability and independence – random variables – discrete random variables – continuous random variables – transformations – expectation of a random variable – some special expectations – important inequalities.

**UNIT II: MULTIVARIATE DISTRIBUTIONS** 20 hrs.

Distributions of two random variables – expectation – Transformations: bivariate random variables – conditional distributions and expectations – correlation coefficient – independent random variables – extension to several random variables – multivariate variance – covariance matrix – transformations for several random variables – Linear combinations of random variables.

**UNIT III: DISTRIBUTIONS** 20 hrs.

Binomial and related distributions – Poisson distribution – gamma, chi -square and beta distributions the normal distribution – the multivariate normal distribution.

**UNIT IV: SPECIAL DISTRIBUTIONS AND ORDER STATISTICS** 15 hrs.

t and F distributions – order statistics.

**UNIT V: CONSISTENCY AND LIMITING DISTRIBUTIONS** 15 hrs.

Convergence in probability – convergence in distribution.

**TEXT BOOK(S):**

Robert V. Hogg, Joseph McKean and Allen T. Craig, (2018). *Introduction to Mathematical Statistics*. (7<sup>th</sup> ed.), New York: Macmillan publishing company. Print. (Chapter 1(10– 72), 2 (75 – 139), 3 (141 – 186, 191–198), 4 (231 –234, 240– 241), 5 (295 – 305)).

**REFERENCE BOOK(S):**

John E. Freund, (1992). *Mathematical Statistics*, (5<sup>th</sup> ed.), New Delhi: Prentice Hall of India Private Limited. Print.

Parimal Mukhopadhyay, (1996). *Mathematical Statistics*, Kolkata: Books and Allied Pvt. Ltd. Print.

Rohatgi V.K., (1976). *An introduction to probability theory and Mathematical statistics*, New Delhi: Wiley Eastern Limited. Print.

**PGM1401CM CLASSICAL MECHANICS**

**(THEORY)**

**LEARNING OUTCOME** 4 hrs./wk.

On successful completion of the course, the student will be able to

- explain the D'Alembert's principle and the concept of dissipation function
- interpret the theory behind Hamilton's principle and Lagrange's equations
- analyze the holonomic and nonholonomic constraints

**COURSE CONTENT:**

**UNIT I: ELEMENTARY PRINCIPLES** 12 hrs.

Mechanics of a particle – Mechanics of a system of particles – constraints – D'Alembert's principle and Lagrange's equations – velocity – dependent potentials and dissipation function

**UNIT II: VARIATIONAL PRINCIPLES AND LAGRANGE'S EQUATIONS** 12 hrs.

Hamilton's principle – some techniques of the calculus of variations – derivation of Lagrange's equations from Hamilton's principle – extension of Hamilton's principle to nonholonomic systems

**UNIT III: ONE-BODY PROBLEM AND CLASSIFICATION OF ORBITS** 12 hrs.

Reduction to the equivalent one-body problem – the equations of motion and first integrals – the equivalent one-dimensional problem and classification of orbits – the virial theorem

**UNIT IV: THE TWO-BODY CENTRAL FORCE PROBLEM** 12 hrs.

The differential equation for the orbit and integrable power-law potentials – conditions for closed orbits (Bertrand's theorem) – the Kepler problem: Inverse square law of force

**UNIT V: THE HAMILTON EQUATIONS OF MOTION** 12 hrs.

Legendre transformations and the Hamilton equations of motion – Cyclic coordinates and conservation theorems.

**TEXT BOOK(S):**

Herbert Goldstein, (2018). *Classical Mechanics*, (2<sup>nd</sup> ed.), New Delhi: Narosa Publishing House, Print. (Chapter: 1(1.1 – 1.5), 2(2.1 - 2.4), 3(3.1-3.7), 8(8.1,8.2))

**REFERENCE BOOK(S):**

Donald T. Greenwood, (2016). *Classical dynamics*, New York: Dover Publications Inc. Print.

Gupta S.L., Kumar V. and Sharma H.V., (1990). *Classical Mechanics*, Meerut: Pragati Prakashan. Print.

John L. Synge, Byron A. Griffith, (1970). *Principles of Mechanics*, (3<sup>rd</sup> ed.), New Delhi: Tata Mc.Graw Hill Book Company inc. Print.

## **PGM2501CM ALGEBRA II**

(THEORY)

**LEARNING OUTCOME** 6 hrs./wk.

On successful completion of the course, the student will be able to

- construct matrix for the linear transformation
- interpret the algebraic structure of extension fields
- relate the existence of algebraic and transcendental numbers

**COURSE CONTENT:**

**UNIT I: EXTENSION FIELDS** 18 hrs.

Extension fields – the transcendence of  $e$  – roots of polynomials

**UNIT II: ROOTS OF POLYNOMIALS** 18 hrs.

Roots of polynomials - more about roots

**UNIT III: GALOIS THEORY** 18 hrs.

The elements of Galois theory.

**UNIT IV: LINEAR TRANSFORMATIONS** 18 hrs.

Canonical forms: Triangular form – nilpotent transformations – Jordan and rational canonical forms

**UNIT V: PROPERTIES OF LINEAR TRANSFORMATIONS** 18 hrs.

Trace and transpose – Hermitian– unitary and normal transformations – real quadratic forms

**TEXT BOOK(S):**

Herstein I.N., (2014). *Topics in Algebra*, (2<sup>nd</sup> ed.), Singapore: John Wiley & Sons. Print. (Chapter: 5 (5.1 – 5.3, 5.5–5.6), 6 (6.4–6.8, 6.10 –6.11)).

**REFERENCE BOOK(S):**

- Jacobson., (1973). *Basic Algebra*, Delhi: Hindustan publishing corporation, Print.
- Kaplansky., (1969). *Fields and Rings*, Chicago: University of Chicago press, Print.
- Serge Lange, (1984). *Algebra*, London: Wesley publishers. Print.
- Vijay K Khanna, Bhambri S.K., (2018). *A course in abstract algebra*, (5<sup>th</sup> ed.), New Delhi: Vikas Publishing House Pvt. Ltd. Print.

**PGM2502CM MEASURE AND INTEGRATION**

**(THEORY)**

**LEARNING OUTCOME**

6 hrs./wk.

On successful completion of the course, the student will be able to

- explain the concepts of measurable functions
- recognize types of measures and their properties
- apply the concept of outer measure in general situations

**COURSE CONTENT:**

**UNIT I: LEBESGUE MEASURE**

18 hrs.

Lebesgue outer measure – the  $\sigma$ -algebra of Lebesgue measurable sets – outer and inner approximation of Lebesgue measurable sets – countable additivity– continuity– the Borel-Cantelli lemma – non-measurable sets – the Cantor set and the Cantor – Lebesgue function

**UNIT II: LEBESGUE MEASURABLE FUNCTIONS**

18 hrs.

Sums, products and compositions – sequential pointwise limits and simple approximation – Littlewood’s three Principles – Egoroff’s theorem – Lusin’s theorem

**UNIT III: LEBESGUE INTEGRATION**

18 hrs.

The Riemann integral – Lebesgue integral of a bounded measurable function over a set of finite measure – the Lebesgue integral of a measurable nonnegative function – the general Lebesgue integral – countable additivity and continuity of integration

**UNIT IV: GENERAL MEASURE SPACES**

18 hrs.

Measures and measurable sets – signed measures: The Hahn and Jordan Decompositions – the Caratheodory measure induced by an outer measure – the construction of outer measures – the Caratheodory-Hahn theorem

**UNIT V: INTEGRATION OVER GENERAL MEASURE SPACES**

18 hrs.

Measurable functions – integration of nonnegative measurable functions – integration of general measurable Functions – the Radon Nikodym theorem

**TEXT BOOK(S):**

- Royden H.L., Fitzpatrick P.M., (2013). *Real Analysis*, (4<sup>th</sup> ed.), Delhi: PHI Learning Pvt. Ltd. Print. (Chapter 2,3,4(4.1 – 4.5),17,18(18.1-18.4))

**REFERENCE BOOK(S):**

- De Barra, (1974). *Measure Theory and Integration*, New Delhi: New Age International limited. Print.
- Halmos, (2000). *Measure Theory*, New Delhi: Narosa Publishing House. Print.

## PGM2503CM TOPOLOGY

(THEORY)

LEARNING OUTCOME

6 hrs./wk.

On successful completion of the course, the student will be able to

- write the interior and closure of a set
- relate the connectedness and compactness of a topological space
- analyze the properties of separation axioms and their relations
- apply topological concepts to solve problems

COURSE CONTENT:

UNIT I: TOPOLOGICAL SPACES AND CONTINUOUS FUNCTIONS

18 hrs.

Topological spaces – basis for a topology– the order topology – the product topology on  $X \times Y$  – the subspace topology – closed sets and limit points – continuous functions – the product topology – the metric topology

UNIT II: CONNECTEDNESS AND COMPACTNESS

18 hrs.

Connected spaces – connected subspaces of the real line – components and local connectedness – compact spaces – compact subspaces of the real line – limit point compactness – local compactness

UNIT III: COUNTABILITY AND SEPARATION AXIOMS

18 hrs.

Countability axioms (definitions only) – separation axioms– normal spaces – Urysohn lemma – Urysohn metrization theorem – Tietze extension theorem

UNIT IV: THE TYCHONOFF THEOREM

18 hrs.

Tychonoff theorem – Stone-Cech compactification

UNIT V: COMPLETE METRIC SPACES AND COMPACTNESS IN METRIC SPACES

18 hrs.

Complete metric spaces – compactness in metric spaces.

TEXT BOOK(S):

James R. Munkres, (2008). *Topology*, (2<sup>nd</sup> ed.), New Delhi: Prentice Hall of India Private Limited. Print. (Chapter 2(12– 21), 3(23 – 29), 4(30(definitions only), 31(only theorems), 32(only theorems), 33 to 35), 5(37,38), 7(43,45))

REFERENCE BOOK(S):

Gupta B.D., (2015). *Topology*, New Delhi: Kedar Nath Ramanath Publishers. Vimal offset Printers. Print.

James Dugundji, (1975). *Topology*, New Delhi: Prentice Hall of India Private Limited. Print.

## PGM2504CM PARTIAL DIFFERENTIAL EQUATIONS

(THEORY)

LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- analyze the structure of partial differential equations
- identify the theory behind the different methods to solve partial differential equations
- apply second order partial differential equations to physical problems

## COURSE CONTENT:

### UNIT I: PARTIAL DIFFERENTIAL EQUATIONS OF THE FIRST ORDER 15 hrs.

Origin of first order partial differential equations – Cauchy’s problem– linear equations – integral surfaces passing through a given curve – surfaces orthogonal to a given system of surfaces – Non-linear partial differential equations

### UNIT II: METHODS OF SOLVING PARTIAL DIFFERENTIAL EQUATIONS OF FIRST ORDER 15 hrs.

Cauchy’s method of characteristics – compatible systems of first order equations – Charpit’s method – special types of first order equations – solutions satisfying given conditions – Jacobi’s method.

### UNIT III: PARTIAL DIFFERENTIAL EQUATIONS OF SECOND ORDER 15 hrs.

Genesis of second order partial differential equation – classification of second order partial differential equation – Laplace’s equation – boundary value problems – maximum and minimum principles – the Cauchy Problem.

### UNIT IV: ONE DIMENSIONAL WAVE EQUATION 15 hrs.

Vibrations of an infinite string – vibration of a semi-infinite string – vibration of a string of finite length Riemann’s Method – Vibrations of a string of finite length (method of separation of variables)

### UNIT V: HEAT CONDUCTION PROBLEM AND DUHAMEL’S PRINCIPLE 15 hrs.

Heat conduction problem – heat conduction infinite rod case – heat conduction finite rod case – Duhamel’s principle: wave equation – heat conduction equation.

## TEXT BOOK(S):

Amaranath T., (2017). *An Elementary Course in Partial Differential Equations*, (2<sup>nd</sup> ed.), New Delhi: Narosa Publishing House. Print. (Chapter 2(2.1–2.3, 2.4 (2.4.1 – 2.4.3), 2.5, 2.6))  
Sneddon Ian., (1988). *Elements of Partial Differential Equations*, (International students edition), Singapore: McGraw Hill Book & Co. Print. (Chapter 2(2.1–2.13)).

## REFERENCE BOOK(S):

Deo S.C. and Raghavendra V. (2002), *Ordinary differential equations and stability theory*, New Delhi; Tata McGraw Hill Publishing Company Limited. Print.  
Dutta B.K., (1993). *An introduction to partial differential equations*, Calcutta: New Central Book Agency (P) Ltd. Print.  
Garrett Birkoff and Gian – Carlo Rota., (1978). *Ordinary differential equations*, (3<sup>rd</sup> ed.), New York: John Wiley and sons. Print.  
Sankara Rao K., (2004). *Introduction to partial differential equations*, New Delhi: Prentice hall of India Private Limited. Print.

**PGM0424E / PGM2401E1 / PGM3401EE ANALYTICAL SKILLS**

**FOR COMPETITIVE EXAMINATIONS**

**(THEORY)**

## LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- acquire speed in solving arithmetical problems
- analyze critically and find the solution of Mathematical puzzles
- write competitive examinations with confidence

**COURSE CONTENT:**

<b>UNIT I: ARITHMETICAL ABILITY</b>	12 hrs.
Averages–percentages–ratio and proportions–time and work–time and distance.	
<b>UNIT II: BUSINESS MATHEMATICS</b>	12 hrs.
Simple interest–compound interest –stocks and shares –profit and loss.	
<b>UNIT III: MENSURATION</b>	12 hrs.
Area – volume and surface areas.	
<b>UNIT IV: DATA INTERPRETATION</b>	12 hrs.
Bar graphs – pie charts – line graphs.	
<b>UNIT V: VERBAL AND NON VERBAL REASONING</b>	12 hrs.
Logical reasoning – Mathematical puzzles.	

**TEXTBOOK(S):**

Aggarwal R.S., (2014). *Quantitative Aptitude*, S. Chand & Company Pvt. Ltd. Print. (Chapter 6,10,11,12,15,17,21,22,24,25,29,35,37,38,39).

Aggarwal R.S., (2015). *Modern approach to verbal and nonverbal reasoning*, New Delhi: S. Chand & company Pvt. Ltd. Print. (Part I – Section I: 5, 6, 8, Part II – 1, 5, 6).

**REFERENCE BOOK(S):**

Alok Kumar, (2008). *CSIR/UGC NET/JRF/SET Mathematics Sciences*, New Delhi: Upkar Prakashan. Print.

Edgar Thrope, (1989). *A course in mental ability and quantitative aptitude for competitive examinations*, New Delhi: Tata McGraw Hill Publishing Company Limited. Print.

**PGM2402EI DISCRETE MATHEMATICS**

**(THEORY)**

**LEARNING OUTCOME** 4 hrs./wk.

On successful completion of the course, the student will be able to

- construct truth tables for compound statements
- deduce adjacency matrix for a given graph
- acquire solutions to problems in propositional calculus

**COURSE CONTENT:**

<b>UNIT I: MATHEMATICAL LOGIC</b>	12 hrs.
Statements and notations – connectives – well formed formulas – tautologies – equivalence of formulas – duality law – tautological implications – other connectives.	
<b>UNIT II: NORMAL FORMS</b>	12 hrs.
Disjunctive normal forms – conjunctive normal forms – principal disjunctive normal forms – principal conjunctive normal forms.	
<b>UNIT III: THEORY OF INFERENCE FOR THE STATEMENT CALCULUS</b>	12 hrs.
Validity using truth tables – rules of inference – consistency of premises and indirect method of proof.	
<b>UNIT IV: INTRODUCTION TO GRAPHS</b>	12 hrs.
Basic concepts – isomorphism and subgraphs.	
<b>UNIT V: TREES</b>	12 hrs.
Definition – properties of trees.	

#### TEXT BOOK(S):

Mott J.L., Kandel A. and Baker. T. P., (2009). *Discrete maths for computer scientists & mathematicians*, (2<sup>nd</sup>ed.), New Delhi: Prentice Hall of India Pvt. Limited. Print. (Chapter 5: section 5.1 to 5.3).

Tremblay J.P. and Manohar R., (2005). *Discrete mathematical structures with applications to computer science*, (2<sup>nd</sup> ed.), New Delhi: Tata McGraw Hill publishing company limited. Print. (Chapter 1:1.1,1.2. (1.2.1 to 1.2.4 ,1.2.6 -1.2.11,1.2.14), 1.3 (1.3.1 to 1.3.4), 1.4 (1.4.1to1.4.3)).

#### REFERENCE BOOK(S):

Arumugam. S and Ramachandran S., (2010). *Invitation to graph theory*, Chennai: Scitech publications private Limited. Print.

Chowdhary K.R., (2012). *Fundamentals of discrete mathematical structures*, (2<sup>nd</sup> ed.), New Delhi: PHI Learning Private Limited. Print.

Seymour Lipschutz and Mark Lipson, (2010). *Discrete mathematics*, (3<sup>rd</sup> ed.), New Delhi: Tata McGraw Hill publishing Co. Ltd. Print.

Venkataraman M.K., Sridharan N. and Chandrasekaran N., (2001). *Discrete mathematics*, Chennai: The National publishing company. Print.

### PGM0401CD SPECIAL FUNCTIONS

#### (THEORY)

#### LEARNING OUTCOME

On successful completion of the course the student will be able to

- identify the different properties of generating functions
- deduce the recurrence relations from the solutions
- derive the generating functions for the differential equations

#### COURSE CONTENT:

##### UNIT I: FROBENIOUS METHOD, LEGENDER EQUATIONS

Methods of integration in series – Frobenious method– Some simple problems – Legendre's differential equation – solutions  $P_n(x)$  and  $Q_n(x)$  – generating functions– orthogonal properties– recurrence formulae – Rodrigue's formula and Christoffel's expansion.

##### UNIT II: BESSEL'S EQUATIONS

Bessel's differential equation –  $J_n(x)$  – generating function – recurrence formulae – orthogonal properties.

##### UNIT III: HYPERGEOMETRIC FUNCTIONS

Hypergeometric differential equation – properties – Kummer's theorem– Gauss theorem – differentiation of hypergeometric functions.

##### UNIT IV: HERMITE POLYNOMIALS

Hermite differential equation – Hermite polynomials – generating functions – recurrence formulae – orthogonal properties.

##### UNIT V: CHEBYSHEV POLYNOMIALS

Chebyshev differential equation – Chebyshev polynomials –  $T_n(x)$  and  $U_n(x)$  – generating function – orthogonal properties – recurrence formulae.

#### TEXT BOOK(S):

Gupta B.D., (2004). *Mathematical Physics*, (3<sup>rd</sup> ed.), New Delhi: Vikas publishing house private limited. Print. (Chapter 8 (8.1 – 8.60), (8.73 – 8.87))

Sharma J.N. and Gupta R.K., (2000). *Special functions*, Meerut: Krishna Prakashan media (P) Ltd. Meerut. (Chapter 6, 8)

#### REFERENCE BOOK(S):

Gupta P.P., Malik G.S. and Mittal S.K., (2001). *Differential equations with partial differential equations and special functions*, (7<sup>th</sup> ed. revised), Meerut: Pragati Prakashan publication. Print.

Sneddon I.N., (1980). *Special functions of mathematical physics and chemistry*, (3<sup>rd</sup> ed.), London: Longman group limited. Print.

### PGM0402CD ADVANCED TOPICS IN GRAPH THEORY

#### (THEORY)

#### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- relate graph theory with other fields
- construct communication networks for different problems
- derive the solution for a given problem using algorithm

#### COURSE CONTENT:

##### UNIT I: GRAPH RELATED VECTOR SPACES

Cut sets and cuts – vector spaces related to graphs – rank and nullity – fundamental cycles and cut sets – dimensions – orthogonality.

##### UNIT II: LABELINGS

Predecessor and successor – algorithm – graceful labelling – sequential functions – applications – magic graphs – conservative graphs.

##### UNIT III: DOMINATION

Domination sets – independent sets – irredundant sets – bounds – upper bounds – lower bounds – independent domination number – total domination number – connected domination number – global domination number.

##### UNIT IV: APPLICATIONS

Construction of reliable communication networks – the Chinese postman problem – the traveling salesman problem – the timetabling problem.

#### TEXT BOOK(S):

Bondy J.A. and Murty U.S.R., (1976). *Graph theory with applications*, London: The Macmillan press Ltd., Print. (Chapter: 3.3, 4.3, 4.4, 6.3)

Kulli V.R., (2010). *Theory of domination in graphs*, Mysore: Vishwa international publications, Print. (Chapter: 2 (2.1 – 2.4), 3 (3.1 – 3.4, 3.9))

Murugan M., (2003). *Topics in graph theory and algorithms*, Chennai: Muthali publishing house, Print. (Chapter: 9,10).

#### REFERENCE BOOK(S):

Teresa W. Haynes, Stephen Hedetniemi and Peter Slater, (1998). *Fundamentals of domination in graphs*, New York: Marcel Dekker, Inc., Print.

## DEPARTMENT OF PHYSICS

### PREAMBLE

The present curriculum of B.Sc. (Spl.) Physics (Aided), B.Sc. Physics with Computer Applications (SF) and M.Sc. Physics (SF) were reviewed and based on which it is found necessary to introduce a few changes in the following courses:

#### Undergraduate:

##### Core Courses

- PHY1302FM Foundation Physics is changed to PHY1303FM Foundation Physics
- PHQ5501CM Molecular Spectroscopy is changed to PHYQ5401CM Molecular Spectroscopy

##### Support Course

- PHY3402AA Basic Physics is changed to PHY3403AA Basic Physics

##### Interdisciplinary Course

- CHPH5402DM Fundamentals of Energy Conversion and Storage is changed to CHPH5403DM Fundamentals of Energy Conversion and Storage

##### Self-Learning Courses

- PHY0421E Essence of Musical Sounds is changed to PHY0405CD Essence of Musical Sounds
- PHY0422E Electric Circuits is changed to PHY0406CD Electric Circuits

Besides this, the department introduces the following courses

##### Core Courses

- PHY3404CT Introduction to Python Programming for Aided and SF streams
- PHE4501CT Introduction to Web Programming
- PHYQ5401CT Physics of Remote Sensing

##### Interdisciplinary Courses

- MAPH6401DT Differential Equations for Computational Physics is introduced to the Aided students of B.Sc. Mathematics and B.Sc. Physics

##### Vocational Course

- PHY3201VS Maintenance of Home Appliances

#### Post Graduate:

##### Core Courses

- PGP3622M Solid State Physics is changed to PGP3524M Solid State Physics
- PGP4621M Atomic and Molecular Spectroscopy is changed to PGP4622M Atomic and Molecular Spectroscopy

##### Self-Learning Course

- PGP0426D Computational Quantum Mechanics is changed to PGP0427D Quantum Mechanics in Molecular Modeling

The course profile along with the syllabi of the modified and new courses are presented.

**COURSE PROFILE**  
**B.Sc. (Special) Physics**

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PART I	TAMIL / HINDI / FRENCH	TH	6		3 or 4		ALLM	TAM/ HIN/ FRE
	PART II	ENGLISH	TH	6		3 or 4		ALLM	ENG
	PHY1303FM	FOUNDATION PHYSICS	TH	4		3		AUPHY	PHY
	PHY1501CM	MECHANICS	TH	5		5	AZ2017	AUPHY	PHY
		ALLIED COURSE	TH	5		4		AUPHY	CHE
	PHY1202FS	COMMUNICATION SKILLS FOR PHYSICISTS	TH	2		2	AZ2017	AUPHY	PHY
	VBC1101FV	HEALTHY TRANSITION FROM ADOLESCENCE TO ADULTHOOD	TH	2		1	BA2018	ALLM	VE
	UIV1101FI	BIBLICAL ESSENTIALS FOR EMERGING ADULTS						AUCH/ SUCH	
	<b>TOTAL</b>				<b>30</b>		<b>21 / 23</b>		
II	PART I	TAMIL / HINDI / FRENCH	TH	6		3 or 4		ALLM	TAM/ HIN/ FRE
	PART II	ENGLISH	TH	6		3 or 4		ALLM	ENG
	PHY2203CP**	GENERAL LAB I	LA		3	2		AUPHY	PHY
	PHY2502CM	ELECTRONICS I	TH	5		5	AV2014	AUPHY	PHY
		ALLIED COURSE	TH	5		4		AUPHY	MAT
	PHY2202FS	DATA ANALYSIS AND REPORTING SKILLS	TH	2		2	BA2018	AUPHY	PHY
	PHY2201NI	ENVIRONMENTAL PHYSICS	TH	2		2	AV2014		PHY
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV2101FI	BIBLICAL FOUNDATION FOR FAMILY LIFE					BA2018	AUCH/ SUCH	
	<b>TOTAL</b>				<b>30</b>		<b>22 / 24</b>		

\*\* Experiments have been reorganized in lab courses offered from semesters II to VI

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PHY3201CP	LAB PHYSICS II	LA		3	2	AV2014	AUPHY	PHY
	PHY3203CP	LAB PHYSICS III	LA		3	2	BA2018	AUPHY	PHY
	PHY3403CM	ELECTRICITY AND MAGNETISM	TH	5		4	BA2018	AUPHY	PHY
	PHY3404CT	INTRODUCTION TO PYTHON PROGRAMMING	LT	4	1	4		AUPHY	PHY
	PHY3501CM	WAVE OPTICS	TH	5		5	BA2018	AUPHY	PHY
		ALLIED COURSE	TH	5		4		AUPHY	MAT
		NON-MAJOR ELECTIVE	TH	2		2			
		VOCATIONAL COURSE				2			
		LIBRARY		1					
	VBC0102FV / VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH / SUCH	
TOTAL				30		26			
IV	PHY4504CM*	ELECTRONICS – II	TH	5		5		AUPHY	PHY
	PHY4502CM	MATHEMATICAL PHYSICS	TH	5		5	AZ2017	AUPHY	PHY
	PHY4503CM	ATOMIC, QUANTUM AND NUCLEAR PHYSICS	TH	5		5		AUPHY	PHY
	PHYQ4501CM / PHYQ4503CM	NON-CONVENTIONAL ENERGY SOURCES / BASICS IN ASTRO PHYSICS	TH	5		5	BA2018/ AZ2017	AUPHY	PHY
	PHY4204CP#	LAB PHYSICS IV	LA		3	2		AUPHY	PHY
		NON-MAJOR ELECTIVE	TH	2		2			
	PHY4202SP	CONCEPTUAL PHYSICS THROUGH FOSS	LA		2	2	AW2015	AUPHY	PHY
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH/ SUCH	
		LIBRARY		1					
	TOTAL				30		28		

\* Content remains the same, hours have been changed

# Experiments have been reorganized in lab courses offered from semesters IV to VI

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	PHY5501CM	DIGITAL ELECTRONICS	TH	5		5	AW2015	AUPHY	PHY
	PHY5502CM	INTRODUCTION TO MICROCONTROLLERS	TH	5		5	BA2018	AUPHY	PHY
	PHY5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	AUPHY	PHY
	PHYQ5401CM / PHYQ5401CT	MOLECULAR SPECTROSCOPY / PHYSICS OF REMOTE SENSING	TH / LT	5 / 3	2	4		AUPHY	PHY
	PHY5201CP	LAB PHYSICS VI	LA		3	2		AUPHY	PHY
	PHY0602LM	ELECTRICAL ENERGY AUDIT		4			BA2018	AUPHY	PHY
	INTER DISCIPLINARY COURSE		TH	4		4			
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
TOTAL				30		24			
VI	PHY6501CM	THERMODYNAMICS, STATISTICAL MECHANICS AND RELATIVITY	TH	6		5	AW2015	AUPHY	PHY
	PHY6502CM	ELECTROMAGNETISM	TH	5		5	AW2015	AUPHY	PHY
	PHY6503CM	SOLID STATE PHYSICS	TH	5		5	AW2015	AUPHY	PHY
	PHY6504CM	NUCLEAR PHYSICS	TH	5		5	BA2018	AUPHY	PHY
	INTER DISCIPLINARY COURSE		TH	4		4			
	PHY0602LM	ELECTRICAL ENERGY AUDIT	PR	4		6		AUPHY	PHY
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH / SUCH	
TOTAL				30		31			

From 2017 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	PHY5501CM	DIGITAL ELECTRONICS	TH	5		5	AW2015	AUPHY	PHY
	PHY5502CM	INTRODUCTION TO MICROCONTROLLERS	TH	5		5	BA2018	AUPHY	PHY
	PHY5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	AUPHY	PHY
	PHYQ5401CM / PHYQ5401CT	MOLECULAR SPECTROSCOPY / PHYSICS OF REMOTE SENSING	TH / LT	5 / 3	2	4		AUPHY	PHY
	PHY5201CP	LAB PHYSICS VI	LA		3	2		AUPHY	PHY
	PHY0602LM	ELECTRICAL ENERGY AUDIT		4			BA2018	AUPHY	PHY
	INTER DISCIPLINARY COURSE		TH	4		4			
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
TOTAL				30		24			
VI	PHY6501CM	THERMODYNAMICS, STATISTICAL MECHANICS AND RELATIVITY	TH	6		5	AW2015	AUPHY	PHY
	PHY6502CM	ELECTROMAGNETISM	TH	5		5	AW2015	AUPHY	PHY
	PHY6503CM	SOLID STATE PHYSICS	TH	5		5	AW2015	AUPHY	PHY
	PHY6504CM	NUCLEAR PHYSICS	TH	5		5	BA2018	AUPHY	PHY
	INTER DISCIPLINARY COURSE		TH	4		4			
	PHY0602LM	ELECTRICAL ENERGY AUDIT		5		6	BA2018	AUPHY	PHY
	TOTAL				30		30		

Extra Credit Courses – Refer Pg. No. 292

## B.Sc. (Special) PHYSICS WITH COMPUTER APPLICATIONS

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PART I	TAMIL / HINDI / FRENCH	TH	6		3 or 4		ALLM	TAM/ HIN/ FRE
	PART II	ENGLISH	TH	6		3 or 4		ALLM	ENG
	PHY1303FM	FOUNDATION PHYSICS	TH	4		3		SUPHY	PHY
	PHY1501CM	MECHANICS	TH	5		5	AZ2017	SUPHY	PHY
	PHE1401AT	PROGRAMMING IN C	LT	3	2	4	BA2018		
	PHY1202FS	COMMUNICATION SKILLS FOR PHYSICISTS	TH	2		2	AZ2017	SUPHY	PHY
	VBC1101FV	HEALTHY TRANSITION FROM ADOLESCENCE TO ADULTHOOD	TH	2		1	BA2018	ALLM	Centre for VE
	UIV1101FI	BIBLICAL ESSENTIALS FOR EMERGING ADULTS						AUCH/ SUCH	
	<b>TOTAL</b>				<b>30</b>		<b>21 / 23</b>		
II	PART I	TAMIL / HINDI / FRENCH	TH	6		3 or 4		ALLM	TAM/ HIN/ FRE
	PART II	ENGLISH	TH	6		3 or 4		ALLM	ENG
	PHY2203CP**	GENERAL LAB I	LA		3	2		SUPHY	PHY
	PHY2502CM	ELECTRONICS I	TH	5		5	AV2014	SUPHY	PHY
		ALLIED COURSE	TH	5		4		SUPHY	MAT
	PHY2202FS	DATA ANALYSIS AND REPORTING SKILLS	TH	2		2	BA2018	SUPHY	PHY
	PHY2201NI	ENVIRONMENTAL PHYSICS	TH	2		2	AV2014		PHY
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV2101FI	BIBLICAL FOUNDATION FOR FAMILY LIFE					BA2018	AUCH/ SUCH	
	<b>TOTAL</b>				<b>30</b>		<b>22 / 24</b>		

\*\* Experiments have been reorganized in lab courses offered from semesters II to VI

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PHY3201CP	LAB PHYSICS II	LA		3	2	AV2014	SUPHY	PHY
	PHY3203CP	LAB PHYSICS III	LA		3	2	BA2018	SUPHY	PHY
	PHY3403CM	ELECTRICITY AND MAGNETISM	TH	5		4	BA2018	SUPHY	PHY
	PHY3404CT	INTRODUCTION TO PYTHON PROGRAMMING	LT	4	1	4		SUPHY	PHY
	PHY3501CM	WAVE OPTICS	TH	5		5	BA2018	SUPHY	PHY
		ALLIED COURSE	TH	5		4			
		NON-MAJOR ELECTIVE	TH	2		2			
		VOCATIONAL COURSE				2			
		LIBRARY		1					
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH/ SUCH	
	TOTAL				30		26		
IV	PHY4504CM*	ELECTRONICS – II	TH	5		5		SUPHY	PHY
	PHY4502CM	MATHEMATICAL PHYSICS	TH	5		5	AZ2017	SUPHY	PHY
	PHY4503CM	ATOMIC, QUANTUM AND NUCLEAR PHYSICS	TH	5		5		SUPHY	PHY
	PHE4501CT	INTRODUCTION TO WEB PROGRAMMING	LT	4	2	5		SUPHY	PHY
	PHY4204CP#	LAB PHYSICS IV	LA		3	2		SUPHY	PHY
		NON-MAJOR ELECTIVE	TH	2		2			
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH/ SUCH	

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	PHY4202SP	CONCEPTUAL PHYSICS THROUGH FOSS	LA		2	2	AW2015	SUPHY	PHY
		TOTAL		30		28			

\* Content remains the same, hours have been changed

# Experiments have been reorganized in lab courses offered from semesters IV to VI

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by	
				TH	LA					
V	PHY5501CM	DIGITAL ELECTRONICS	TH	5		5	AW2015	SUPHY	PHY	
	PHY5502CM	INTRODUCTION TO MICROCONTROLLERS	TH	5		5	BA2018	SUPHY	PHY	
	PHY5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	SUPHY	PHY	
	PHE5501CM	DATA COMMUNICATION AND NETWORKING	TH	5		5	AW2015	SUPHY	PHY	
	PHY5201CP	LAB PHYSICS VI	LA		3	2	AW2015	SUPHY	PHY	
	PHY0602LM	ELECTRICAL ENERGY AUDIT		4			BA2018	SUPHY	PHY	
	INTERDISCIPLINARY COURSE				4		4			
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE	
TOTAL				30		25				
VI	PHY6501CM	THERMODYNAMICS, STATISTICAL MECHANICS AND RELATIVITY	TH	6		5	AW2015	SUPHY	PHY	
	PHY6502CM	ELECTROMAGNETISM	TH	5		5	AW2015	SUPHY	PHY	
	PHE6401CT	LINUX ADMINISTRATION	LT	3	2	4	AW2015	SUPHY	PHY	
	PHE6501CM	ATOMIC, QUANTUM AND NUCLEAR	TH	5		5	AW2015	SUPHY	PHY	

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
VI		PHYSICS							
	INTERDISIPLINARY COURSE			4		4			
	PHY0602LM	ELECTRICAL ENERGY AUDIT	PR	4		6		SUPHY	PHY
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1	1			ALLM	Centre for VE
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH / SUCH	
	TOTAL			30		30			

From 2017 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	PHY5501CM	DIGITAL ELECTRONICS	TH	5		5	AW2015	SUPHY	PHY
	PHY5502CM	INTRODUCTION TO MICROCONTROLLERS	TH	5		5	BA2018	SUPHY	PHY
	PHY5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	SUPHY	PHY
	PHE5501CM	DATA COMMUNICATION AND NETWORKING	TH	5		5	AW2015	SUPHY	PHY
	PHY5201CP	LAB PHYSICS VI	LA		3	2	AW2015	SUPHY	PHY
	PHY0602LM	ELECTRICAL ENERGY AUDIT		4			BA2018	SUPHY	PHY
	INTERDISIPLINARY COURSE			4		4			
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES/ FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	TOTAL			30		25			
VI	PHY6501CM	THERMODYNAMICS, STATISTICAL MECHANICS AND RELATIVITY	TH	6		5	AW2015	SUPHY	PHY
	PHY6502CM	ELECTROMAGNETISM	TH	5		5	AW2015	SUPHY	PHY

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
VI	PHE6401CT	LINUX ADMINISTRATION	LT	3	2	4	AW2015	SUPHY	PHY
	PHE6501CM	ATOMIC, QUANTUM AND NUCLEAR PHYSICS	TH	5		5	AW2015	SUPHY	PHY
	INTERDISIPLINARY COURSE				4		4		
	PHY0602LM	ELECTRICAL ENERGY AUDIT		5		6	BA2018	SUPHY	PHY
	TOTAL				30		29		

Extra Credit Courses – Ref. Pg. No. 292

### COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

#### ALLIED COURSE

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic	Offered to	Offered by
				TH	LA				
III	PHY3403AA	BASIC PHYSICS	TH	5		4		AUCHE	PHY

#### NON-MAJOR ELECTIVE COURSES

Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
			TH	LA				
PHTA3201EI	TAMIL LITERATURE AND PHYSICS	TH	2		2	AV2014	AUALLM	PHY & TAM
HIPH3201EI	SCIENTIFIC PRINCIPLES IN HISTORICAL MONUMENTS	TH	2		2	AZ2017	AUALLM	PHY & HIS
CBPH3201EI	CONSUMER AWARENESS ON EVERYDAY APPLIANCES	TH	2		2	AZ2017	AUALLM	PHY & COM
ENPH3202EI	READING SCIENCE FICTION FILMS	TH	2		2	AZ2017	AUALLM	PHY & ENG
ENPH4201EI*	READING SCIENCE FICTION FILMS	TH	2		2		AUALLM	PHY & ENG
PEPH4201EI	SCIENCE OF SPORTS	TH	2		2	AV2014	AUALLM	PHY & PED
CSPH4201EP	INTRODUCTION TO SATELLITE IMAGE PROCESSING AND GIS	TH	2		2	AY2016	AUALLM	PHY & CSC
COPH4201EI*	CONSUMER AWARENESS ON EVERYDAY APPLIANCES	TH	2		2		AUALLM	PHY & COM

\* Content remains the same, but the semester has been changed

### INTERDISCIPLINARY COURSES

Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
			TH	LA				
MAPH5401DM	FOURIER TRANSFORM AND ITS APPLICATIONS	TH	4		4	AW2015	AUPHY & AUMAT	PHY & MAT
CHPH5403DM	FUNDAMENTALS OF ENERGY CONVERSION AND STORAGE	TH	4		4		AUPHY & AUCHE	PHY & CHE
CSPH5401DT	DIGITAL IMAGE PROCESSING	LT	3	1	4	AW2015	SUPHY & SUCSC	PHY & CSC
CSPH5402DT	GEOINFORMATICS	LT	3	1	4	AZ2017	SUPHY & SUCSC	PHY & CSC
MAPH5402DM	INTRODUCTION TO ASTROPHYSICS	TH	4		4	AZ2017	SUPHY & SUMAT	PHY & MAT
CHPH6401DM	ORGANIC ELECTRONICS	TH	4		4	AW2015	AUPHY & AUCHE	PHY & CHE
PHZO6401DM	BIO MEDICAL INSTRUMENTATION	TH	4		4	BA2018	AUPHY & AUZOO	PHY & ZOO
BSPS6401DM	APPLICATIONS OF NANOMATERIALS	TH	4		4	AW2015	AUALLS (EXCEPT MATHS)	CHE
BTPH6402DM	BIOMEDICAL INSTRUMENTATION		4		4	BA2018	SUPHY & SUBTE	PHY & BTE
CSPH6401DT	THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEM	LT	3	1	4	AW2015	SUPHY, SUCSC & SUITM	PHY & CSC
MAPH6401DT	DIFFERENTIAL EQUATIONS FOR COMPUTATIONAL PHYSICS	LT	3	1	4		AUPHY & AUMAT	PHY & MAT

### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II / III /	PHY0403CD	PROBLEMS IN PHYSICS I	TH	4	AV2014	ALLM	PHY
	PHY0401CD	TOPICS IN PHYSICS – I	TH	4	AU2013	ALLM	PHY
	PHY0402CD	PHYSICS IN EVERYDAY LIFE	TH	4	AW2015	ALLM	PHY

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
IV / V / VI	PHY0404CD	PROBLEMS IN PHYSICS II	TH	4	AV2014	ALLM	PHY
	PHY0405CD	ESSENCE OF MUSICAL SOUNDS	TH	4		ALLM	PHY
	PHY0406CD	ELECTRIC CIRCUITS	TH	4		ALLM	PHY

### PHY1303FM FOUNDATION PHYSICS (THEORY)

#### LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- recall the concepts of vectors in one-dimensional motion
- apply the principles of reflection and refraction to explore image formation
- interpret the basic principles of classical thermodynamics and analysis of electric circuits

#### COURSE CONTENT:

##### UNIT I: KINEMATICS

12 hrs.

Nature of Physics – solving physics problems – vectors and vector addition – components of vectors – displacement, time, and average velocity – instantaneous velocity – average and instantaneous acceleration – freely falling bodies

##### UNIT II: MECHANICAL WAVES

12 hrs.

Types of mechanical waves – periodic waves – mathematical description of a wave: wave function for a sinusoidal wave – graphing the wave function – speed of a transverse wave using Newton's second law of motion – wave interference, boundary conditions and superposition – standing waves on a string – normal modes of a string.

##### UNIT III: GEOMETRIC OPTICS

12 hrs.

Reflection and refraction at a plane surface, reflection at a spherical surface: Image formation of a point object by a spherical mirror – focal point and focal length – convex mirrors – refraction at a spherical surface, thin lenses – properties of a lens – image of an extended object: converging lenses – diverging lenses – lens maker's equation – graphical methods for lenses

##### UNIT IV: THERMAL PHYSICS

12 hrs.

Temperature and thermal equilibrium – thermometers and temperature scales – gas thermometers and Kelvin scale – thermal expansion – quantity of heat – thermodynamic systems – work done during volume changes – paths between thermodynamic states – internal energy and first law of thermodynamics.

##### UNIT V: ELECTRIC CIRCUITS

12 hrs.

Resistors in series and in parallel – Kirchhoff's rules – electrical measuring instruments – RC circuits – mutual inductance – self-inductance and inductors – magnetic field energy – RL circuit – LC circuit – LRC series circuit.

#### TEXT BOOK(S):

Hugh D. Young, Roger A. Freedman and A. Lewis Ford, (2017). *Sears & Zemansky's University Physics with Modern Physics*, (13<sup>th</sup> ed.), New Delhi: Pearson. Print.

1.1,1.2,1.7,1.8,2.1-2.3,2.5,15.1-15.4,15.6-15.8,17.1-17.5, 19.1-19.4,26.1-26.4,30, 34.1-34.4.

## REFERENCE BOOK(S):

Harris Benson, (2008). *University Physics*, New Delhi: Wiley India (P) Ltd. Print.

Jerold Touger, (2006). *Introductory Physics - Building Understanding*, New Delhi: Wiley India (P) Ltd. Print.

Paul G. Hewitt, (2015). *Conceptual Physics*, (12<sup>th</sup> ed.), England: Pearson Education Limited.

Resnick, Halliday and Krane, (2010). *Physics*, (5<sup>th</sup> ed.), New Delhi: John Wiley & Sons. Print.

Raymond A. Serway and Chris, (2010). *College Physics*, (9<sup>th</sup> ed.), USA: Charles Hartford.

## WEBSITE(S):

Optics - <http://www.upscale.utoronto.ca/GeneralInterest/Harrison/Flash/#optics>

Heat and Thermodynamics - <http://hyperphysics.phy-astr.gsu.edu/hbase/heacon.html>

## PHY3404CT INTRODUCTION TO PYTHON PROGRAMMING

### (LAB CUM THEORY)

## LEARNING OUTCOME

4+1 hrs./wk.

On successful completion of the course, the student will be able to

- acquire the skill of working with Python
- apply programming concepts to solve physics problems
- appraise the salient features of Python in physics simulations

## COURSE CONTENT:

### UNIT I: VARIABLES AND EXPRESSIONS

12T + 3L hrs.

Introduction to Python programming language – integer values – variables and assignment – identifiers – floating – point types – control codes within strings – user input – eval function – controlling the print function – expressions – operator precedence and associativity – comments – errors – arithmetic examples – arithmetic operators.

Lab: Newtons' Law and its applications.

### UNIT II: CONTROL STATEMENTS AND LOOPS

12T + 3L hrs.

Boolean Expressions – simple if statement – if/else statement – compound Boolean expressions- nested conditionals – multi – way decision statements – conditional expressions – errors in conditional statements – while statement – definite loop vs. indefinite loops – for statement – nested loops – abnormal loop termination – infinite loops – iteration examples.

Lab: Collisions, Impulse and Momentum and System of particles

### UNIT III: FUNCTIONS

12T + 3L hrs.

Function basics – user defined functions – main function – parameter passing – function examples – custom function versus standard function – global variables – default parameters – recursion – making functions reusable.

Lab: Rotational Kinematics and Projectile motion

### UNIT IV: LISTS AND OBJECTS

12T + 3L hrs.

Using List – list assignment and equivalence – list bounds– slicing-lists and functions – sorting a list search – using objects – string objects – list objects.

Lab: Refraction and reflection of light, Series and Parallel circuit analysis, Matrix operations

## UNIT V: PLOTTING

12T + 3L hrs.

Introduction – matplotlib – pylab versus pyplot – basic 2d plot – plotting more than one graph on same axes – various features of a plot – histograms – bar charts – error bar charts – scatter plot – pie chart – polar plots – subplots – surface plots

Lab: 2D plot of Sound Beats, Electric potential, Mechanical waves and oscillations, I-V characteristics of a diode.

### REFERENCE BOOK(S):

Bill Lubanovic, (2018), *Introducing Python*, Mumbai: Shroff Publishers and Distributors Pvt. Ltd. Print.  
John Paul Mueller, (2015), *Beginning Programming with Python for Dummies*, New Delhi: Wiley India Pvt. Ltd. Print.

Mark Lutz, (2011). *Learning Python*, (4<sup>th</sup> ed.), Mumbai: Shroff Publishers and Distributors Pvt. Ltd. Print.

Mike McGrath, (2013), *Python in easy steps*, Chennai: McGraw Hill Education (India) Pvt. Ltd. Print.

Radha Ganesan P., (2017), *Problem Solving and Python Programming*, Chennai, Chess Educational Publishers. Print.

Richard L. Halterman (2011), *Learning to program with Python*. Goodreads.

Sandeep Nagar, (2016), *Introduction to Python: For Scientists and Engineers*. Goodreads.

### WEBSITE(S):

[https://spoken-tutorial.org/tutorial-search/?search\\_foss=Python+3.4.3&search\\_language=English](https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English)

<https://www.w3schools.com/python/>

<https://www.tutorialspoint.com/python/>

<https://nptel.ac.in/courses/117106113/34>

<https://www.geeksforgeeks.org/python-programming-language/>

## PHY4503CM ATOMIC, QUANTUM AND NUCLEAR PHYSICS

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- relate the wave and particle nature of matter and light
- explain the development of the structure of atoms from a semi classical physics
- employ the concepts of nuclear energy for constructive applications

#### COURSE CONTENT:

##### UNIT I: THE NATURE OF LIGHT AND MATTER

15 hrs.

Introducing the photon – photoelectric effect – Compton effect – matter waves – testing de Broglie's hypothesis – waves and particles – Heisenberg's uncertainty principle

##### UNIT II: THE SCHRÖDINGER'S EQUATION

15 hrs.

Wave function – Schrödinger's equation – barrier tunneling – electrons, free and bound – an electron trapped in a potential well – an electron trapped in a finite well – an electron trapped in an atom – ground state of the hydrogen atom – angular momentum of electrons in atoms – an excited state of hydrogen atom – counting the states of hydrogen

- UNIT III: ATOMIC STRUCTURE** 15 hrs.  
 X-ray spectrum of atoms – X-rays and the numbering of the elements – building atoms – periodic table – atomic magnetism – Stern-Gerlach experiment – nuclear magnetic resonance
- UNIT IV: NUCLEAR PHYSICS AND ENERGY FROM NUCLEUS** 15 hrs.  
 Discovering the nucleus – some nuclear properties – radioactive decay – alpha decay – beta decay – measuring ionizing radiation – natural radioactivity – nuclear reactions – nuclear models – atom and the nucleus – nuclear fission: the basic process – theory of nuclear fission.
- UNIT V: NUCLEAR REACTORS AND PARTICLE PHYSICS** 15 hrs.  
 Nuclear reactors: the basic principles – natural reactor – thermonuclear fusion: the basic process – particle interactions – families of particles – conservation laws

**TEXT BOOK(S):**

Halliday, Resnick and Krane, (2005). *Physics*, (5<sup>th</sup> ed.), New York: John Wiley & sons, Print.  
 Chapters: 45.1,45.3,45.4, Ch.46, Ch.47, Ch. 48.1 – 48.7, Ch. 50, Ch. 51.1-51.6, Ch. 52.1 – 52.3.

**REFERENCE BOOK(S):**

Kenneth Krane, (1998). *Modern Physics*, (2<sup>nd</sup> ed.), New York: John Wiley & Sons, Print.  
 Richerd P. Feynmann, Robert B. Lighton and Matthew Sands, (1986). *Lectures on Physics*, 3, New Delhi: Narosa Publishing House, Print.

**PHE4501CT INTRODUCTION TO WEB PROGRAMMING**

**(LAB CUM THEORY)**

**LEARNING OUTCOME** 4T+2L hrs./wk.

On successful completion of the course, the student will be able to

- interpret PHP programming structure and develop a simple PHP web page
- create, backup and restore a MySQL database
- employ server-side scripting

**COURSE CONTENT:**

- UNIT I: BASIC ELEMENTS OF PHP** 12T + 6L hrs.  
 Accessing PHP – creating a sample application – embedding PHP in HTML – identifiers, variables, operators – control structures and iteration – alternative control structures syntax – using declare – using arrays – numerically indexed arrays – array indices and operators – multidimensional arrays.
- UNIT II: STRINGS AND FUNCTIONS** 12T + 6 L hrs.  
 Formatting strings – manipulating strings using string functions – using require and include functions – defining own functions – passing reference and values – return keyword – recursion.
- UNIT III: INTRODUCTION TO MySQL** 12T + 6 L hrs.  
 Relational database concepts – web database architecture – Logging into MySQL – setting up users privileges – Creating Tables in MySQL – Data Manipulation Commands – Dropping Table.
- UNIT IV: INTEGRATING MySQL AND PHP** 12T + 6 L hrs.  
 Accessing MySQL database with PHP – querying a database – uploading files – using directory functions – sending and reading email – managing date and time – session control – setting and reading cookies – implementing simple session – configuring a session.

## UNIT V: BUILDING APPLICATIONS WITH AJAX

12T + 6 L hrs.

Introduction to Ajax – HTTP request and Response – server side programming – adding ajax elements – creating additional files – adding bookmarks.

### LAB Programs:

1. Write a PHP script to get the PHP version and configuration information.
2. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
3. Write a PHP program using loops to convert word to digit.
4. Write a PHP program using functions to compute the sum of the digits of a number
5. Create a database named student using MySQL. Insert 10 records using PHP with necessary fields and find the average and grade of 10 students.
6. Write PHP script to read, write and delete a cookie.
7. Creating a static web page using PHP.
8. Create an application form using PHP form elements and write a module to upload your resume.

### TEXT BOOK(S):

Luke Welling and Laura Thomson, (2009). *PHP and MySQL web development*, (4<sup>th</sup> ed.), New Delhi: Pearson Education Inc., Print.

Chapters:1,3,5,8,9,10,11,19,21,23,27,28,29,34.

### REFERENCE BOOK(S):

Jon A. Phillips and Michele E. Davis, (2006). *Learning PHP and MySQL*, (1<sup>st</sup> ed.), California: O'reilly Media Inc., Print.

Mario Lurig, (2008). *PHP Reference: Beginner to Intermediate PHP5*, (1<sup>st</sup> ed.).

Steve Suehring, Tim Converse, and Joyce Park, (2009). *PHP6 and MySQL Bible*, Wiley Publishing, Inc., Print.

### WEBSITE(S):

[https://spoken-tutorial.org/tutorial-search/?search\\_foss=PHP+and+MySQL&search\\_language=English](https://spoken-tutorial.org/tutorial-search/?search_foss=PHP+and+MySQL&search_language=English)

<https://coursesweb.net/php-MySQL>

[https://www.w3schools.com/php/php\\_MySQL\\_intro.asp](https://www.w3schools.com/php/php_MySQL_intro.asp)

<https://www.tutorialspoint.com/php/>

<https://www.tutorialspoint.com/MySQL/>

[http://www.nptelvideos.com/php/php\\_video\\_tutorials.php](http://www.nptelvideos.com/php/php_video_tutorials.php)

## PHYQ5401CM MOLECULAR SPECTROSCOPY (THEORY)

### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- acquire knowledge on different regions of electromagnetic spectrum
- recognize the technologies involved in the sample preparation
- analyze and interpret spectra from different regions

**COURSE CONTENT:**

**UNIT I: SPECTROSCOPIC METHODS** 12 hrs.

Electromagnetic spectrum – types of molecular energies – elements of practical spectroscopy – spectral line width – absorption and emission of radiation – Einstein's coefficients – lasers

**UNIT II: MICROWAVE SPECTROSCOPY** 15 hrs.

Classification of molecules – interaction of radiation with rotating molecule – rotational spectra of rigid diatomic molecules – isotope effect in rotational spectra – intensity of rotational lines – non – rigid rotator – vibrational excitation effect – linear polyatomic molecule – symmetric top molecules – microwave spectrometer – information derived from rotational spectra.

**UNIT III: INFRARED SPECTROSCOPY** 15 hrs.

Vibrational energy of a diatomic molecule – infrared spectra – infrared selection rules vibrating diatomic molecule – diatomic vibrating rotator – asymmetry of rotation vibration band – vibrations of polyatomic molecules – Fermi resonance – hydrogen bonding interpretation of vibrational spectra – group frequencies – IR spectrophotometer – instrumentation – sample handling techniques – Fourier transform infrared spectroscopy applications

**UNIT IV: RAMAN SPECTROSCOPY** 15 Hrs.

Rayleigh & Raman scattering – rotational raman spectra – vibrational Raman spectra – mutual exclusion principle – Raman spectrometer – sample handling techniques – Fourier transform Raman spectrometer – polarization of Raman scattered light – structure determination using IR and Raman spectroscopy

**UNIT V: ELECTRONIC SPECTRA & SPIN RESONANCE SPECTROSCOPY** 18 hrs.

Born – Oppenheimer approximation – vibrational coarse structure – Frank Condon principle rotational fine structure of electronic vibration spectra – fortrat parabola dissociation – predissociation – magnetic properties of nuclei – resonance condition – NMR instrumentation – relaxation processes – chemical shift – indirect spin – spin interaction – interpretation of certain NMR spectra

**TEXT BOOK(S):**

Aruldhas G., (2001). *Molecular structure and spectroscopy*, New Delhi: Prentice Hall of India Pvt. Ltd., Print.

Chapters: 1.1 – 1.7, 6.1 – 6.9, 6.14, 6.15, 7.1 – 7.7, 7.9, 7.10, 7.14, 7.16 – 7.18, 7.19.1, 7.19.4, 8.1 – 8.7, 8.9, 8.10, 8.12, 8.15, 9.2, 9.6, 9.7, 9.8, 9.9, 9.10, 10.1 – 10.3, 10.5, 10.8, 10.9, 10.20.

**REFERENCE BOOK(S):**

Colin N. Banwell and Elaine M. McCash, (2016). *Fundamentals of Molecular Spectroscopy*, (4<sup>th</sup> ed.) New Delhi: Tata McGraw Hill Publishing Company Limited. Print.

Gurdeep R. Chatwal, Sham K. Anand, (2016). *Spectroscopy*, (5<sup>th</sup> ed.), Mumbai: Himalaya Publishing House Pvt. Ltd. Print.

Straughan B.P. and Walker. S., (1994). *Spectroscopy*, 1, New York: Halsted press. Print.

**PHYQ5401CT PHYSICS OF REMOTE SENSING  
(LAB CUM THEORY)**

**LEARNING OUTCOME**

3T+2L hrs./wk.

On successful completion of this course, the student will be able to

- relate the concepts of physics and principles of remote sensing
- identify the role of electromagnetic radiation in remote sensing and sensors
- employ remote sensing software in real time applications

## COURSE CONTENT:

### UNIT I: FUNDAMENTALS OF REMOTE SENSING

9T+3L hrs.

Introduction of Remote Sensing – energy sources and radiation principles – energy interaction in the atmosphere – scattering – absorption – energy interaction with surface features – energy interaction with earth surface features – spectral response patterns – atmospheric influences on spectral response – resolution properties – multi spectral and hyper spectral concepts

### UNIT II: ELECTROMAGNETIC RADIATION

9T+3L hrs.

Properties of EM radiation – velocity – polarization – coherent radiation – propagation – reflection and transmission – diffraction – doppler effect – absorption – scattering – quantum nature – thermal radiation – emissivity – source of EM radiation for remote sensing

### UNIT III: RADIOMETRIC MEASUREMENTS AND IMAGE PROCESSING

9T+3L hrs.

Measurement geometry – radiometric quantities: radiant energy, flux, irradiance, intensity, radiance – surface characteristics for radiometric measurements – digital image processing: image rectification and restoration, enhancement, classification, data merging and GIS integration

### UNIT IV: OPTICAL SENSORS AND PLATFORMS

9T+3L hrs.

Classification of remote sensors – selection of sensor parameters – scanner approach – push broom approach – wedge imaging spectrometer – principles of satellite motion – types of orbit – geo and sun synchronous orbit – spacecraft: IRS, LANDSAT, IKONOS, QUICKBIRD, ASTER, MODIS, WORLDVIEW, INSAT, NOAA – GNSS systems

### UNIT V: APPLICATIONS

9T+3L hrs.

Applications in Agriculture – forestry – water – soil – landuse / landcover – weather – oceanography – natural hazard – case studies

### LAB EXERCISES

1. DN to radiance conversion
2. Spectral reflectance analysis
3. Geo correction of images using GPS
4. Image Enhancement
5. Fourier analysis – Low pass and High pass filter
6. Image Classification
7. Accuracy assessment
8. Data fusion
9. Soil / Water / Vegetation indices
10. 3D Analysis using satellite images
11. Familiarization of google earth

### TEXTBOOK(S):

George Joseph, (2018). *Fundamentals of Remote Sensing*. (3<sup>rd</sup> ed.), University Press India Limited. Print.

Ch.: 1,3,2,3,5,1,5,2,6.1,6.8,6.9,8.1,8.2,8.3,8.4,8.5.

John R. Jensen, (2014). *Remote sensing of the environment: An earth resource perspective*. (2<sup>nd</sup> ed.), Pearson Education. Print. Ch.: 10,11,12,13.

Lillesand, Kiefer, Chipman, (2014). *Remote sensing and image interpretation*. (6<sup>th</sup> ed.), New Delhi. Print. Ch.: 1.1-1.5.

**REFERENCE BOOK(S):**

Floyd F. Sabins., (2007). *Remote Sensing principles and interpretation*. (3<sup>rd</sup> ed.), United states of America.

James B. Campbell, Randolph H. Wynne., (2011). *Introduction to Remote sensing*. (5<sup>th</sup> ed.), The Guilford Press.

Rees R.G., (2013). *Physical Principles of Remote sensing*. (3<sup>rd</sup> ed.), Cambridge University Press.

**PHY3403AA BASIC PHYSICS**

**(THEORY)**

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- apply Newton's laws to different physical systems
- interpret the concept of wave phenomena
- acquire knowledge on the fundamentals of electricity and magnetism

**COURSE CONTENT:**

**UNIT I: NEWTON'S LAWS AND APPLICATIONS**

15 hrs.

Vectors and vector addition – components of vectors – Newton's first law – Newton's second law – Newton's third laws – applications of Newton's laws

**UNIT II: MOMENTUM AND ROTATIONAL DYNAMICS**

15 hrs.

Momentum and impulse – conservation of momentum – angular speed and angular acceleration – relationship between angular and linear quantities – centripetal acceleration – torque – relation between torque and angular acceleration

**UNIT III: WAVES AND SOUND**

15 hrs.

Hooke's law – motion of a pendulum – waves – interference of waves – producing a sound wave – characteristics of sound waves – energy and intensity of sound waves – standing waves – standing waves in air columns – beats – quality of sound

**UNIT IV: ELECTRICITY**

15 hrs.

Properties of electric charges – Coulomb's law – electric field – electric field lines – electric flux and Gauss law – potential difference and electric potential – applications: electrostatic precipitator, xerography and laser printers

**UNIT V: MAGNETISM**

15 hrs.

Magnets – Earth's magnetic field – magnetic fields – ampere's law – induced emf and magnetic flux – Faraday's law of induction and Lens law – generators – application: RL circuits

**TEXT BOOK(S):**

Raymond A. Serway, Chris Vuille, (2012). *College Physics*, (9<sup>th</sup> ed.), Vol. 1, Canada: Cengage Learning.

Chapters: 3.1-3.2, 4.2-4.4, 4.5 (88-103), 6.1 (167-171), 6.2, 6.3, 7.1, 7.3, 7.4, 8.1, 8.5 (247- 250), 3.1, 13.5, 13.7, 13.8, 13.10, 14.1, 14.2, 14.4, 14.8, 14.10-14.12, 15.1, 15.3-15.5, 15.9 (533-537), 16.1 (552-555), 16.2, 16.5, 19.1 – 19.3, 19.7, 20.1, 20.2, 20.4, 20.6.

**REFERENCE BOOK(S):**

Jerold Touger, (2006). *Introductory Physics – Building understanding*, New Delhi: John Willey & Sons. Print.

Nelkon and Parker (1995), *Advanced Level Physics*, (7<sup>th</sup> Ed.), New Delhi: CBS Publishers & Distributors P Ltd. Print.

Resnick, Halliday, and Krane (2010). *Physics*, (5<sup>th</sup> ed.), Vol. 1, New Delhi: John Wiley & Sons. Print.

## PHY0405CD ESSENCE OF MUSICAL SOUNDS

### (THEORY)

#### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- relate the physics principles with various musical instruments
- illustrate the frequency relationships in a musical scale
- infer basic knowledge of the music technology and acoustics of buildings

#### COURSE CONTENT:

##### UNIT I: ESSENCE OF MUSIC

Wave motion–longitudinal and transverse waves – ripple tank – sound – what causes sound –how vibrations travel – reflection – refraction – diffraction – interference of sound – velocity of sound – standing waves – beats – resonance and resonators.

##### UNIT II: CHARACTERISTICS OF MUSIC

Ear – pitch loudness and quality of musical notes – just noticeable difference in pitch – decibel – binaural hearing – aural or combination of notes – subjective tones – subjective music – vibrato and tremolo – pitch range of musical instruments – quality.

##### UNIT III: MATHEMATICS OF MUSIC

Fourier's theorem – musical scales and frequency ratios – choosing a musical scale – consonance and dissonance – diatonic scale – merits and demerits – equitempered scale – Indian musical scale – frequency of stretched strings – longitudinal vibrations in strings – modes of oscillation in open and closed pipes.

##### UNIT IV: MUSICAL INSTRUMENTS

Plucked, bowed and struck stringed instruments – wind instruments – human voice – percussion instruments – examples for each type (stringed, wind, percussion) from eastern and western instruments.

##### UNIT V: ELECTRONIC MUSIC AND ACOUSTICS

Microphones – mixer basics – digital audio file formats – musical instrument digital interface MIDI – digital audio recording – room acoustics – reverberation time – measurement and calculation of reverberation time – measurement of absorptance co-efficient – optimum reverberation time – correcting auditorium acoustics – acoustical qualities of concert halls.

#### REFERENCE BOOK(S):

Catherine Schmidt-Jones, (2007). *Understanding Basic Music Theory*, Texas: Connexions. Print

Catherine Schmidt-Jones, (2013). *Sound, Physics and Music*, Texas: Connexions. Print

David R.Lapp, (2002). *The Physics of Music and musical instruments*, Massachusetts: Wright Center for Innovative Science Education Tufts University. Print

John Askill, (1979). *Physics of Musical Sounds*, New York: D. Van Nostrand Company, Print.

## WEBSITE(S):

<https://ehomerecordingstudio.com/types-of-microphones/>

<https://ehomerecordingstudio.com/best-daw-software/>

<https://ehomerecordingstudio.com/best-audio-interfaces/>

<https://www.musictech.net/2013/06/beginners-guide/>

<http://www.indiana.edu/~emusic/361/midi.htm>

<https://www.wisdomjobs.com/e-university/multimedia-tutorial-270/midi-musical-instrument-digital-interface-12767.html>

<http://tmu.ac.in/college-of-computing-sciences-and-it/wp-content/uploads/sites/17/2016/10/ICAC-1604221.pdf>

## PHY0406CD ELECTRIC CIRCUITS

### (THEORY)

#### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- acquire the knowledge and interpret the working of ac circuits
- apply the network theorems to simplify and analyze the complex circuits
- develop analytical and problem solving skills

#### COURSE CONTENT:

##### UNIT I: NETWORK THEOREMS

Kirchhoff's laws and network solution – network analysis by Maxwell's circulating currents – superposition theorem – Thevenin's theorem – constant current generator – Norton's theorem – delta-star transformation – star-delta transformation – maximum power transfer.

Activities with LTspice: Application of Thevenin and Norton theorems for dc circuits

##### UNIT II: ANALYSIS OF AC CIRCUITS – R, L AND C

Basic ac circuits – alternating current in a resistive circuit – alternating current in an inductive circuit – current and voltage in an inductive circuit – resistance and inductance in series – alternating current in a capacitive circuit – current and voltage in a capacitive circuit – resistance and capacitance in series.

Activities with LTspice: Study of frequency response and phase of series RC and RL circuits

##### UNIT III: ANALYSIS OF AC CIRCUITS – R, L & C IN SERIES AND PARALLEL

Alternating current in an RLC circuit – frequency variation in a series *RLC* circuit – resonance – current and voltage in a series RLC circuit – quality factor – band width – parallel resonance

Activities with LTspice: Study of frequency response and impedance of series and parallel RLC circuits

##### UNIT IV: POWER IN AC CIRCUITS

Impossible power – power in a resistive circuit – power in a purely inductive circuit – power in a purely capacitive circuit – power in a circuit with resistance and reactance – power factor – active and reactive currents – practical importance of power factor

Activities with LTspice: Power in ac circuits, maximum power transfer

## UNIT V: COMPLEX NOTATION IN AC CIRCUITS

j operator – addition and subtraction of phasors – voltage, current and impedance – admittance, conductance and susceptance –  $RL$  series circuit admittance –  $RC$  series circuit admittance – parallel admittance – calculation of power using complex notation – superposition theorem – Thevenin's theorem – Norton's theorem

Activities with LTspice: Application of Thevenin and Norton theorems for ac circuits

### TEXT BOOK(S):

Edward Hughes, (2008). *Electrical and Electronic Technology*, (10<sup>th</sup> ed.), England, Pearson Education Limited. Print.

Chapters: 4.2, 4.3, 4.5 – 4.11, 5.1, 5.3 – 5.7, 5.14 - 5.18, 8.1, 8.2, 8.6 – 8.9, 10.1- 10.4, 10.6-10.8, 10.10, 10.11, 12.1 – 12.8, 13.1-13.8, 14.2-14.6, 14.10, 14.12, 15.4 – 15.6.

### REFERENCE BOOK(S):

George J. Angerbauer, (1985). *Principles of the DC and AC Circuits*, (2<sup>nd</sup> ed.), Delhi: CBS Publishers & Distributors. Print.

Jain S.K., and Prasad V., (1987). *Circuit Theory and Network Analysis*, Delhi: CBS Publishers and Distributors. Print.

Mitchel E Schultz, (2007). *Basic Electronics*, (10<sup>th</sup> ed.), New Delhi: Tata McGraw-Hill Publishing Company Ltd. Print.

### WEBSITE(S):

<http://denethor.wlu.ca/ltspice/>

<https://www.ufsj.edu.br/portal2-repositorio/File/Apostila%203.pdf>

(For the following course, experiments have been reorganized in lab courses offered from semesters II to VI and the content for semester II is presented in this Academic Council booklet)

## PHY2203CP GENERAL LAB I

(LAB)

### LEARNING OUTCOME

3 hrs./wk.

On successful completion of the course, the student will be able to

- use basic measuring instruments
- infer the basic concepts in Mechanics, Optics and Electrical circuits
- develop the skill of observation and make meaningful conclusions.

### COURSE CONTENT:

#### EXPERIMENTS/LAB:

A minimum of 10 experiments to be done

1. Handling basic laboratory instruments (screw guage, travelling microscope, spectrometer, spherometer)
2. Study of Collisions
3. Study of rigid body oscillations (Torsional/bifilar/compound pendula)
4. Study of frictional forces
5. Study of refraction (Lenses / Prisms)
6. Study of lens system (simple and compound microscope)

7. Eye and its defects
8. Comparing EMF of two batteries using potentiometer
9. Melde's string – standing waves
10. Coefficient of viscosity by flow method
11. Surface tension by capillary rise method
12. Pitch acuity of human ear

**REFERENCE BOOK(S):**

- Arora C.L., (2011). *B.Sc. Practical Physics*, New Delhi: S. Chand & company Ltd. Print.
- Bhattacharya C.K., (1984). *University Practical Physics with Viva-Voce*, New Delhi: CBS publishers and distributors. Print.
- Chattapadhyay D. and Rakshit P.C., (2005). *An Advanced course in Practical Physics*, (7<sup>th</sup> ed.), Kolkatta: New Central Book Agency Pvt., Ltd. Print.
- Gupta S.L., and Kumar V., (2002). *Practical Physics*, (25<sup>th</sup> ed.), Meerut: Pragatiprakashan Publication. Print.
- Ouseph C.C., Rao U.J. and Viyayendran V., (2010). *Practical Physics and Electronics*, Chennai: S. Viswanathan Printers and Publishers Pvt., Ltd., Print.
- Palanisamy P K, (2002). *Physics Laboratory Manual*, Chennai: Scitech Publications (India) Pvt. Ltd., Print.

(For the following course, experiments have been reorganized in lab courses offered from semesters IV to VI and the content for semester IV is presented in this Academic Council booklet)

**PHY4204CP LAB PHYSICS – IV**

**(LAB)**

**LEARNING OUTCOME**

**3 hrs./wk.**

On successful completion of the course, the student will be able to

- describe the characteristics of an op-amp
- analyze the linear applications of op-amps
- relate the theory of optics, electricity and magnetism with experimental ideas

**COURSE CONTENT:**

**EXPERIMENTS: (Minimum of 10 experiments)**

1. Resolving power of grating
2. Fresnel's biprism – wavelength of monochromatic source
3. Magnetic field due to a current carrying circular coils
4. Determination of rigidity modulus using static torsion method
5. Polarimeter- Specific rotation of the given solution
6. Differential amplifier using transistors
7. Op-amp characteristics (Input offset voltage, input bias current, input impedance and CMRR)
8. Op-amp circuits (Inverting amplifier, Non-inverting amplifier & Voltage follower)
9. VCIS and ICVS amplifiers
10. Linear op-amp applications (Summing, difference and averaging amplifiers)
11. Precision half/full wave rectifier circuits

## REFERENCE BOOK(S):

Albert P. Malvino, David J. Bates, (2009). *Electronic Principles*, (7<sup>th</sup> ed.), New Delhi: Tata McGraw-Hill Publishing Company Ltd. Print.

Grob. B, (2007). *Basic Electronics*, (10<sup>th</sup>ed), New Delhi: Tata McGraw–Hill Publishing Company Ltd. Print.

Jacob Millman, Christos C. Halkias, (2006). *Electronic Devices and Circuits*, New Delhi: Tata McGraw-Hill Publishing Company Ltd. Print.

(For the following course, content remains the same but the contact hours have been changed and the content is presented in this Academic Council booklet)

## PHY4504CM ELECTRONICS - II

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify the development of ICs in electronics
- use differential amplifier in building op-amps
- design and analyze linear and non-linear op-amp circuits

#### COURSE CONTENT:

##### UNIT I: DIFFERENTIAL AMPLIFIERS

15 hrs.

Long – tailed pair – differential amplifier – DC analysis of a differential amplifier – AC analysis of a differential amplifier – characteristics of the differential amplifier – common mode gain – current mirror – loaded differential amplifier

##### UNIT II: OPERATIONAL AMPLIFIERS

15 hrs.

Introduction to Op Amps – 741 Op Amp – Inverting amplifier – noninverting amplifier – two op amp applications – four types of negative feedback– bandwidth – inverting amplifier circuits – noninverting amplifier circuits – inverter/non-inverter circuits

##### UNIT III: LINEAR OP-AMP CIRCUITS

15 hrs.

Differential amplifiers – summing amplifier circuits – active filters – ideal responses – passive filters – first order stages – VCVS unity gain second order low pass filters – VCVS high pass filters.

##### UNIT IV: NONLINEAR OP-AMP CIRCUITS

15 hrs.

Comparators with zero reference – comparators with nonzero references – comparators with hysteresis – window comparator – Integrator – waveform conversion – waveform generation - differentiator.

##### UNIT V: OSCILLATORS

15 hrs.

Theory of sinusoidal oscillation – Wien-Bridge oscillator – Colpitts oscillator – quartz crystals – 555 timer – astable operation of the 555 timer.

#### TEXT BOOK(S):

Albert P. Malvino, and David J. Bates, (2009). *Electronic Principles*, (7<sup>th</sup> ed.), New Delhi: Tata McGraw-Hill Publishing Company Ltd., Print.

Chapters: 17.1-17.5, 17.7,17.8, 18.1-18.5,19.1,19.7,20.1-20.4,20.6,21.1,21.3,21.4,21.5, 21.8,22.1-22.7,22.10, 23.1, 23.2, 23.4, 23.6-23.8.

**REFERENCE BOOK(S):**

John. D. Ryder, (1999). *Electronic fundamentals and applications*, (5<sup>th</sup> ed.), New Delhi, Prentice-Hall of India Private Ltd., Print.

Ramakant A. Gayakwad, (2000). *Op-Amps and linear integrated circuits*, (4<sup>th</sup> ed.), New Delhi, PHI Learning private Ltd., Print.

Salivahanan S, and Kanchana Bhaaskaran V.S, (2011). *Linear Integrated Circuits*, seventh reprint, New Delhi, Tata McGraw-Hill Publishing Company Ltd., Print.

Sedha R.S, (2013). *A text book of Applied Electronics*, Revised edition, New Delhi, S.Chand & Company Ltd., Print.

**COURSE PROFILE**

**M.Sc. Physics (Self-Financed)**

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./ Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PGP1622M	CLASSICAL MECHANICS AND NONLINEAR DYNAMICS	TH	6		6	AZ2017	SPPHY	PHY
	PGP1625M	MATHEMATICAL PHYSICS I	TH	6		6	BA2018	SPPHY	PHY
	PGP1624M	INTEGRATED ELECTRONICS	TH	6		6	AZ2017	SPPHY	PHY
	PGP1421M	NUMERICAL METHODS WITH C	TH	5		4		SPPHY	PHY
	PGP1323P	GENERAL LAB I	LA		3	3	AT2012	SPPHY	PHY
	PGV1101PV	FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE
	PGV1102PV	PERSPECTIVES ON GENDER					AV2014 as PGV2101V	LDC ALLM	
	PIV1102PI	THE BIBLE AND SCIENCE						APCH/ SPCH	
		LIBRARY		1					
		CLUB		1					
TOTAL				30		26			
II	PGP2622M	MATHEMATICAL PHYSICS II	TH	6		6	AW2015	SPPHY	PHY

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PGP2523M	QUANTUM MECHANICS I	TH	5		5	AT2012	SPPHY	PHY
	PGP2525M	STATISTICAL MECHANICS AND THERMODYNAMICS	TH	5		5	BA2018	SPPHY	PHY
	PGP2321P	GENERAL LAB II	LA		3	3	AT2012	SPPHY	PHY
	PGP2325P	ELECTRONICS LAB	LA		3	3	BA2018	SPPHY	PHY
	PGV2103PV	HUMAN RIGHTS AND DUTIES	TH	2		1	AM2005 as PGV0104V	NON LDC ALLM	Centre for VE
	PGV2102PV	PRACTICING HUMAN RIGHTS	TH				AM2005 as PGV0107V	LDC ALLM	
	PIV2102PI	RIGHTS, RESPONSIBILITIES AND THE BIBLE	TH					APCH/ SPCH	
	PGP2423E	INTRODUCTION TO GEOGRAPHICAL INFORMATION SYSTEM	TH	4		4	BA2018	SPALLM (Except Physics)	PHY
		CLUB			1			SPPHY	PHY
		LIBRARY			1			SPPHY	PHY
	TOTAL				30		27		

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PGP3524M	SOLID STATE PHYSICS	TH	6		5		SPPHY	PHY
	PGP3523M	QUANTUM MECHANICS II	TH	5		5	AZ2017	SPPHY	PHY
	PGP3621M	ELECTROMAGNETIC THEORY	TH	6		6	AZ2017	SPPHY	PHY
	PGP35230 / PGP35250	MICRO CONTROLLERS / GIS AND ITS APPLICATIONS	TH	5		5	AR2010 / AP2008	SPPHY	PHY
	PGP3330P / PGP3331P	COMPUTATIONAL AND MICROCONTROLLER LAB / COMPUTATIONAL AND GIS LAB	LA		3	3	BA2018	SPPHY	PHY
	PGP3423E	RENEWABLE ENERGY SOURCES AND	TH	4		4	BA2018	SPALLS	PHY

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
		EMERGING TECHNOLOGIES							
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH/ SPCH	
	TOTAL				30		29		
IV	PGP4524M	MODERN OPTICS	TH	5		5	AY2016	SPPHY	PHY
	PGP4523M	NUCLEAR PHYSICS	TH	5		5	BA2018	SPPHY	PHY
	PGP4622M	ATOMIC AND MOLECULAR SPECTROSCOPY	TH	6		6		SPPHY	PHY
	PGP45210 / PGP45240	NANOSCIENCE / THIN FILM PHYSICS	TH	5		5	AQ2009/ AY2016	SPPHY	PHY
	PGP0621M	PROJECT		6		6		SPPHY	PHY
		LIBRARY		1		-		SPPHY	PHY
	PGV4103PV	IN TUNE WITH NATURE	TH	2		1		ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER						APCH/ SPCH	
TOTAL				30		28			

### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PGP2301MT	PGP3301MT	PGP4301MT	MT	3	SPPHY	PHY
MINI PROJECT	PGP2301MP	PGP3301MP	PGP4301MP	MP	3	SPPHY	PHY
COMPREHENSIVE VIVA	PGP2301MV	PGP3301MV	PGP4301MV	MV	3	SPPHY	PHY
COMPREHENSIVE – e-ASSESSMENT	-	-	PGP4201CE	CE	2	SPPHY	PHY

## COURSES OFFERED TO OTHER DEPARTMENTS

### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Credits	Passed in Academic Council	Offered to	Offered by
II / III / IV	PGP0421D	ASTROPHYSICS	4	AQ2009 (Profile) / AN2005 (Content)	ALLM	PHY
	PGP0422D	NANOELECTRONICS	4	AQ2009 (Profile) / AN2005 (Content)	ALLM	PHY
	PGP0423D	PHYSICS APPLICATIONS WITH MATLAB	4	AV2012	ALLM	PHY
	PGP0427D	QUANTUM MECHANICS IN MOLECULAR MODELLING	4		AUPHY & AUCHE	PHY

### PG ELECTIVE COURSES

Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
			TH	LA				
PGP2422E	HISTORY AND PHILOSOPHY OF SCIENCE	TH	4		4	AW2015	SPALLM (Except Physics)	PHY
PGP2423E	INTRODUCTION TO GEOGRAPHICAL INFORMATION SYSTEM	TH	4		4	BA2018		
PGP3423E	RENEWABLE ENERGY SOURCES AND EMERGING TECHNOLOGIES	TH	4		4	BA2018	SPALLS	PHY

### PGP1421M NUMERICAL METHODS WITH C (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- apply the concepts of interpolation and least square approximation of functions
- appreciate the various methods in numerical integration and statistical analysis
- implement the numerical concepts in programming

#### COURSE CONTENT:

#### UNIT I: ERROR ANALYSIS & INTRODUCTION TO C

15 hrs.

Error Analysis: Types of errors – types of uncertainties – propagation of uncertainties in compound quantities-static performance parameters – impedance loading and matching – specification of instrument static characteristics – selection of the instrument – Introduction – C operators – Control instructions in C – decision control structure: *if-else* statement- loop control structure: *while* loop – *for* loop – *do-while* loop – case control structure: *switch*.

**UNIT II: FUNCTIONS, ARRAYS AND FILES**

15 hrs.

Functions – passing values between functions – scope rule of functions – calling convention – one dicey issue – advanced features of functions – return type of function – call by value and call by reference – introduction to pointers – pointer notation – back to function calls – conclusions – recursion – recursion and stack – Arrays – array initialization – bounds checking – passing array elements to a function – pointers and arrays – passing an entire array to a function – two dimensional array – initializing a 2D array – memory map of a 2D array – pointers and 2D arrays – pointer to an array – passing 2D array to a function – array of pointers – file input/output – data organization – file operations – opening a file – reading from a file – trouble in opening a file – closing the file – counting characters, tabs, spaces – a file copy program – writing to a file.

**UNIT III: NUMERICAL SOLUTION OF EQUATIONS**

15 hrs.

Numerical algebraic and transcendental equations: introduction – beginning an iterative method – method of successive bisection – method of false position – Newton – Raphson iterative method – secant method – method of successive approximation – comparison of iterative methods – simultaneous linear algebraic equations: introduction – Gauss elimination method – pivoting – ill conditioned equations – refinement of the solution obtained by Gaussian elimination – Gauss-Seidel iterative method – comparison of direct and iterative methods.

**UNIT IV: INTERPOLATION, LEAST SQUARE APPROXIMATION OF FUNCTION**

15 hrs.

Introduction – Lagrange interpolation – difference tables – truncation error in interpolation – spline interpolation – least squares approximation of functions: introduction – linear regression – algorithm for linear regression – polynomial regression – fitting exponential and trigonometric functions – Taylor series representation.

**UNIT V: NUMERICAL INTEGRATION AND ORDINARY DIFFERENTIAL EQUATIONS**

15 hrs.

Numerical integration – Simpson's rule – algorithms for integration of tabulated function – algorithms for integrating a known function – Euler's method – Taylor series method – Runge-Kutta methods – predictor corrector method – higher order differential equations – comparison of predictor corrector method and Runge – Kutta methods.

**TEXT BOOK(S):**

Nakra B.C. and Chaudhry K. K., (2004). *Instrumentation, Measurement and Analysis*, (2<sup>nd</sup> ed.). New Delhi: Tata McGraw Hill Publishing Company Ltd. Print. Chap 2.1 to 2.7.

Rajaraman V., (2005). *Computer Oriented Numerical Methods*, (3<sup>rd</sup> ed.). New Delhi: Prentice Hall of India Pvt. Ltd. Print.

Chapters: 3.1-3.8, 4, 5.1- 5.4, 6.1 - 6.5, 8.3 ,8.4,8.6, 8.7, 9.1 - 9.4.

Yashavant Kanetkar, (2009). *Let Us C*, (9<sup>th</sup> ed.), New Delhi: BPB publications. Print.

Chapters: 1, 2, 3, 4, 5, 8, 12.

**REFERENCE BOOK(S):**

Balagurusamy E., (2007). *Programming in ANSI C*, (4<sup>th</sup> ed.), New Delhi: Tata McGraw Hill Publishing Company Ltd., Print.

Jain M.K., Iyengar S.R.K. and Jain R.K., (1990). *Numerical methods for Scientific & Engineering Computation*, New Delhi: Wiley Eastern. Print.

Mollah, S.A., (2011). *Numerical Analysis and Computational Procedures*, Kolkata: Arunbhasen Books and Allied (p) Ltd., Print.

Parthasarthy, S., (2008). *Essentials of programming in C for life sciences*, (2<sup>nd</sup> ed.), New Delhi: ANE books Pvt. Ltd., Print.

Venkataraman, M. K., (1993). *Numerical methods in Science and Engineering*, Chennai: The National Publishing, Co. Ltd. Print.

## PGP3524M SOLID STATE PHYSICS

### (THEORY)

#### LEARNING OUTCOME

6 hrs./wk.

On successful completion of the course, the student will be able to

- interpret the elastic vibrations of crystals and the thermal properties of phonons
- explain the occurrence of superconductivity
- examine the consequences of dislocation and point defects

#### COURSE CONTENT:

##### UNIT I: CRYSTAL STRUCTURE, BINDING AND ELASTIC CONSTANTS

18 hrs.

Periodic array of atoms – fundamental types of lattices – Index system for crystal planes – diffraction of waves by crystals – Brillouin zones – analysis of elastic strain – elastic compliance and stiffness constants – elastic waves in cubic crystals, quasi crystals and liquid crystals.

##### UNIT II: PHONONS: VIBRATIONS AND THERMAL PROPERTIES

18 hrs.

Vibrations of crystal with monoatomic basis – two atoms per primitive basis – quantization of elastic waves – phonon momentum – inelastic scattering by phonons-phonon heat capacity – an harmonic crystal interactions – thermal conductivity.

##### UNIT III: FREE ELECTRON FERMI GAS AND ENERGY BANDS

20 hrs.

Energy levels in one dimension – effect of temperature on the Fermi – Dirac distribution – free electron gas in three dimensions – heat capacity of electron gas – electrical conductivity and Ohm's law – motion in magnetic fields – thermal conductivity of metals – Nearly free electron model – Bloch functions – Bloch Theorem – Kronig – Penney model – wave equation of electron in a periodic potential – calculation of energy bands.

##### UNIT IV: SUPERCONDUCTIVITY

16 hrs.

Experimental survey of superconductivity – theoretical survey of superconductivity – BCS theory of superconductivity – type II superconductors – London equation – London penetration depth – Dc Josephson effect – Meissner Effect – Ac Josephson effect – high temperature superconductors and its applications.

##### UNIT V: FERROMAGNETISM, FERROELECTRICS, CRYSTAL DEFECTS & DISLOCATIONS AND ALLOYS

18 hrs.

Ferromagnetic order – Curie– Weiss law– magnons – ferrimagnetic order- curie temperature and susceptibility of ferrimagnets – antiferromagnetic order – structural phase transitions – ferroelectric crystals – displacive transitions – lattice vacancies – diffusion – shear strength of single crystals – slip – dislocations – burgers vectors – stress fields of dislocations – strength of alloys – dislocations and crystal growth – alloys: general considerations – substitutional solid solutions – hume–rothery rules – order -disorder transformation.

#### TEXT BOOK(S):

Charles Kittel., (2013). *Introduction to Solid State Physics*, (8<sup>th</sup> ed.), New Delhi: John Wiley. Print.

Relevant sections in chapters - 1,2,3,4,5,6,7,8,9,10,12,16,20,21,22.

Relevant sections in chapter 9 and sub-sections in calculation of Energy bands.

Relevant sections in chapter 12 and sub-sections in Ferromagnetic order, Curie-Weiss law-magnons, ferrimagnetic order-Curie temperature and susceptibility of ferrimagnets, antiferromagnetic order

Relevant sections in chapter 16 and sub-sections in Structural phase transitions, ferroelectric crystals, displacive transitions.

#### REFERENCE BOOK(S):

Ashcroft, N.W. and Mermin N.D., (1976). *Solid State Physics*, Philadelphia: Holt, Rinehart and Winton, International Edition. Print.

Charles Kittel, (2008). *Introduction to solid state physics*, (7<sup>th</sup> ed.), New Delhi: John Wiley. Print.

Dekkar, A.J., (1971). *Solid State Physics*, Chennai: Macmillan. Print.

Feymann, R.P.et al. (1989). *The Feyman Lectures on Physics*, Vol II. New Delhi: Narosa Book Distributors. Print.

Gerald Burns, (1985). *Solid state Physics*, (1<sup>st</sup> ed.), N.Y: Academic Press. Print.

Giuseppe G., Giuseppe P., (2012). *Solid State Physics*, Elsevier. Print.

Kakani S.L., Hemarajni C., (2005). *Solid State Physics*, New Delhi: Sultan Chand. Print.

Mathias Noe and Michael Steurer, (2007). High-temperature superconductor fault current limiters: concepts, applications, and development status, IOP Publishing Ltd, Superconductor Science and Technology, Volume 20, Number 3.

Pillai S. O., (1994). *Solid State Physics*, New Delhi: Wiley Eastern Limited. Print.

Pillai S. O., (1994). *Problems in Solid State Physics*, New Delhi: Willey Eastern Limited.

Wahab M. A., (2006). *Solid State Physics Structure and Properties of Materials*, Narosa Publishing House. Print.

#### WEBSITE(S):

<http://iopscience.iop.org/article/10.1088/0953-2048/20/3/R01/meta>

### PGP4622M ATOMIC AND MOLECULAR SPECTROSCOPY

#### (THEORY)

#### LEARNING OUTCOME

6 hrs./Wk.

On successful completion of the course, the student will be able to

- inquire the principles of spectroscopy in the different regions of the electromagnetic spectrum
- apply the concepts of group theory to molecular vibrations
- relate the theory of spectroscopy to the study of molecular structure

#### COURSE CONTENT:

#### UNIT I: ELECTRONIC SPECTROSCOPY OF ATOMS

18 hrs.

Structure of atoms – electronic angular momentum – many electron atoms: the building-up (Aufbau) principle – spectrum of lithium and other hydrogen like species – angular momentum of many-electron atoms – term symbols – spectrum of helium and the alkaline earths – equivalent and

nonequivalent electrons – photoelectron spectroscopy – Zeeman effect – Stark effect – influence of nuclear spin.

**UNIT II: MOLECULAR SYMMETRY & MICROWAVE SPECTROSCOPY** 18 hrs.

Symmetry operations – symmetry elements – algebra of symmetry operations – multiplication table – molecular point groups – matrix representation of symmetry operations – reducible and irreducible representations – great orthogonality theorem – character table for  $C_{2v}$  and  $C_{3v}$  point group – symmetry species of point groups – complete character table for point groups – rotation of molecules – rotational spectra – diatomic molecule – polyatomic molecules – chemical analysis by microwave spectroscopy.

**UNIT III: INFRARED SPECTROSCOPY** 18 hrs.

Vibrating diatomic molecule – diatomic vibrating rotator – vibration-rotation spectrum of carbon monoxide – breakdown of the Born-Oppenheimer approximation: interaction of rotations and vibrations – vibrations of polyatomic molecules – influence of rotation on the spectra of polyatomic molecules – analysis by infra-red techniques – applications.

**UNIT IV: RAMAN SPECTROSCOPY** 18 hrs.

Classical theory of Raman effect – pure rotational Raman spectra: linear molecules – symmetric top molecules – asymmetric top molecules – vibrational Raman spectra: Raman activity of vibrations – rule of mutual exclusion – vibrational Raman spectra – rotational fine structure – structure determination from Raman and IR spectroscopy – effect of nuclear spin on Raman spectroscopy – resonance Raman scattering – stimulated Raman scattering – surface enhanced Raman scattering: surfaces for SERS study – enhancement mechanisms – surface selection rules – representative spectra – SERS microprobe – applications of SERS.

**UNIT V: ELECTRONIC AND SPIN RESONANCE SPECTROSCOPY** 18 hrs.

Electronic spectra of diatomic molecules: Born – Oppenheimer approximation – vibrational coarse structure – Franck-Condon principle – Jablonski diagram - dissociation energy and dissociation products – rotational fine structure of electronic-vibration transitions – Fortrat diagram – predissociation – nuclear magnetic resonance: magnetic properties of nuclei – resonance condition – NMR instrumentation – dipolar interaction – chemical shift – indirect spin-spin interaction – interpretation of certain NMR spectra.

**TEXT BOOK(S):**

Aruldas G., (2009). *Molecular Structure and Spectroscopy*, (2<sup>nd</sup> ed.), New Delhi: Prentice Hall of India Pvt Ltd., Print.

Chapters: 3.16, 5.1-5.11, 10.1–10.3, 10.7-10.9, 10.20, 14.1-14.7, 8.16,15.6

Banwell C.N., (2007). *Fundamentals of Molecular Spectroscopy*, (4<sup>th</sup> ed.), New Delhi: Tata McGraw Hill reprint.

Chapters: 2.1- 2.4, 2.6, 3.1-3.7,4.1-4.3,4.5, 5.1-5.8, 6.1

**REFERENCE BOOK(S):**

Pauling, L., (2001). *The Nature of Chemical Bond and the Structure of Molecules and Crystals*, Singapore: World Scientific publishing company, Pvt., Ltd. Print.

Richmyer, F.K., Kennard, E.H. and Cooper, John, N., (1981). *Introduction to Modern Physics*, (6<sup>th</sup> ed.). New Delhi: Tata McGraw Hill Publishing Company Ltd. Print.

Straughan, B.P and Walker S., (1976) *Spectroscopy*, Vol. I, New York: John Wiley & Sons. Print  
White, (1974). *Introduction to Atomic Spectra*, New Delhi: McGraw Hill Kogakusha Ltd. Print.

**WEBSITE(S):**

[http://www.astro.uwo.ca/~jlandstr/p467/lec5-mol\\_spect/index.html](http://www.astro.uwo.ca/~jlandstr/p467/lec5-mol_spect/index.html)

<http://crab.rutgers.edu/~alroche/Rads-Ch4.pdf>

[http://www.shsu.edu/chm\\_tgc/primers/pdf/JAB.pdf](http://www.shsu.edu/chm_tgc/primers/pdf/JAB.pdf)

## **PGP0427D QUANTUM MECHANICS IN MOLECULAR MODELING (THEORY)**

### **LEARNING OUTCOME**

On successful completion of the course, the student will be able to

- differentiate between HF and the density functional theory methods
- interpret geometry optimization techniques, energy calculations and thermodynamical properties
- compare different methods of atomic charge calculations

### **COURSE CONTENT:**

#### **UNIT I: THE WAVE FUNCTION**

Molecular orbital theory – Hamiltonian operator – general features – wave function – basis sets: Gaussian type orbitals – differences between STOs and GTOs – classification of basis sets – minimal basis sets – double and triple zeta basis sets – split valence basis sets – diffuse and polarized basis sets – vibrational principle – Born – Oppenheimer approximation – construction of trial wave functions – lcao basis set approach – secular equation – many electron wave functions – Hartree product wave functions – Hartree-Hamiltonian – self consistent field method.

#### **UNIT II: DFT METHODS**

Development of DFT – functional – Hohenberg – Kohn existence theorem – Hohenberg–Kohn variational theorem – Kohn – Sham method – applications of DFT – advantages of density functional theory (DFT).

Suggested exercises: Optimization of a molecule using HF and DFT methods, Optimization of molecules with different basis sets.

#### **UNIT III: GEOMETRY OPTIMIZATION AND ENERGY COMPUTATIONS**

Potential energy surface – stationary points – geometry optimization – frequency calculations – Inputting a Gaussian program – standard keywords and their meaning – understanding the Gaussian output – visualizing molecules in Gauss View.

Suggested exercises: Scan calculation for a molecule (Energy Vs Dihedral Angle and Energy Vs bond length), Geometry Optimization with frequency calculations (Vibrations–IR/Raman).

#### **UNIT IV: POPULATION ANALYSIS AND MOLECULAR ELECTROSTATIC POTENTIAL**

Types of charges – Mulliken population analysis – natural population analysis – electrostatic charges – interpreting a Gaussian NBO output – importance of checkpoint file – visualizing HOMO–LUMO orbitals – MEP plot.

Suggested exercises: Investigate the difference between the charge calculations for a molecule and NBO studies, Plot the MEP and Molecular orbitals (MOs) for neutral molecule.

## UNIT V: DIPOLE MOMENT, POLARIZABILITY AND THERMODYNAMICAL PROPERTIES

Entropy – enthalpy – specific heat capacity – Gibb's free energy – dipole moment – polarizability

Suggested exercises: Calculation of thermodynamical properties, dipole moment and polarizability calculations.

### REFERENCE BOOK(S):

Christopher J. Cramer, (2004). *Essentials of Computational Chemistry: Theories and Models*. (2<sup>nd</sup> ed.) John Wiley and Sons Ltd. Print.

Chapters: 4.2, 4.3, 4.5, 6.2, 8.2, 8.3, 8.5

Errol G. Lewars, (2004). *Computational Chemistry Introduction to the Theory and Applications of Molecular and Quantum Mechanics*, New York: Kluwer Academic Publishers. Print.

Chapters: 2.1-2.4

Ramachandran K. I., Deepa G. Namboori K., (2008). *Computational Chemistry and Molecular Modeling Principles and Applications*. Berlin: Springer. Print

Chapters: 6.1, 6.4 – 6.7, 6.10 – 6.11, 9.4 – 9.7, 9.21 – 9.23, 12.3, 12.7.1, 12.7.4

### WEBSITE(S):

<http://www.cup.uni-muenchen.de/ch/compchem/pop/mk.html>

[http://www.lct.jussieu.fr/manuels/Gaussian03/g\\_ur/g03mantop.htm](http://www.lct.jussieu.fr/manuels/Gaussian03/g_ur/g03mantop.htm)

<https://comp.chem.umn.edu/Chem8021/gv.pdf>

<https://www.d.umn.edu/~psiders/courses/chem5650/gaussviewtutorial/tutorial.html>

## CERTIFICATE COURSE IN MEDICAL INSTRUMENTATION

### PREAMBLE

The certificate course in Medical Instrumentation is offered to undergraduate science students. This course enables the students to appreciate the Physics concepts in medical field and can open new avenues in their higher studies as well as in their career.

### Eligibility:

- Students pursuing undergraduate science programme (Physical Sciences and Life Sciences)

Duration of the course: One semester

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Passed in Academic Council	Offered To	Offered By
				TH	LA			
I / II / III / IV / V / VI	CMP0051	HUMAN PHYSIOLOGY AND ITS MEASUREMENT SYSTEMS	TH	2			Physical Sciences and Life Sciences	AUPHY & SUPHY
	CMP0052	RADIATION TECHNIQUES AND PROTECTION	TH	2			Physical Sciences and Life Sciences	AUPHY & SUPHY
	CMP0053	ADVANCED DIAGNOSTIC TECHNIQUES	TH	2			Physical Sciences and Life Sciences	AUPHY & SUPHY

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Passed in Academic Council	Offered To	Offered By
				TH	LA			
	CMP0054	INTERNSHIP - DIAGNOSTIC TECHNIQUES	INTERNSHIP	30 hrs.			Physical Sciences and Life Sciences	AUPHY & SUPHY

## CMP0051 HUMAN PHYSIOLOGY AND ITS MEASUREMENT SYSTEMS

(THEORY)

### LEARNING OUTCOME

2 hrs./wk.

On successful completion of course, student will be able to

- recognize the anatomy and physiology of human system
- develop the knowledge of bio medical instruments
- acquire knowledge in measurement systems

### COURSE CONTENT:

#### UNIT I: INTRODUCTION TO HUMAN BODY

6 hrs.

Human anatomy– anatomical position and direction – human anatomical terms – various joints movements in human body – cells structure– functions of cell

#### UNIT II: ANATOMY & PHYSIOLOGY

6 hrs.

The skeletal system – the circulatory system– the respiratory system – the excretory system – muscular system – central nervous system

#### UNIT III: BIO-POTENTIAL ELECTRODES, AMPLIFIERS & MEASUREMENT SYSTEMS

9 hrs.

Origin of bio signals – classification of biomedical instruments – performance parameters of instruments – bio potential electrode-bioelectric amplifiers – errors in measurement systems

#### UNIT IV: BIO-MEDICAL INSTRUMENTATION

9 hrs.

Electrocardiography (ECG) – vector cardiography – cardiac stress test – respiratory system- spirometry – full body Plethysmograph – Dilution method of determining functional residual capacity – Electroencephalograph (EEG) – Electromyography (EMG)

### REFERENCE BOOK(S):

John G. Webster, (2003). *Bio Instrumentation*, John Wiley & Sons, Inc. Print

Mandeep Singh, (2010). *Introduction to Biomedical Instrumentation*, New Delhi: PHI Learning Private Limited. Print.

Ross and Wilson, (2003). *Anatomy and Physiology in Health and Illness*, Elsevier science Ltd., Print.

## CMP0052 RADIATION TECHNIQUES AND PROTECTION

(THEORY)

### LEARNING OUTCOME

2 hrs./wk.

On successful completion of course, the student will be able to

- explain the interaction of radiation with matter
- acquire the basics of radiological physics
- infer knowledge in radiation protection techniques

**COURSE CONTENT:**

**UNIT I: ELECTRON AND PHOTON INTERACTIONS** 6 hrs.

Classification of radiation – electron-orbital electron interactions – electron-nucleus interactions – types of indirectly ionizing photon radiation – photon beam attenuation – types of photon interaction

**UNIT II: DOSIMETRY PRINCIPLES, QUANTITIES AND UNITS** 9 hrs.

Photon fluence and energy fluence – kerma – cema – absorbed dose – stopping power – relationships between various dosimetric quantities – cavity theories – Properties of dosimeters – ionization chamber dosimeter systems – film dosimetry

**UNIT III: RADIATION PROTECTION BASICS** 6 hrs.

Principles of radiation protection: time – distance – shielding – ALARA principles – equations and calculations – radiation units and conversion factors – radioactivity – radiation dose – dose equivalent – dose rate

**UNIT IV: RADIATION PROTECTION TECHNIQUES** 9 hrs.

International Commission on radiological protection (ICRP) – implementation of radiation protection in the radiology facility – medical exposures – occupational exposure – public exposure in radiology practices – shielding – X-ray hazards and protection – radiation safety considerations for patient protection – radiation safety considerations for operator protection

**REFERENCE BOOK(S):**

Andrew Karam.P, *Radiation Safety Officer Refresher*, Nevada Technical Associates

Dance D.R, Christofides S, Maidment A.D.A, McLean I.D, Ng K.H., (2014). *Diagnostic Radiology Physics: a handbook for teachers and students*

Khan. F.M., (2003). *The Physics of Radiation Therapy*, (3<sup>rd</sup> ed.), Lippincott Williams and Wilkins, U.S.A.

Podgorsak. E.B., (2005). *Radiation oncology physics: A Handbook for teachers and students*. IAEA publications. Print.

**CMP0053 ADVANCED DIAGNOSTIC TECHNIQUES**

**(THEORY)**

**LEARNING OUTCOME** 2 hrs./wk.

On successful completion of the course, the student will be able to:

- interpret the principles of advanced radiographic techniques
- appreciate the concepts of CT imaging techniques
- acquire in-depth knowledge on magnetic resonance imaging and ultra sound imaging

**COURSE CONTENT:**

**UNIT I: BASICS OF COMPUTED RADIOGRAPHY AND DIGITAL RADIOGRAPHY** 7 hrs.

Introduction of Radiography – screen film detector – computed radiography – charged coupled device (CCD) – technique factors in radiography – fluoroscopy and its functionality – fluoroscopic detector systems – fluoroscopy modes of operation – image quality in fluoroscopy

**UNIT II: COMPUTED TOMOGRAPHY** 7 hrs.

Principles of CT imaging – CT reconstruction algorithm – CT generations: first to fourth generation – spiral CT scanning – ultrafast CT scanners – viewing systems – quality control

**UNIT III: MAGNETIC RESONANCE IMAGING**

9 hrs.

Principles of operations of MRI – Larmor frequency – magnetic resonance signal – magnetization properties of tissues – MRI instrumentation – MRI test procedures – advantages and disadvantages of MRI – MR artifacts – MR safety and bio effects

**UNIT IV: ULTRA SOUND IMAGING**

7 hrs.

Basis of Ultrasonic waves – ultrasound transducer – Echo Display Modes: A mode, B mode, M mode – image quality and artifacts – biological mechanism and effects

**MANDATORY ACTIVITY – Completing an internship course (CMP0054)**

To experience and gain knowledge on diagnostic techniques through Hospital Visit.

**REFERENCE BOOK(S):**

Anandanatarajan R., (2011). *Biomedical instrumentation and Measurements*, New Delhi: PHI Learning Private Limited. Print.

Jerrold T. Pushberg, J. Anthony Seibert, Edwin M. Leidholdt JR and John M. Boone, (2012). *The Essential Physics of Medical Imaging*, (3<sup>rd</sup> ed.), Tokyo: lippincott Williams & Wilkins.

Rosan S. Livingstone, (2007). *Handbook of Physics in Diagnostic Imaging*, Chennai: B. I. Publication Pvt. Ltd. Print.

William R. Hendee and E. Russell Ritenour, (2002). *Medical Imaging Physics*, (4<sup>th</sup> ed.), New York: A John Wiley & sons Inc. Publications. Print.

**CMP0054 INTERNSHIP – DIAGNOSTIC TECHNIQUES****LEARNING OUTCOME**

30 hrs.

On successful completion of the course, the students will be able to

- infer knowledge in the working principles of diagnostic techniques
- appreciate the application of Physics in Medical field

**Sample of Internship Institution /Hospitals**

- Vadamalayan Multispecialty hospital Pvt. Ltd., 9A, Vallabai Road, Chokikulam, Madurai, Tamil Nadu 625002

## EVALUATION PATTERN

### Certificate Course in Medical Instrumentation (UG)

Course code	Course Title	Offered to	Course type	Total Hrs./wk.	Formative (60%)						Summative (40%)		
			Theory / Internship		Test			Assignment			Theory		
					No.	RM	GM	No.	RM	GM	RM	GM	Exam Hrs.
CMP0051	HUMAN PHYSIOLOGY AND ITS MEASUREMENT SYSTEMS	PHY	TH	2	1	20	30	1	5	10	15	60	2 Hrs.
CMP0052	RADIATION TECHNIQUES AND PROTECTION	PHY	TH	2	1	20	30	1	5	10	15	60	2 Hrs.
CMP0053	ADVANCE DIAGNOSTIC TECHNIQUES	PHY	TH	2	1	20	30	1	5	10	15	60	2 Hrs.

### INTERNSHIP

Course code	Course Title	Offered to	Course type	Total Hrs.	Formative (100%)				Summative
			Theory / Internship		Work diary (RM)	Report (RM)	Presentation (RM)	Total	
CMP0054	INTERNSHIP - DIAGNOSTIC TECHNIQUES	PHY	INTERNSHIP	30 hrs.	20	10	10	40	NA

## CERTIFICATE COURSE IN REMOTE SENSING & GIS

### PREAMBLE

The certificate course in Remote sensing and GIS enables the students to identify and appreciate the basic concepts of Remote sensing and GIS in diverse fields and can open new avenues in their higher studies as well as in their career.

### Eligibility:

- A pass in the Higher Secondary School Examination or its equivalent.

Duration of the course: One semester

From 2019 batch onwards

Semester	Course Code	Course Title	Course Type	Hrs./Wk.		Passed in Academic Council	Offered to	Offered by
				TH	LA			
I / II / III / IV / V / VI	CRG0051	PRINCIPLES OF REMOTE SENSING	TH	2			ALLM	SUPHY
	CRG0052	GIS AND ITS APPLICATIONS	TH	2			ALLM	SUPHY
	CRG0053	REMOTE SENSING AND GIS LAB	LA	-	4		ALLM	SUPHY

### CRG0051 PRINCIPLES OF REMOTE SENSING

#### (THEORY)

#### LEARNING OUTCOME

2 hrs./wk.

On the successful completion of the course the students will be able to

- acquire the basic knowledge of remote sensing
- interpret the remote sensing imageries
- apply remote sensing techniques in different fields

#### COURSE CONTENT:

##### UNIT I: FUNDAMENTALS OF REMOTE SENSING

7 hrs.

Introduction – sun and atmosphere – concept of signatures – remote sensing systems – electromagnetic radiation – propagation of EM waves from one medium to another – attenuation – thermal radiation – source of EM radiation for remote sensing

##### UNIT II: RADIOMETRY AND SPECTRAL SIGNATURES

7 hrs.

Radiometric quantities – surface characteristics of radiometric measurements – signature in the reflective IR region – vegetation – soil – water – thermal infrared – microwave

##### UNIT III: REMOTE SENSORS – AN OVERVIEW

8 hrs.

Classification of remote sensors – selection of sensor parameters – spatial resolution – spectral resolution – radiometric resolution – temporal resolution – hyper spectral image – measuring the third dimension – image quality aspects – types of satellites - Platforms: types of orbits – Global Positioning System

#### UNIT IV: DATA ANALYSIS AND APPLICATIONS OF REMOTE SENSING

8 hrs.

Visual image analysis – digital classification: optimum band selection for band classification – supervised classification procedure – unsupervised classification – future trends in digital classification – applications of remote sensing for earth resources management – forestry application – land cover/land use mapping – watershed analysis

#### TEXT BOOK(S):

George Joseph, (2003). *Fundamentals of Remote Sensing*, (1<sup>st</sup> ed.), University Press India Limited. Print.

Ch: 1.1 – 1.4, 2.4, 2.5, 2.7, 2.8, 3.1 – 3.5, 4.1, 4.1.1, 4.1.2, 4.2, 5.1 – 5.6, 6.7 – 6.9, 8.3, 8.6, 10, 11.1, 11.2, 11.5

*WATERSHED ANALYSIS USING GIS*, Watershed Modelling, Peter Molnar and Paolo Burlando, Institute of Environmental Engineering, ETH Zürich

Anji Reddy M., (2001). *Remote Sensing and Geographical Information Systems*, (2<sup>nd</sup> ed.), BS Publications Second edition. Print. Ch: 4.5, 4.6

#### REFERENCE BOOK(S):

Jensen, John R., (2005). *Introductory Digital Image Processing – A Remote Sensing Perspective*, (3<sup>rd</sup> ed.), Upper Saddle River, NJ: Prentice Hall. Print. Ch: 1, 2 & 3.1

Pradip Kumar Guha, (2003). *Remote Sensing for the beginners*, (1<sup>st</sup> ed.), East West Press Private Limited. Print.

Thomas M. Lillesand and Ralph W. Kiefer, (2000). *Remote sensing and image interpretation*, (4<sup>th</sup> ed.), New York: John Wiley & Sons. Print.

### CRG0052 GIS AND ITS APPLICATION

#### (THEORY)

#### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course, students will be able to

- identify the basics of GIS data analysis
- recognize the relationship between analysis and modeling
- employ GIS software in real time applications

#### COURSE CONTENT:

#### UNIT I: FUNDAMENTALS OF GIS

8 hrs.

Introduction – roots of GIS – overview of information system – the four ms – contribution disciplines – GIS definitions and terminology – geographical entities – attributes – topology – cognitive models – GIS queries – GIS architecture – components of a GIS – GIS work flow – theoretical models of GIS – functional elements of GIS – fundamental operations of GIS – theoretical framework for GIS – GIS categories – levels/scales of measurements

#### UNIT II: SPATIAL DATA MODELING

8 hrs.

Introduction – stages of GIS data modeling – graphical representation of spatial data – raster data representation – vector data representation – spatial data models – raster GIS models – simple raster arrays – hierarchical raster structures – vector GIS models – spaghetti model – topological models – shape file – map projections – commonly used map projections and their comparison

### UNIT III: DATA ANALYSIS

7 hrs.

Introduction – format conversion – data structure conversion – conversion of different raster formats – skeleton sing – data medium conversion – mode of digitization – scan digitizing system – line array of detectors – spatial measurement methods – reclassification – buffering technology – overlay analysis – GIS output – maps as output – graphical outputs – network features – network flow – analysis of network.

### UNIT IV: APPLICATIONS

7 hrs.

Urban and municipal applications – appropriate methodologies – rapid land use assessment – rapid land information system development – GIS as an emerging tool – an analysis system – dynamic urban land use – semi-dynamic land use – passive land use – land use / land cover system in India

### TEXTBOOK(S):

Anji Reddy M., (2001). *Remote Sensing and Geographical Information Systems*, BS Publications Second edition. Print.

Ch: 1.6, 1.7, 7, 8.1, 8.2, 8.3.1-3, 8.4.1, 8.4.2, 8.5.1 - 8.5.3, 12.1.1, 12.2.2, 12.3.1 – 12.3.3, 12.4 - 12.6, 12.7.1 – 12.7.3, 12.10.1, 12.10.2, 13.4 - 6

<http://www.gisdevelopment.net/application/index.htm>

Michael Zeiler, (1999). *Modeling Our World*, The ESRI Guide to Geodatabase Design, ESRI Press. Print.

Ch: 8.4, 8.5, 8.6

### REFERENCE BOOK(S):

Cracknell A. P. and L. W. B. Hayes, (2003). *Introduction to Remote Sensing*, Taylor & Francis Pvt., Print.

Ian Heywood, Sarah Cornelius, Steve Carver, *Introduction to Geographical Information System*, (2<sup>nd</sup> ed.), Pearson Education. Print.

Lo Albert C.P., Yeung K.W., (2002). *Concepts & Techniques of Geographical Information System*, Prentice – Hall of India Pvt. Ltd. Print.

Micahel N. Demers, *Fundamentals of Geographic Information Systems*, (4<sup>th</sup> ed.), New York: John Wiley & Sons. Print.

Panda Dr. B. C., (2005). *Remote sensing Principles and Application*, Viva Books private limited. Print.

## CRG0053 REMOTE SENSING AND GIS LAB

(LAB)

### LEARNING OUTCOME

4 hrs./wk.

On the successful completion of the course, students will be able to

- create Geodatabase and work with spatial data
- relate the concepts of remote sensing and GIS
- appraise the salient features of GIS in mapping

## COURSE CONTENT:

### ERDAS

1. Geocorrection  
Geocorrection of IRS1C & IRS1D satellite images
2. Subsetting & Mosaicing  
Subsetting the geocorrected images – mosaicing the subsetting images
3. Vectorization & Map Composition  
Vectorizing the map - Map composition
4. Enhancement & Classification  
Using enhancement techniques on images – Supervised & Unsupervised classification of multispectral images
5. Fourier Analysis of Images  
Low pass filter – high pass filter – band pass filter
6. Open source software (any two)  
GRASS – MAPLE – SAGA GIS – gvSIG – kalypso – Quantum GIS – AGIS

### Arc GIS (use the output images of ERDAS)

1. Geocorrection  
Map Reading – Geocorrection of scanned Toposheets
2. Creating database & layers  
Creating Personal Geodatabase – Feature Dataset & Feature Data class – Creating Domains and Sub-types
3. Digitization  
Digitization of Point, Line and Polygon data – Entering labels, domains and subtypes
4. Creating a map with GPS  
Data collection with GPS – Mapping the collected data
5. Map generation & Data analysis  
Map composition – Map generation – Data analysis – overlay – ground water analysis

**EVALUATION PATTERN**  
**CERTIFICATE COURSE IN REMOTE SENSING & GIS**

Sem	Course Code	Course Title	Offered to	Course type	Total Hrs./wk.	Formative						Summative			Formative	Summative	
						TH (60%)						TH (40%)			LA (75%)	LA (25%)	
				Test			Assignment			Continuous Assessment							
				No		RM	GM	No	RM		GM	RM	GM	Exam Hrs.	RM	RM	Exam Hrs.
I / II / III / IV / V / VI	CRG0051	PRINCIPLES OF REMOTE SENSING	ALLM	TH	2	1	20	30	1	5	10	15	60	2 Hrs.	-	-	-
	CRG0052	GIS AND ITS APPLICATIONS	ALLM	TH	2	1	20	30	1	5	10	15	60	2 Hrs.	-	-	-
	CRG0053	REMOTE SENSING AND GIS LAB	ALLM	LA	4	-	-	-	-	-	-	-	-	-	60	20	3 Hrs.



## DEPARTMENT OF CHEMISTRY

### PREAMBLE

The present curriculum of B.Sc. Chemistry (Aided) was reviewed and based on which it is found necessary to introduce few changes in the following courses.

Undergraduate:

- CHE1302FT Basics of Chemistry is changed to CHE1201FP VOLUMETRIC ANALYSIS
- CHE2502CM Chemistry of Aliphatic Hydrocarbons is changed to CHE2503CM BASICS OF ORGANIC CHEMISTRY
- CHE2202CP Separation and Purification Techniques is changed to CHE2203CP SEPARATION AND PURIFICATION TECHNIQUES
- CHE2201FS Data Handling and Presentation is changed to CHE2202FS DATA HANDLING AND PRESENTATION
- CHPH5402DM Fundamentals of Energy Conversion and Storage is changed to CHPH5403DM Fundamentals of Energy Conversion and Storage

Postgraduate:

Based on the teachers' and students' feedback, the P.G. Chemistry curriculum (Semesters I and II) is revised in order to facilitate better understanding of the subject.

Besides this, the department introduces the following course

- PCH2401EP Textile Chemical Processing

The course profile along with the syllabi of the new and modified courses are presented.

### COURSE PROFILE

#### B.Sc. CHEMISTRY

From 2019 batch onwards

Se m.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PART I	TAMIL / HINDI / FRENCH	TH	6		3 / 4	AV2014	ALLM	TAM / HIN / FRE
	PART II	ENGLISH	TH	6		3 / 4	AV2014	ALLM	ENG
	CHE1201FP	VOLUMETRIC ANALYSIS	LA		4	2		AUCHE	CHE
	CHE1402CM	GENERAL CHEMISTRY	TH	5		4	AV2014	AUCHE	CHE
		ALLIED COURSE	TH	5		4		AUCHE	MAT
	CHE1201FS	FUNCTIONAL ENGLISH FOR CHEMISTS	TH	2		2	AV2014	AUCHE	CHE
	VBC1101FV	HEALTHY TRANSITION FROM ADOLESCENCE TO ADULTHOOD	TH	2		1	BA2018	ALLM	Centre for VE

Se m.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	UIV1101FI	BIBLICAL ESSENTIALS FOR EMERGING ADULTS						AUCH/ SUCH	
		Total		30		19 / 21			
II	PART I	TAMIL / HINDI / FRENCH	TH	6		3 / 4	AV2014	ALLM	TAM / HIN / FRE
	PART II	ENGLISH	TH	6		3 / 4	AV2014	ALLM	ENG
	CHE2503CM	BASICS OF ORGANIC CHEMISTRY	TH	5		5		AUCHE	CHE
	CHE2203CP	SEPARATION AND PURIFICATION TECHNIQUES	LA		3	2		AUCHE	CHE
		ALLIED COURSE	TH	5		4		AUCHE	MAT
	CHE2202FS	DATA HANDLING AND PRESENTATION	TH	2		2		AUCHE	CHE
	CHE2201NI	ENVIRONMENTAL CHEMISTRY	TH	2		2	AV2014	ALLM	CHE
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV2101FI	BIBLICAL FOUNDATION FOR FAMILY LIFE					BA2018	AUCH/ SUCH	
		Total		30		22 / 24			

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	CHE3503CM	ORGANIC REACTION MECHANISM	TH	5		5	BA2018	AUCHE	CHE
	CHE3501CM	CHEMISTRY OF s- AND p- BLOCK ELEMENTS	TH	5		5	AV2014	AUCHE	CHE
	CHE3502CM	BEHAVIOUR OF GASES AND LIQUIDS	TH	5		5	AW2015	AUCHE	CHE
	CHE0301CP	EXPERIMENTAL ORGANIC CHEMISTRY	LA		3		AW2015	AUCHE	CHE

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	CHE0303CP	EXPERIMENTAL PHYSICAL CHEMISTRY	LA		3		BA2018	AUCHE	CHE
		ALLIED COURSE	TH	5		4	AV2014	AUCHE	PHY
		NON-MAJOR ELECTIVE	TH	2		2			
		VOCATIONAL COURSE				2			
		LIBRARY		1					
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH/ SUCH	
		Total		30		24			
IV	CHE4501CM	CHEMICAL THERMODYNAMICS	TH	5		5	AW2015	AUCHE	CHE
	CHE4502CM	CHEMISTRY OF ORGANIC COMPOUNDS WITH OXYGEN FUNCTIONALITY	TH	5		5	AW2015	AUCHE	CHE
	CHE4503CM	CHEMISTRY OF TRANSITION ELEMENTS	TH	5		5	AW2015	AUCHE	CHE
	CHE0301CP	EXPERIMENTAL ORGANIC CHEMISTRY	LA		3	3	AW2015	AUCHE	CHE
	CHE0303CP	EXPERIMENTAL PHYSICAL CHEMISTRY	LA		3	3	BA2018	AUCHE	CHE
	CHE4201CP	EXPERIMENTAL INORGANIC CHEMISTRY	LA		3	2	AW2015	AUCHE	CHE
		NON-MAJOR ELECTIVE	TH	2		2			
	CHE4202SP	CHEMINFORMATICS LAB	LA		2	2	AW2015	AUCHE	CHE
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH/ SUCH		
		Total		30		29			

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	CHE5401CM	COORDINATION AND BIOINORGANIC CHEMISTRY	TH	5		4	AZ2017	AUCHE	CHE
	CHE5502CM	CHEMICAL KINETICS, CATALYSIS AND ELECTRO CHEMISTRY	TH	5		5	AW2015	AUCHE	CHE
	CHE5503CM	NITROGEN COMPOUNDS AND NATURAL PRODUCTS	TH	5		5	AY2016	AUCHE	CHE
	CHE5202CP	INSTRUMENTATION LAB	LA		3	2	AY2016	AUCHE	CHE
		INTERDISCIPLINARY COURSES	TH	4		4			
	CHE5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	AUCHE	CHE
	CHE0601LM	WATER QUALITY MANAGEMENT	PR	4			AW2015	AUCHE	CHE
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	AUALLM	Centre for VE
UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN						AUCH / SUCH		
		Total		30		24			
VI	CHE6505CM	ORGANIC SYNTHESIS AND SPECTROSCOPY	TH	5		5	AZ2017	AUCHE	CHE
	CHE6503CM	MOLECULAR SPECTROSCOPY, QUANTUM CHEMISTRY AND GROUP THEORY	TH	5		5	AW2015	AUCHE	CHE
	CHE6504CM	PHOTOCHEMISTRY, PHASE EQUILIBRIA AND INSTRUMENTAL ANALYSIS	TH	5		5	AY2016	AUCHE	CHE
	CHE6501CT	APPLICATIONS OF CHEMINFORMATICS	LT	4	2	5	AZ2017	AUCHE	CHE

VI		INTERDISCIPLINARY COURSE	TH	4		4			
	CHE0601LM	WATER QUALITY MANAGEMENT	PR	4		6		AUCHE	CHE
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH / SUCH	
		Total		30		31			

EXTRA CREDIT COURSES – Refer Pg. No. 292

SUMMER INTERNSHIP (OPTIONAL)

Sem.	Course Code	Course Title	Course Type	Duration	Credits	Passed in Academic Council	Offered to	Offered by
III	CHE3201SI	SUMMER INTERNSHIP	TR	60 hrs. / 2 weeks at the end of semester II or IV	2	AZ2017	AUCHE	CHE
V	CHE5201SI							

COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

ALLIED COURSES

Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
			TH	LA				
CHE2402AA*	GENERAL CHEMISTRY FOR BIOLOGISTS - II	TH	5		4		SUBTE	CHE
CHE2403AT*	FUNDAMENTALS OF CHEMISTRY FOR BIOLOGISTS	LT	3	2	4		AUBOT	CHE

\* Content remains the same, course code has been changed

NON-MAJOR ELECTIVES

Course Code	Course Title	Course Type	Hrs./Wk.	Credits	Passed in Academic Council	Offered to	Offered by
CHZO3201EI	FOOD, NUTRITION AND HEALTH CARE	TH	2	2	AZ2017	AUALLM	CHE & ZOO

Course Code	Course Title	Course Type	Hrs./Wk.	Credits	Passed in Academic Council	Offered to	Offered by
CHSS3201EI	CRIMINOLOGY AND FORENSICS	TH	2	2	AV2014	AUALLM	CHE & SOC
CHTA4201EI	NATURAL FOOD AND CHEMISTRY	TH	2	2	AV2014	AUALLM	CHE & TAM
CHCO4201EI	WEALTH FROM WASTE	TH	2	2	AV2014	AUALLM	CHE & COM

### INTERDISCIPLINARY COURSES

Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
			TH	LA				
BOCH5401DT	MEDICINAL PHYTOCHEMISTRY	LT	3	1	4	AZ2017	AUBOT & AUCHE	BOT & CHE
CHPH5403DM	FUNDAMENTALS OF ENERGY CONVERSION AND STORAGE	TH	4		4		AUCHE & AUPHY	CHE & PHY
BSPS5401DM	CONCEPTS AT NANOSCALE	TH	4		4	AW2015	AUALLS (EXCEPT MATHS)	CHE
CHMA6401DM	APPLICATIONS OF GRAPH THEORY IN CHEMISTRY	TH	4		4	AW2015	CHE & MAT	CHE & MAT
BSPS6401DM	APPLICATIONS OF NANOMATERIALS	TH	4		4	AW2015	AUALLS (EXCEPT MATHS)	CHE
CHPH6401DM	ORGANIC ELECTRONICS	TH	4		4	AW2015	CHE & PHY	CHE & PHY

### SELF-LEARNING COURSES

Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
CHE0403CD	CHEMISTRY OF THE SOIL	TH	4	AU2013	ALLM	CHE
CHE0405CD	CHROMATOGRAPHIC TECHNIQUES	TH	4	AU2013	ALLM	CHE
CHE0404CD	DAIRY CHEMISTRY	TH	4	AU2013	ALLM	CHE
CHE0402CD	INDUSTRIAL CHEMISTRY	TH	4	AU2013	ALLM	CHE
CHE0401CD	GEOCHEMISTRY	TH	4	AU2013	ALLM	CHE

### CHE1201FP VOLUMETRIC ANALYSIS

(LAB)

LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- acquire knowledge on lab safety and precautionary measures
- develop the skills for handling glasswares
- analyze and estimate a chemical substance using titrimetric principles

**COURSE CONTENT:**

60 hrs.

- Lab ethics and safety measures in a chemical laboratory
- Handling electronic analytical balance
- Calibration of volumetric glasswares
- Basic Concepts: Discussion and Problem solving – Equivalent weight of acids, bases, oxidizing and reducing agents – Normality – Molarity – Molality – ppm – Percent solution – Saturated – unsaturated – supersaturated solutions

**EXPERIMENTS:**

1. Preparation of standard solutions and dilutions
2. Estimation of sodium hydroxide
3. Estimation of acetic acid
4. Estimation of Fe(II) / Fe(III) in a mixture
5. Estimation of copper by Iodometry
6. Estimation of iron by Permanganometry
7. Estimation of magnesium by Complexometry
8. Estimation of chloride by Argentometric titration
9. Estimation of Calcium by Indirect method

**REFERENCE BOOK(S):**

Day R A. and Underwood A I., (1991). *Quantitative Analysis*, (6<sup>th</sup> ed.), New York: Pearson Emory University. Print.

Jeffery G.H., Bassett J., Mendham J., and Denney R.C., (1989). *Vogel's Textbook of Quantitative Chemical Analysis*, (5<sup>th</sup> ed.), New York: Longman Scientific & Technical. Print.

## CHE2503CM BASICS OF ORGANIC CHEMISTRY (THEORY)

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- apply the IUPAC rules to name organic compounds
- acquire the knowledge on the basic concepts of reaction mechanisms
- illustrate the mechanisms involved in reactions of alkanes, alkenes, alkynes and alkydienes

**COURSE CONTENT:****UNIT I: NOMENCLATURE OF ORGANIC COMPOUNDS**

15 hrs.

IUPAC nomenclature – rules for naming organic compounds: alkanes, alkenes – alkynes – cyclic aliphatic hydrocarbons – alkyl halides – alcohols – ethers – aldehydes – ketones – carboxylic acids and its derivatives – alkyl cyanides – nitroalkanes and amines – selected examples of monofunctional and polyfunctional organic compounds – structure of organic compound from its IUPAC name – common errors in writing IUPAC names.

**UNIT II: FUNDAMENTALS OF ORGANIC REACTION MECHANISMS**

15 hrs.

Electronic displacements: inductive effect – electromeric effect – mesomeric effect – hyper conjugation – steric effects – heterolytic and homolytic cleavages. Reactive intermediates: carbocations – stability of carbocations – carbanions – stability of carbanions – free radicals – stability

of free radicals – carbenes – nitrenes – electrophiles and nucleophiles – types of reactions – substitution – addition – elimination and rearrangement reactions.

**UNIT III: ALKANES AND ALKENES**

15 hrs.

ALKANES: Introduction – chemical properties – free radical substitution reactions – halogenation (reactivity and selectivity) nitration – sulphonation – oxidation reactions.

ALKENES: Introduction – physical properties – preparation: reduction of alkynes – elimination reactions – Wittig reaction – Kolbe's electrolytic method – chemical properties – stability of alkenes – electrophilic addition reactions – addition of halogens – hydrogen halide – sulphuric acid – water – oxymercuration – demercuration reaction – hydroboration – peroxyacid – alkenes – carbenes – free radical addition reaction – Addition of HBr(peroxide effect) – oxidation reactions – hydroxylation of alkenes with Baeyer's reagent – acidified and alkaline  $\text{KMnO}_4$  –  $\text{OsO}_4$  –  $\text{K}_2\text{Cr}_2\text{O}_7$  –  $\text{Pb}(\text{OAc})_4$  – ozonolysis – allylic substitution reactions – polymerization of alkenes.

**UNIT IV: ALKADIENES**

15 hrs.

Introduction – stability of dienes – preparation of buta-1, 3-diene – molecular orbital picture of 1,3-butadiene – Chemical properties of buta-1, 3-diene – reduction and oxidation reactions – electrophilic addition reaction (1, 2-addition Versus 1, 4-addition) – free radical addition reactions – Diels-Alder reaction.

Polymerization – isoprene – preparation – chemical properties – chloroprene – preparation – chemical properties

**UNIT V: ALKYNES**

15 hrs.

Introduction – preparation (recall) – physical properties – chemical properties – addition of hydrogen – electrophilic addition reactions oxidation reactions – addition of halogens, hydrogen halides, water – nucleophilic addition reactions – reactions involving acetylenichydrogens – reactions with sodamide, lithium amide and Grignard reagent – synthetic application of metal alkynides – reaction of terminal alkynes with ammoniacal cuprous chloride – silver nitrate – polymerization reactions – isomerization (Acetylenic Allene Rearrangement).

**TEXT BOOK(S):**

Jain, M. K. and Sharma, S. C., (2013). *Modern Organic Chemistry*, (4<sup>th</sup> ed.), New Delhi: Vishal Publishing. Print.

**REFERENCE BOOK(S):**

Bruice, P.Y., (2002). *Organic Chemistry*, (3<sup>rd</sup> ed.), New Delhi: Pearson education Inc., Print.

Ghosh, S.K., (1998). *Advanced General Organic Chemistry*, (2<sup>nd</sup> ed.), Calcutta: Books and Allied (P) Ltd., Print.

Mehta, B., and Mehta, M., (2011). *Organic Chemistry*, (6<sup>th</sup> ed.), New Delhi: PHI Learning Private Limited Print.

Morrison, R.T, Boyd, R.N. and Bhattacharjee S. K., (2011). *Organic Chemistry*, (7<sup>th</sup> ed.), New Delhi: Pearson. Print.

Solomons, T.W.G., Fryhle C.B. and Snyder S.A., (2016). *Organic Chemistry*, (11<sup>th</sup> ed.), United States: Wiley. Print.

## CHE2203CP SEPARATION AND PURIFICATION TECHNIQUES

(LAB)

### LEARNING OUTCOME

3 hrs./wk.

On successful completion of this course, the student will be able to

- employ the techniques for the purification of organic compounds
- apply the techniques for the extraction of natural products
- use chromatographic techniques for the separation of mixture of compounds

### COURSE CONTENT:

45 hrs.

#### TECHNIQUES FOR SEPARATION AND PURIFICATION:

1. Purification of organic compounds by crystallization using the following solvents:
  - a. Water
  - b. Alcohol
  - c. Alcohol-Water
2. Determination of melting and boiling point
3. Distillation
  - a. Simple
  - b. Steam
  - c. Fractional
4. Soxhlet extraction
5. Solvent extraction technique for separation of organic mixture
6. Chromatographic techniques:

Adsorption Chromatography

  - a. Column
  - b. TLC Partition Chromatography
  - c. Paper – Ascending
  - d. Circular disc

All lab classes will have pre-lab discussions.

### REFERENCE BOOK(S):

Donald L. Pavia, Gary M. Lampman, George and Kriz S., (2009). *Organic Chemistry – A Lab Manual*  
New Delhi: Sengage Learning. Print.

Furniss B.S., (1989). *Vogel's Textbook of Organic Chemistry*, (5<sup>th</sup> ed.), London: ELBS. Print.

## CHE2202FS DATA HANDLING AND PRESENTATION

(THEORY)

### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course, the student will be able to

- analyze and tabulate the data
- make use of computers to represent the data
- design a scientific report

## COURSE CONTENT:

### UNIT I: DATA CLASSIFICATION

6 hrs.

Data – definition – types of data – categorical or qualitative and numerical or quantitative – categorical – nominal and ordinal – numerical – discrete and continuous, interval and ratio – classification of data – chronological, geographical, qualitative, quantitative, frequency distribution.

### UNIT II: DATA ANALYSIS

6 hrs.

Data collection – primary and secondary – variable – dependent and independent – accuracy and precision – significant figures – measure of central tendency – mean, median and mode and measures of dispersion – range, mean deviation, standard deviation.

### UNIT III: DATA REPRESENTATION

10 hrs.

Tabulation of data – conversion of table to diagrams and graphs – diagrams – bar and pie diagram – graphs – line and frequency distribution – linear graphs (identification of slope and intercept values) – use of error bars in presenting graphical data – using computers to prepare tables, spread sheets and graphs.

### UNIT IV: REPORT PREPARATION

8 hrs.

Data interpretation – preparation of report – presentation of report (written & oral) – use of computer in preparation and presentation of a scientific report – use of computer aided tools to represent chemical structures – effective usage of internet for literature search – plagiarism.

### TEXT BOOK(S):

Gary D. Christian, (2011). *Analytical Chemistry*, (6<sup>th</sup> ed.), New York: John Wiley & Sons. Print.

### REFERENCE BOOK(S):

Douglas A. Skoog and Donald M. West, F., James Holler and Stanley R. Crouch, (2011). *Fundamentals of Analytical Chemistry*, (9<sup>th</sup> ed.), United States: Cengage learning. Print.

Jeffery G.H., Bassett J., Mendham J. and Denney R.C., (1989). *Vogel's Textbook of Quantitative Chemical Analysis*, (5<sup>th</sup> ed.), New York: Longman Scientific & Technical. Print.

Nirmala Jeyaraj (ed.td.), (2008). *Introduction to Research Methodology (A multidisciplinary approach)*, Madurai: Lady Doak College. Print.

(For the following course, content remains the same, course code has been changed and the content is presented in this Academic Council Booklet)

## CHE2402AA GENERAL CHEMISTRY FOR BIOLOGISTS - II

(THEORY)

### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- explain the thermodynamic basis of biological reactions
- appraise the symmetry in nature
- apply the principles of spectroscopy in biomolecules

## COURSE CONTENT:

### UNIT I: CHEMICAL EQUILIBRIUM

15 hrs.

Gibbs free energy – Variation of  $\Delta G$  with composition – reactions at equilibrium – standard reaction  
Gibb's free energy – coupled reactions in bioenergetics –function of ATP, oxidation of Glucose –  
proton transfer equilibria – Brønsted – Lowry theory – protonation and deprotonation – polyprotic  
acids – amphiprotic systems.

### UNIT II: BASIC CHEMISTRY OF BIOMOLECULES

15 hrs.

Carbohydrates: Classification, aldose and ketose, monosaccharides (glucose and fructose),  
oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen)

Proteins: Elementary idea of amino acids, peptide bond, polypeptides - primary, secondary and  
tertiary structure of proteins and quaternary structure, denaturation of proteins.

Vitamins: Classification and functions

Nucleic acids: Chemical composition of DNA and RNA

### UNIT III: ENERGY CONSIDERATIONS IN BIOCHEMISTRY

15 hrs.

Factors affecting the spontaneity of a chemical reaction - Reversible and irreversible reactions –  
Enthalpic and entropic contributions to  $\Delta G$  – temperature dependence of  $\Delta G$  for a protein – Protein  
ligand binding - The importance of irreversible reactions in the strategy of metabolism – Energy  
conversion in living organisms - Energy producing and energy Utilising systems – thermodynamic  
relationships and energy rich components

### UNIT IV:

15 hrs.

#### a. SYMMETRY AND GROUP THEORY

Symmetry in nature and molecules, symmetry elements and operations, properties of a group -  
classification of molecules based on the symmetry and arriving at various point groups.

#### b. FUNDAMENTALS OF SPECTROSCOPY

Introduction – electromagnetic radiations – interaction of electromagnetic radiations – Basic  
principles of UV-Visible – laws of absorption, Photophysical processes – fluorescence,  
Phosphorescence, IR-stretching frequencies of Common functional Groups,  $^1\text{H}$  NMR spectroscopy-  
magnetic properties of the nucleus – Nuclear Resonance-Chemical Shifts: Position of Signals.

### UNIT V: BIOLOGICAL APPLICATIONS OF SPECTROSCOPY

15 hrs.

Applications of UV-Visible Spectrophotometry – interpretation of Absorption Spectra of Biological  
Macromolecules – Infrared spectrophotometry – Extrinsic Fluorescence – Nuclear Magnetic  
Resonance Spectroscopy.

### REFERENCE BOOK(S):

Avinash Upadhyay, Kakoli Upadhyay, Nirmalendu Nath, (2002). *Biophysical Chemistry, Principles and Techniques*, Himalaya Publishing House, Mumbai, Chapters: (UNIT V).

Bhattacharya P.K., (1986). *Group Theory and Its Chemical Applications*, Himalayan Publishing House, Chapters: (UNIT IV).

Bhupinder Mehta, Manju Mehta, (2005). *Organic Chemistry*, First edition, PHI Learning Pvt. Ltd, 01-Mar-, Chapters: (Unit IV).

Gary D. Christian, (2011). *Analytical Chemistry*, 6<sup>th</sup> ed., John Wiley & Sons, Chapters: (UNIT II & V).

Morrison R.T., Boyd R.N. and Bhattacharjee S.K, (2011). *Organic Chemistry*, 7<sup>th</sup> ed., India: Pearson Education. Chapters: (UNIT II).

Peter Atkins, Julio D. Paula, (2005). *Physical Chemistry for the Life Sciences*, 1<sup>st</sup> ed., New Delhi: Oxford University press. Chapters: (UNIT I).

Ramakrishnan V. and M.S. Gopinathan, (1998). *Group Theory In Chemistry*, Vishal Publications. Chapters: (UNIT IV).

Satyanarayana U., Chakrapani U, (2010). *Essentials of Biochemistry*, 2<sup>nd</sup> ed., Kolkatta: Books and Allied Pvt. Ltd. Chapters: (UNIT II & UNIT III).

Thomas M. Devlin, (2011). *Textbook of Biochemistry with Clinical Correlations*, 7<sup>th</sup> ed., USA: John Wiley & Sons. Chapters: (UNIT II).

William H. Elliott, Daphne C. Elliott, (2005). *Biochemistry and Molecular Biology*, 3<sup>rd</sup> ed., New Delhi: Oxford University press. Chapters: (UNIT II).

## CHE2403AT FUNDAMENTALS OF CHEMISTRY FOR BIOLOGISTS

### (LAB CUM THEORY)

#### LEARNING OUTCOME

3T hrs. + 2L hrs. / wk.

On successful completion of the course, the students will be able to

- describe the structure of atoms and bonding in molecules
- know the basic principles of spectroscopic techniques
- acquire knowledge for preparing standard solutions and analyzing plant pigments

#### COURSE CONTENT:

##### UNIT I STRUCTURE AND BONDING

15 hrs.

Subatomic and atomic particles – Dalton's atomic theory – Thomson's model – Rutherford's atomic model – Bohr theory of hydrogen atom – Wave-particle duality of matter – de Broglie's equation- Heisenberg's uncertainty principle.

Bonding in biomolecules – covalent bonding – polar covalent bond and coordinate covalent bond, Non covalent bonding – ionic bonds, van der Waals forces – dispersion attractions, dipole-dipole and dipole-induced dipole interactions, hydrogen bonds – inter and intramolecular hydrogen bonding- importance of hydrogen bond in sustaining life.

##### UNIT II REDOX REACTIONS

15 hrs.

Covalency, Oxidation number and oxidation state – Rules for calculating oxidation number – oxidation – reduction reactions – oxidizing and reducing agents- Auto and induced oxidation– Balancing redox reactions by oxidation number method and ion electron method. Biological redox reactions – reduction potential – standard reduction potentials of biologically important half-reactions – calculation of free energy change.

##### UNIT III a NOMENCLATURE OF ORGANIC COMPOUNDS

15 hrs.

IUPAC nomenclature – rules for naming organic compounds-alkanes, alkenes, alkynes, cyclic aliphatic hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids and its derivatives and amines – selected examples of monofunctional and polyfunctional organic compounds – structure of organic compound from its IUPAC name – common errors in writing IUPAC names.

## b INTRODUCTION TO SPECTROSCOPIC TECHNIQUES –

Introduction – interaction of EMR with matter – Basic principles of UV- Visible spectroscopy – laws of absorption, Emission spectroscopy – fluorescence, Phosphorescence, IR spectroscopy – principle – stretching frequencies of Common functional Groups, H1 NMR spectroscopy – principle – number, position and splitting of signals.

**LAB I Volumetric analysis:** 15 hrs.

Preparation of solutions – different concentration units – normality, molarity, molality, mole fraction, ppm, mole percent and mass percent. Primary and secondary standard – Equivalent weight of acids, bases, oxidizing and reducing agents.

**Experiments:**

- Determination of acetic acid in vinegar (Acid – base)
- Determination of iron in plant products (Dichrometry)
- Determination of ascorbic acid in citrus fruits (Iodimetry)

**LAB II Phytochemical analysis** 15 hrs.

**Experiments:**

Extraction of pigments from medicinal plants.

Qualitative tests to identify the different secondary metabolites viz., carotenoids, anthocyanins, flavones, chlorophyll, glycosides – tannins, saponins, alkaloids, quinoline

## REFERENCE BOOK(S):

Agarwal O.P., (2007). *Organic Chemistry natural products*, Vol. I & II, Meerut: Goel Publishing house. (Unit IV)

Albert L. Lehninger, David L. Nelson, Michael M. Cox, (2004). *Principles of Biochemistry*, 5<sup>th</sup> ed., CBS Publishers. (Unit II)

Arun Bahl, B.S. Bahl, G.D. Tuli, (2009). *Essentials of Physical Chemistry*, 1<sup>st</sup> ed., New Delhi: S. Chand & Company Ltd. (Units I and II).

Madan R.D, (2011). *Modern Inorganic Chemistry*, 3<sup>rd</sup> ed., S. Chand & Company Ltd., (Unit I and II)

Bhupinder Mehta , Manju Mehta, (2005). *Organic Chemistry*, 1<sup>st</sup> ed., PHI Learning Pvt. Ltd., (Unit III a and b)

Gary D. Christian, (2011). *Analytical Chemistry*, 6<sup>th</sup> ed., John Wiley & Sons, (UNIT III b)

G.H. Jeffery, J. Basset and others, (2009). *Vogel's Textbook of Quantitative Chemical Analysis*, London: ELBS, 6<sup>th</sup> ed., (Lab I)

African Journal of Pure and Applied Chemistry Vol. 5(8), pp. 237-244, 2011. ((Lab II) Middle – East journal of scientific

## COURSE PROFILE

### M. Sc. CHEMISTRY

From 2019 batch onwards

Sem.	Course code	Course title	Course Type	Hrs. / wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PCH1501CM	ORGANIC REACTION MECHANISM	TH	5		5		SPCHE	CHE
	PCH1502CM	CLASSICAL THERMODYNAMICS AND CHEMICAL KINETICS	TH	5		5		SPCHE	CHE
	PCH1503CM	CONCEPTS IN INORGANIC CHEMISTRY	TH	5		5		SPCHE	CHE
	PCH1401CM	ANALYTICAL CHEMISTRY	TH	4		4		SPCHE	CHE
	PCH0401CP	ORGANIC CHEMISTRY LAB	LA		3			SPCHE	CHE
	PCH1201CP	PHYSICAL CHEMISTRY LAB I	LA		3	2		SPCHE	CHE
	PCH0402CP*	INORGANIC CHEMISTRY LAB	LA		2			SPCHE	CHE
		ACADEMIC CLUB			1				
	PGV1101PV	FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2	1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE	
PGV1102PV	PERSPECTIVES ON GENDER	AV2014 as PGV2101V				LDC ALLM			
PIV1102PI	THE BIBLE AND SCIENCE					APCH/ SPCH			
		Total		30		22			
II	PCH2501CM	ORGANIC STEREOCHEMISTRY AND PHOTOCHEMISTRY	TH	5		5		SPCHE	CHE
	PCH2502CM	QUANTUM CHEMISTRY AND GROUP THEORY	TH	5		5		SPCHE	CHE
	PCH2501MO* / PCH2502MO*	COORDINATION CHEMISTRY / POLYMER CHEMISTRY	TH	5		5		SPCHE	CHE

Sem.	Course code	Course title	Course Type	Hrs. / wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PCH2401EI / PCH2401EP	FORENSIC SCIENCE / TEXTILE CHEMICAL PROCESSING	TH / LA	4 /	4	4		SPALLM	CHE
	PCH0401CP	ORGANIC CHEMISTRY LAB	LA		2	4		SPCHE	CHE
	PCH2201CP	PHYSICAL CHEMISTRY LAB II	LA		3	2		SPCHE	CHE
	PCH0402CP*	INORGANIC CHEMISTRY LAB	LA		3	4		SPCHE	CHE
		CLUB			1				
	PGV2103PV	HUMAN RIGHTS AND DUTIES	TH	2	1	AM2005 as PGV0104V	NON LDC ALLM	Centre for VE	
	PGV2102PV	PRACTICING HUMAN RIGHTS				AM2005 as PGV0107V	LDC ALLM		
	PIV2102PI	RIGHTS, RESPONSIBILITIES AND THE BIBLE					APCH/ SPCH		
			Total		30	30			

\* Content remains the same, course code has been changed

Sem.	Course code	Course Title	Course Type	Hrs. / wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PCH3623M	ORGANIC SYNTHETIC METHODS	TH	6		6	AS2011	SPCHE	CHE
	PCH3522M	ORGANIC STEREOCHEMISTRY AND PHOTOCHEMISTRY	TH	5		5	AS2011	SPCHE	CHE
	PCH3523M	ORGANOMETALLIC AND BIOINORGANIC CHEMISTRY	TH	5		5	AS2011	SPCHE	CHE
	PCH3523O	CHEMICAL THERMODYNAMICS AND PHOTOCHEMISTRY	TH	5		5	AS2011	SPCHE	CHE
	PCH3424E	CHEMINFORMATICS FOR DRUG DESIGN	LT	3	1	4	AY2016	SPALLS	CHE

	PCH0621M	PROJECT	PR	4		--		SPCHE	CHE
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH/ SPCH	
		<b>Total</b>		<b>30</b>		<b>26</b>			
IV	PCH4621M	CHEMISTRY OF NATURAL PRODUCTS	TH	6		6	AS2011	SPCHE	CHE
	PCH4522M	RINGS, CAGES AND CLUSTERS	TH	5		5	AS2011	SPCHE	CHE
	PCH4523M	ADVANCED TOPICS IN CHEMISTRY	TH	5		5	AS2011	SPCHE	CHE
	PCH4521M	PRINCIPLES AND APPLICATIONS OF ELECTROCHEMISTRY	TH	4		5	AS2011	SPCHE	CHE
	PCH0621M	PROJECT	PR	8		6		SPCHE	CHE
	PGV4103PV	IN TUNE WITH NATURE						ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER	TH	2		1		APCH/ SPCH	
		<b>Total</b>		<b>30</b>		<b>28</b>			

### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PCH2301MT	PCH3301MT	PCH4301MT	MT	3	SPCHE	CHE
MINI PROJECT	PCH2301MP	PCH3301MP	PCH4301MP	MP	3	SPCHE	CHE
COMPREHENSIVE e-ASSESSMENT	-	-	PCH4201CE	CE	2	SPCHE	CHE

### SUMMER INTERNSHIP

Sem.	Course Code	Course Title	Course Type	Duration	Credits	Passed in Academic Council	Offered to	Offered by
III	PCH3201SI	SUMMER INTERNSHIP	TR	90 hrs. / 3 weeks at the end of semester II	2	AZ2017	SPCHE	CHE

## COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

### ELECTIVE COURSES

Sem	Course code	Course title	Course type	Hrs. / wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PCH2421E	FORENSIC CHEMISTRY	TH	4		4	AS2011	ALLM (Except Chemistry)	CHE
III	PCH3424E	CHEMINFORMATICS FOR DRUG DESIGN	LT	3	1	4	AY2016	SPALLS	CHE

### SELF-LEARNING COURSES

Sem	Course code	Course title	Course type	Credits	Passed in Academic Council	Offered to	Offered by
II / III / IV	PCH0421D	NUCLEAR CHEMISTRY	TH	4		ALLM	CHE
	PCH0422D	INDUSTRIAL CHEMISTRY	TH	4		ALLM	CHE
	PCH0423D	SEPARATION TECHNIQUES	TH	4		ALLM	CHE
	PCH0424D	GREEN CHEMISTRY	TH	4		SPCHE	CHE

### PCH1501CM ORGANIC REACTION MECHANISM

#### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify and describe the different types of reaction mechanisms
- recognize the relationship between structure and reactivity
- compare the mechanistic details of substitution, elimination and addition reactions

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION TO REACTION MECHANISM

15 hrs.

Structure and stability: carbocations – carbanions – free radicals – carbenes – nitrenes – types of reaction mechanisms – thermodynamic and kinetic requirement of chemical reaction – Hammond's postulate – microscopic reversibility – methods of determining mechanism – isotopic labeling – kinetic evidence – isotope effect – cross over experiments.

##### UNIT II: STRUCTURE AND REACTIVITY

15 hrs.

Effect of structure and reactivity: resonance and field effects – steric effects – quantitative treatments – linear free energy relationship – Hammett equation – Taft equation –  $\sigma$  and  $\rho$  values in aromatic electrophilic substitutions.

Aromaticity: Huckel's rule – aromaticity in 5,6,7 and 8 membered rings (recall) – aromatic systems with electron numbers other than six – systems of two electrons – four electrons (anti aromaticity) – eight electrons – ten electrons – more than ten electrons – annulenes.

##### UNIT III: NUCLEOPHILIC SUBSTITUTION AND ELIMINATION REACTIONS

15 hrs.

Aliphatic nucleophilic substitution: Mechanism –  $S_N2$  –  $S_N1$  – mixed  $S_N1$  &  $S_N2$  –  $S_{Ni}$  – SET – Reactivity – effect of substrate – attacking nucleophile – leaving group – reaction medium –

substitution at vinylic – trigonal – allylic carbons – neighboring group participation: NGP by  $\pi$  and  $\sigma$  bonds – non-classical carbocations.

Elimination: mechanisms of  $\beta$  eliminations – E1 – E2 – E1CB – orientation of double bonds – reactivity – effect of substrate – attacking base – leaving group – medium – pyrolytic elimination.

**UNIT IV: ADDITION REACTIONS AND AROMATIC SUBSTITUTION** 15 hrs.

Addition to C – C multiple bonds: mechanisms – electrophilic – nucleophilic – free radical – orientation and reactivity – addition of conjugated systems – cyclopropane rings – carbon – hetero multiple bonds.

Electrophilic additions: mechanism of addition – halogens – hydrogen halides on C – C double bond system.

Aromatic Electrophilic Substitution: Arenium ion mechanism – orientation and reactivity in monosubstituted benzene rings – benzene rings with more than one substituent – effect of leaving group – *o/p* ratio.

Aromatic Nucleophilic substitution: mechanism – S<sub>N</sub>Ar – S<sub>N</sub>1 – Benzyne – reactivity – effect of substrate – leaving group – attacking nucleophile.

**UNIT V: SELECTED ORGANIC NAME REACTIONS** 15 hrs.

Favorskii reaction – stork enamine reaction – Michael addition – sharpless asymmetric epoxidation – Hofmann Löffler Freytag reaction – Shapiro reaction – Baeyer–Villiger reaction – Bischler–Napieralski reaction – Robinson annulation – Heck reaction – Suzuki coupling – Stille coupling – Sonogashira coupling.

**TEXT BOOK(S):**

Michael B. Smith, (2016). *March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure*, (7<sup>th</sup> ed.), New Delhi: Wiley eastern limited. Print.

**REFERENCE BOOK(S):**

Edwin S. Gould, (1959). *Mechanism and Structure in Organic Chemistry*, New York: Holt Rinehart and Winston Inc. Print.

Francis A. Carey, (2000). *Organic Chemistry*, (4<sup>th</sup> ed.), New York: McGraw Hill Inc. Print.

Graham Solomons, T.W., Craig B. Fryhle and Scott A. Snyder, (2016). *Organic Chemistry*, (11<sup>th</sup> ed.), Delhi: John Wiley & Sons, Inc. Print.

Jonathan Clayden, Nick Greeves and Stuart Warren, (2012). *Organic Chemistry*, (2<sup>nd</sup> ed.), New York: Oxford University Press Inc. Print.

Lowry T.H. and Richardson K.S., (1976). *Mechanism and Theory in Organic Chemistry*, London: Harper and Row. Print.

Moody C.J. and Whitham G.H., (1992). *Reactive intermediates*, New York: Oxford chemistry Primers. Print.

Peter Sykes, (2008). *A Guidebook to Mechanism in Organic Chemistry*, (6<sup>th</sup> ed.), New Delhi: Pearson education, Ltd. Print.

Reinhard Bruckner, (2003). *Advanced Organic Chemistry – Reaction Mechanisms*, London: Academic Press. Print.

# PCH1502CM CLASSICAL THERMODYNAMICS AND CHEMICAL KINETICS

## (THEORY)

### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- recognize the principles that govern equilibrium and non-equilibrium thermodynamics
- describe the theories of various reaction rates
- analyze the ionic conductivity of strong electrolytes

### COURSE CONTENT:

#### UNIT I: EQUILIBRIUM THERMODYNAMICS

15 hrs.

General review: enthalpy – entropy – free energy – partial molar quantities and their determination – chemical potential – Gibbs–Duhem equation – Gibbs–Duhem–Margules equation – Gibbs phase rule: thermodynamic derivation of phase rule and its application to three component system – Fugacity: methods of determining the fugacity of a real gas, Variation of fugacity with pressure and temperature – Activity: dependence of activity on temperature and pressure – activity coefficient – determination of activity and activity coefficient of non-electrolytes – Aqueous solutions of electrolytes – Mean ionic activity – Mean ionic activity coefficient and ionic strength.

#### UNIT II: NON-EQUILIBRIUM THERMODYNAMICS

15 hrs.

Conservation of mass and energy – entropy production: entropy production in chemical reactions – entropy production and entropy flow in open systems – transformation properties of rates and affinities – Onsager's theory: validity of Onsager theory and its verification – principle of microscopic reversibility and Onsager reciprocal relations – thermoelectricity – electro kinetic effects – thermomolecular pressure difference – thermomechanical effect – transference of electrolytes in aqueous solutions – stationary non-equilibrium states – irreversible thermodynamics of biological systems – irreversible thermodynamics of non-linear regime.

#### UNIT III: CHEMICAL KINETICS – THEORIES OF REACTION RATES

15 hrs.

Basic kinetic concepts: rate of reaction – rate constants – order and molecularity – reactions having no order – elementary – composite – chain reactions – theories of reaction rates: solution – phase reactions: collision theory, transition state theory – thermodynamic formulation of conventional transition state theory – gas-phase reactions: unimolecular reactions – Lindemann – Hinshelwood – RRK – RRKM and Slater treatments – Oscillating reactions: B-Z reaction, mechanism, Brussellator and Oregonator models

#### UNIT IV: CATALYSIS AND SURFACE CHEMISTRY

15 hrs.

Homogenous catalysis: acid – base catalysis – salt effect – Hammett acidity function – enzyme catalysis: Michealis-Menten equation – turnover number – mechanism of enzyme inhibition – competitive – non-competitive – uncompetitive inhibition – effect of pH on enzyme catalyzed reaction – Heterogenous catalysis: adsorption: physisorption and chemisorption – Langmuir – BET – Temkin adsorption Isotherm – desorption activation energy – Gibbs adsorption isotherm – Enzyme-like catalysis – reactions assisted by micelle formation, critical micellar concentration and factors affecting CMC, reactions assisted by phase-transfer catalyst agents, thermodynamics of micellization, reverse micelles.

**UNIT V: ELECTROCHEMISTRY I**

15 hrs.

Ionic interaction: ion activity – ion-ion interaction and ion-solvent interactions – electrical potential and thermodynamic functions – Debye-Huckel equation – limiting and extended forms of Debye-Huckel equation – applications of the Debye-Huckel equation – Ion association.

Reversible electrode potentials: Electrode potentials and activity – Nernst equation – cell EMF and sign conventions – electrochemical concentration cells – concentration cells with and without liquid junctions.

**TEXT BOOK(S):**

Crow, D. R., (1988). *Principles and Applications of Electrochemistry*, (3<sup>rd</sup> ed.), Chapman Hall, London. Print. (Unit V)

Keith J. Laidler, (2004). *Chemical Kinetics*, (3<sup>rd</sup> ed.), Delhi: Pearson education. Print. (Unit III)

Peter Atkins and Julio de Paula, (2016). *Physical Chemistry*, (10<sup>th</sup> ed.), Oxford University Press. (Unit III)

Kuriacose, J.C., (1991). *Catalysis*, (3<sup>rd</sup> ed.), MacMillan India Ltd. Print. (Unit IV)

Kuriakose, J.C. and Rajaram, J., (1986). *Thermodynamics for students of Chemistry*, Jalandhar: Shoban Lal & Co. Print. (Units I & II)

**REFERENCE BOOK(S):**

Bajpai, D. N., (2015). *Advanced Physical Chemistry*, (3<sup>rd</sup> ed.), New Delhi: S Chand and Company Pvt Ltd. Print.

Francis W. Sears and Gerhard L. Salinger, (1986). *Thermodynamics, Kinetic theory and Statistical Thermodynamics*, (3<sup>rd</sup> ed.), New Delhi: Narosa publishing house. Print.

Kalidas, C. and Sangaranarayanan M.V., (2002). *Non Equilibrium Thermodynamics Principles and Applications*, (1<sup>st</sup> ed.), New Delhi: Macmillan India Limited. Print.

Samuel Glasstone, (2000). *An Introduction to Electrochemistry*, (an east-west ed.), New Delhi: East-West Press private limited. Print.

**PCH1503CM CONCEPTS IN INORGANIC CHEMISTRY****(THEORY)****LEARNING OUTCOME**

5 hrs. / wk.

On successful completion of the course, the student will be able to

- relate the structure and electrical, mechanical properties of solids
- discuss the applications of radioactivity
- compare the properties of Lanthanides and Actinides

**COURSE CONTENT:****UNIT I: PERIODIC PROPERTIES AND THEORY OF ACIDS AND BASES**

15 hrs.

Periodic properties of atoms – ionization energy – Slater's rule – electron affinity – Pauling's and modern scales of electro negativity – acid – base concept – measure of acid and base strength – HSAB concept and applications – non-aqueous solvents:  $\text{NH}_3$  –  $\text{H}_2\text{SO}_4$  –  $\text{HF}$  –  $\text{N}_2\text{O}_4$  –  $\text{SO}_2$  –  $\text{BrF}_3$  – super acids and molten salts.

**UNIT II: STRUCTURE AND BONDING** 15 hrs.

Ionic bond: lattice energy – Born-Landé equation – Born-Haber cycle – Covalent bond: resonance – formal charge – hybridization – VSEPR theory with applications to inorganic compounds – Bent's rule and energies of hybridization – Walsh diagram of triatomic systems – MO theory – MO diagrams –  $A_2$  – AB: NO – CO –  $AB_2$ : linear  $BeCl_2$  – bent  $H_2O$  –  $AB_3$ :  $NH_3$  molecule – bond length – bond energy – bond order – polarizability – hydrogen bonding.

**UNIT III: SOLID STATE CHEMISTRY AND CRYSTALLOGRAPHY** 15 hrs.

Crystal lattice – lattices and unit cells – crystalline solids – diffraction methods – x-ray diffraction – Bragg's law of diffraction – experimental methods of crystal structure determination – single crystal and powder pattern – structure factor calculation – indexing of lattices – Neutron diffraction – electron diffraction – basic principles and applications – structure of solids – close packing – radius ratio – types of crystal structure – spinels – bonding in solids – metallic bond – band model – semiconductors – super conductors – BCS theory – defects – point and plane dislocations – non-stoichiometry – solid solutions – Hume Rothery rule.

**UNIT IV: NUCLEAR CHEMISTRY** 15 hrs.

Nuclear binding energy and stability – nuclear models: nuclear shell model – liquid drop model – collective model – nuclear reactions: types of reactions – Bethe notation – nuclear cross – sections – Q-value – natural and artificial radioactivity – radioactive decay and equilibrium – nuclear fission – nuclear fusion – radioactive techniques: neutron activation analysis – counting techniques: G.M. counter – proportional counters – scintillation counters – particle accelerators: cyclotron – synchrotron – betatron.

**UNIT V: LANTHANIDES AND ACTINIDES** 15 hrs.

Lanthanides and actinides: general trends in periodic properties – stable oxidation states – colour and electronic absorption spectra – luminescence – magnetic properties – hydroxides – oxides – complexes – organometallic compounds – lanthanide shift reagents – Transuranium elements – formation and colour of ions in aqueous solution – comparison of inner transition and transition metals.

**TEXT BOOK(S):**

Azaroff, L., (1995). *Introduction to Solids*, New Delhi: Tata McGraw-Hill Publishing Company. Print. (Unit III)

Catherine E. Housecroft and Alan G. Sharpe, (2012). *Inorganic Chemistry*, (4<sup>th</sup> ed.), England: Pearson education limited. Print. (Unit V)

James E. Huheey, (1993). *Inorganic Chemistry*, (4<sup>th</sup> ed.), HarperCollins College Publishers. Print. (Units I & II)

Mark Weller, Tina Overton, Jonathan Rourke and Fraser Armstrong, (2016). *Inorganic Chemistry*, (6<sup>th</sup> ed.), Oxford University Press. Print. (Units I & II)

Samuel Glasstone, (1979). *Source Book of Atomic Energy*, (3<sup>rd</sup> ed.), U.S.A: Krieger Pub Co. Print. (Unit IV)

**REFERENCE BOOK(S):**

Freidlander G., Kennedy J.W., Macias E.S., and Miller J.M., (1964). *Nuclear and Radiochemistry*, John Wiley and Sons. Print.

Gary Wulfsberg, (2010). *Inorganic Chemistry*, (Viva Student ed.), New Delhi: Viva Books Pvt Limited Print.

Lesley Smart and Elaine Moore, (2004). *Solid state chemistry – An introduction*, (2<sup>nd</sup> ed.), UK: Nelson Thornes. Print.

Sharma B. K., (1996). *Nuclear & Radiation Chemistry*, Meerut: GOEL Publishing House. Print.

## PCH1401CM ANALYTICAL CHEMISTRY

### (THEORY)

#### LEARNING OUTCOME

4 hrs. / wk.

On successful completion of the course, the student will be able to

- employ the various methods to handle and analyze the data scientifically
- review the different instrumental techniques
- compare the advanced chromatographic separation methods

#### COURSE CONTENT:

##### UNIT I: DATA HANDLING AND SPREADSHEETS

12 hrs.

Accuracy and precision – significant figures – rounding off – measures of central tendency: mean, mode, median – determinate and indeterminate errors – ways of expressing accuracy: absolute and relative errors – ways of expressing precision: standard deviation – variance – coefficient of variation – relative standard deviation – propagation of errors – control chart – confidence limit – tests of significance: F test – student t test – Q test – statistics for small data sets – median – range – linear least squares – correlation coefficient – use of spreadsheets for data analysis.

##### UNIT II: ATOMIC SPECTROSCOPY

12 hrs.

Atomic absorption spectroscopy: principle – instrumentation – source – flame atomization: types of flames – flame structure – flame atomizers – electrothermal atomization – types of interferences – applications – quantitative analysis – determination of metallic elements in biological materials and food samples – atomic emission spectroscopy: principles – excitation sources – flame and plasma – advantages of using plasma over flame and electrothermal absorption methods – Inductively coupled plasma atomic emission spectroscopy – ICP source and applications – atomic x-ray fluorescence spectrometry – principle and applications.

##### UNIT III: THERMOANALYTICAL TECHNIQUES

12 hrs.

Thermo gravimetry: principle – factors affecting TGA – TGA curves of calcium oxalate, copper sulphate and polyethene – applications – derivative thermogravimetric analysis – differential thermal gravimetry: principle and working – factors affecting DTA – applications – differential scanning calorimetry: principle and applications, Thermomechanical analysis: principle and applications – thermometric titrations: theory – titration curves – applications of thermometric titrations.

##### UNIT IV: ELECTROANALYTICAL TECHNIQUES

12 hrs.

Potentiometry: general principles – types of electrodes – reference – indicator electrodes: metallic – membrane electrodes – potentiometric titrations – coulometry: current – voltage relationships, coulometric methods – types – coulometric titrations – voltammetry: excitation signals in

voltammetry – linear sweep voltammetry – cyclic voltammetry – pulse voltammetry – stripping methods: anodic and cathodic stripping – applications of voltammetry.

**UNIT V: CHROMATOGRAPHIC METHODS**

12 hrs.

General principles of chromatography – classification of chromatographic methods – working and applications of gas chromatography – high performance liquid chromatography – supercritical fluid chromatography – gel permeation chromatography.

**TEXT BOOK(S):**

Gary D. Christian, (2004). *Analytical Chemistry*, (6<sup>th</sup> ed.), India: John Wiley & Sons. Print. (Unit I)

Douglas A. Skoog, F. James Holler and Crouch (2016). *Principles of Instrumental Analysis*, (6<sup>th</sup> ed.), Delhi: Cengage learning. Print. (Units II, III, IV & V)

Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch, (2004). *Fundamentals of Analytical Chemistry*, (8<sup>th</sup> ed.), Delhi: Cengage learning. Print. (Units II, III, IV & V)

**REFERENCE BOOK(S):**

Gurdeep R. Chatwal and Sham K. Anand, (2002). *Instrumental methods of chemical analysis*, New Delhi: Himalaya Publishing House. Print.

Willard, Merritt, Dean and Settle, (1986). *Instrumental methods of analysis*, (7<sup>th</sup> ed.), New Delhi: CBS Publishers. Print.

**PCH0401CP ORGANIC CHEMISTRY LAB**

(LAB)

**LEARNING OUTCOME**

5 hrs./ wk.

On successful completion of this course, the student will be able to

- identify the functional groups
- design experiments to prepare, purify and characterize organic compounds
- record the method of quantitative analysis of organic compounds

**COURSE CONTENT:**

75 hrs.

**I. GENERAL LAB SAFETY MEASURES**

**II. SPECIAL TECHNIQUES IN ORGANIC SYNTHESIS:**

1. Purification of solvents (General discussions related to Nature, toxicity etc.)
2. Steam distillation – isolation of clove oil from cloves
3. Solid – liquid extraction – using Soxhlet apparatus
4. Recrystallisation techniques

**III. SEPARATION AND ANALYSIS OF WATER SOLUBLE / INSOLUBLE ORGANIC COMPOUNDS**

1. Separation of two component mixture
2. Separation of three component mixture (separation only)

**IV. PREPARATION OF ORGANIC COMPOUNDS**

1. Reduction of prochiral ketone
2. *p*-bromoaniline from aniline
3. Microwave assisted Diel's Alder reaction of maleic anhydride and Anthracene
4. One Green Chemistry experiment – choice of the student

## V. ESTIMATION OF ORGANIC COMPOUNDS

1. Estimation of ketone
2. Estimation of glucose (Lane and Eynon method, Anthrone method)
3. Estimation of glycine

### REFERENCE BOOK(S):

- Arthur I. Vogel, (1987). *Elementary Practical Organic Chemistry, Part I – Small scale preparations*, (2<sup>nd</sup> ed.), New Delhi: CBS Publishers and Distributors. Print.
- Arthur I. Vogel, (1987). *Elementary Practical Organic Chemistry, Part II – Qualitative organic analysis*, (2<sup>nd</sup> ed.), New Delhi: CBS Publishers and Distributors. Print.
- Arthur I. Vogel, (1987). *Elementary Practical Organic Chemistry, Part III – Quantitative organic analysis*, (2<sup>nd</sup> ed.), New Delhi: CBS Publishers and Distributors. Print.
- Brian. S. Furniss, Antony J. Hannaford, Peter W. G. Smith and Austin R. Tatchell, (2011). *Vogel's Textbook of Practical Organic Chemistry*, (5<sup>th</sup> ed.), New Delhi: Pearson Education Ltd. Print.
- Pavia, Lampman, Kriz, Engel, (2009). *Organic Chemistry. A lab manual*, New Delhi: Cengage Learning India Private Limited, Print.
- Rakesh K. Sharma, Indu Tucker Sidhwani and Mihir K. Chaudhuri, (2013). *Green Chemistry Experiments. A Monograph*, I.K., New Delhi: International Publishing House Pvt. Ltd, Print.
- Vishnoi N.K., (1990). *Advanced Practical Organic Chemistry*, New Delhi: VIKAS Publishing House Private Ltd. Print.

## PCH1201CP PHYSICAL CHEMISTRY LAB I

(LAB)

### LEARNING OUTCOME

3 hrs./wk.

On successful completion of the course, the student will be able to

- operate the instruments and collect the necessary data
- apply the theoretical knowledge in laboratory
- analyze the data collected through an experiment

### COURSE CONTENT:

45 hrs.

#### I. BASIC PREPARATIVE TECHNIQUES IN PHYSICAL CHEMISTRY

Calibration of the instrument – data acquisition and treatment

#### II. ELECTROCHEMISTRY

1. Construction of galvanic cell and determination of single electrode potential of Cu and Zn
2. Determination of concentration of Ferrous Ammonium Sulphate by Potentiometric redox titration

#### III. CHEMICAL KINETICS

3. Determination of order for the acid – catalysed hydrolysis of ester
4. Evaluation of activation energy and thermodynamic parameters for the acid – catalyzed hydrolysis of ester

#### IV. SURFACE CHEMISTRY

5. Determination of critical micellar concentration of Sodium Dodecyl Sulphate
6. Verification of adsorption isotherm for the adsorption of acetic acid on activated charcoal

#### V. FLAME EMISSION SPECTROSCOPY

7. Determination of low concentration of metals using flame photometry

## VII. CYCLIC VOLTAMMETRY

- Investigation on redox behavior of ferrocyanide / ferricyanide system

## VIII. ATOMIC ABSORPTION SPECTROMETRY

- Determination of copper, chromium, iron, nickel in a given sample (any one)

### REFERENCE BOOK(S):

Mendham J., Denney R. C., Barnes J.D. and Thomas M.J.K., (2009). *Vogel's Quantitative Chemical Analysis*, (6<sup>th</sup> ed.), New Delhi: Pearson education. Print.

Viswanathan B. and Raghavan P. S., (2017). *Practical Physical Chemistry*, (1<sup>st</sup> ed.), New Delhi: Viva Books Pvt. Ltd. Print.

## PCH2501CM ORGANIC STEREOCHEMISTRY AND PHOTOCHEMISTRY

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- discuss the significance of chirality of allenes, spiranes and biphenyls
- interpret the various pericyclic reactions
- describe the various photochemical reactions

#### COURSE CONTENT:

##### UNIT I: FUNDAMENTALS OF STEREOCHEMISTRY

15 hrs.

Stereoisomerism – definitions and classification – molecular representation: interconversion of Sawhorse – Fischer – Newman projection formulae – classification of stereoisomers: classification based on symmetry criterion and energy criterion – chirality – molecules with single chiral center – racemic modifications – racemic modifications and thermodynamic properties, classification of racemic modifications – configurational nomenclature: R and S nomenclature – E and Z nomenclature – molecules with more than one chiral centre: constitutionally unsymmetrical molecules – constitutionally symmetrical molecules – erythro and threo – like and unlike – Brewster's system – Pref – Parf – stereoisomerism in cyclic compounds – axial chirality – planar chirality and helicity – principles of axial and planar chirality – elongated tetrahedron approach – stereochemistry of allenes – spiranes – biphenyls – ansa compounds – molecular overcrowding – stereochemistry of elements other than carbon: stereochemistry of phosphorus – nitrogen – sulphur compounds.

##### UNIT II: PROSTEREOISOMERISM AND CONFORMATIONAL STUDY

15 hrs.

Topicity and Prostereoisomerism: topicity of ligands and faces – homotopic ligands and faces – enantiotopic ligands and faces – diastereotopic ligands and faces – nomenclature of stereoheterotopic ligands and faces – symbols for stereoheterotopic ligands and faces – prostereoisomerism and stereoisomerism – chemical and biochemical transformation of stereoheterotopic ligands and faces – molecules with one prochiral center – Re and Si system of nomenclature for ligands.

Conformations of cyclic systems – conformation of monosubstituted cyclohexanes – disubstituted cyclohexanes: typical – atypical disubstituted cyclohexanes – conformation of polysubstituted cyclohexanes – conformation of fused bicyclic ring systems: decalins – conformational study of fused

polycyclic ring systems: perhydrophenanthrenes – perhydroanthracenes – structure and nomenclature of bridged ring systems.

**UNIT III: ASSYMETRIC SYNTHESIS & CHIROPTICAL PROPERTIES** 15 hrs.

Asymmetric synthesis: principles of asymmetric synthesis – stereoselectivity – terminology and classification – principle of stereoselectivity – asymmetric synthesis and asymmetric induction – acyclic stereoselection – addition of nucleophiles to carbonyl compounds – Cram and Prelog's rule – Felkin-Anh model – addition of enolate to carbonyl group: Texler – Zimmerman model – racemisation and methods of resolution – mechanism of racemization – asymmetric transformations: first – second order asymmetric transformation – methods of resolution – optical purity and enantiomeric excess.

Chiroptical properties – introduction – polarized lights and chirotopic properties – linearly and circularly polarized lights – circular birefringence and circular dichroism – ORD and CD curves – Cotton effect – application of CD and ORD – empirical and semiempirical rules: the axial haloketone rule – octant rule.

**UNIT IV: PERICYCLIC REACTIONS** 15 hrs.

Definition – classification of pericyclic reactions – electrocyclic reactions: FMO treatment – correlation diagram – PMO method – Woodward–Hoffmann rule – cycloadditions: FMO treatment – PMO method – [2+2] cycloadditions – [4+2] cycloaddition – sigmatropic reactions: FMO analysis of [1,3] and [1,5] sigmatropic rearrangements of Hydrogen – FMO analysis of [1,3] and [1,5] sigmatropic rearrangements of alkyl group – [3,3] sigmatropic – Cope – degenerate cope – Oxy– Cope – anionic Oxy – Cope – Aza – Cope – claisen rearrangement – [5,5] sigmatropic shift – [2,3] sigmatropic rearrangements – Sommelet Hauser rearrangement – ene reaction – chelotropic reactions – Fluxional tautomerism.

**UNIT V: ORGANIC PHOTOCHEMISTRY** 15 hrs.

Introduction – interaction of electromagnetic radiation with matter – electronic excitations – excited states – transfer of excitation energy – sensitization and quenching – photochemical eliminations – Norrish type I and II reactions – Barton reaction – Paterno – Buchi reaction – oxidations – reductions – cis – trans isomerization – rearrangements (di-pi-methane or Zimmerman rearrangement) – photochemistry of arenes.

**TEXT BOOK(S):**

Coxon J. M. and Halton B., (2011). *Organic Photochemistry*, (2<sup>nd</sup> ed.), Cambridge UK: Cambridge University Press. Print. (Unit V)

Coyle J.D., (1988). *Organic Photochemistry*, New York: John Wiley & Sons Ltd., Print. (Unit V)

Finar I.L., (1994). *Organic Chemistry*, (6<sup>th</sup> ed. & Volume II), Singapore: ELBS. Print. (Unit I)

Nasipuri D., (2002). *Stereochemistry of Organic Compounds – Principles and applications*, (3<sup>rd</sup> ed.), New Delhi: New Age International. Print. (Units I, II & III)

Sunil Kumar., Vinod Kumar and S.P. Singh., (2016). *Pericyclic Reactions, A Mechanistic and Problem-Solving Approach*, New Delhi: Academic Press. Print. (Unit IV)

**REFERENCE BOOK(S):**

Chatwal G. R., (1998). *Organic Photochemistry*, (1<sup>st</sup> ed.), Mumbai: Himalaya Publishing House. Print.

Depuy C.H. and Chapmann O.L., (1975). *Molecular Reactions and Photochemistry*, New Delhi: Eastern Economic ed. Tata-McGraw Hill. Print.

Ernest L. Eliel, (1997). *Stereochemistry of Carbon Compounds*, (22<sup>nd</sup> Reprint), New Delhi: Tata McGraw Hill, Print.

Finar I.L., (1994). *Organic Chemistry*, (6<sup>th</sup> ed./Volume I), Singapore: ELBS. Print.

Gilchrist T.L and Storr R.C., (1972). *Organic Reactions and Orbital Symmetry*, Cambridge UK: Cambridge University Press. Print.

Jagdamba Singh and Jaya Singh, (2010). *Photochemistry and Pericyclic reactions*, New Delhi: New Age International Pvt. Ltd. Print.

Kalsi P.S., (1990). *Stereochemistry*, New Delhi : Wiley eastern limited, Print.

Lowry T.H. and Richardson K.S., (1976). *Mechanism and Theory in Organic Chemistry*, New York: Harper and Row. Print.

Nicholass J. Turro, Scaiano J.C. and Ramamurthy V., (2010). *Modern Molecular Photochemistry of Organic Molecules*, (1<sup>st</sup> ed.), New Delhi: University Science Books. Print.

## PCH2502CM QUANTUM CHEMISTRY AND GROUP THEORY

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of this course, the student will be able to

- relate quantum mechanics to chemical bonding
- recognize the symmetry of the molecules using group theory
- interpret molecular bonding and vibrations in terms of group theory

#### COURSE CONTENT:

##### UNIT I: FUNDAMENTALS OF QUANTUM CHEMISTRY

15 hrs.

Quantum hypothesis – black body radiation and photoelectric effect – de-Broglie equation and matter waves – Heisenberg uncertainty principle – time independent Schrodinger equation – particle in 1D box – operators in quantum mechanics: linear – real – imaginary – commutative and non-commutative nature – eigen functions and eigen values of operators – wave functions and probabilistic interpretation – quantisation of energy – normalisation – average momentum and position of the particle – validation of Heisenberg uncertainty principle – particle in a three-dimensional box: rectangular – cubic – degeneracy of energy states.

##### UNIT II: QUANTUM MECHANICS OF SIMPLE SYSTEMS

15 hrs.

Postulates of quantum mechanics: state of a system and wave function – quantum mechanical operators – time dependent Schrodinger wave equation – Hermitian operators – orthogonal functions and orthonormal waves.

Harmonic Oscillator and Hooke's law: energy levels – wave functions and Hermite polynomials – even and odd functions – average kinetic and potential energy – Laplacian operator and coordinate systems – Rigid rotator: energy levels – wave functions and spherical harmonics – angular momentum and non-commutative property – Hydrogen atom: Schrodinger equation – s, p and d orbitals – Helium atom: Setting up of Schrodinger equation

**UNIT III: APPLICATIONS OF QUANTUM CHEMISTRY**

15 hrs.

Approximation Methods: Perturbation method: theory – perturbed system – slanting box problem – anharmonic oscillator – variational method – ground state energy – trial functions and secular determinant – perturbation and variational theory for Helium atom: Slater orbitals – Hartree – Fock approximation – HF equations and self-consistent field method – electron and intrinsic spin angular momentum – antisymmetric wave functions and Slater determinants – Born Oppenheimer approximation – valence – bond treatment to Hydrogen molecule: coulomb, exchange and overlap integrals – Heitler – London theory of hydrogen – molecular orbital treatment of  $H_2^+$  – comparison of VB and MO approach – Huckel molecular orbital treatment – ethylene, butadiene, benzene

**UNIT IV: PRINCIPLES OF GROUP THEORY**

15 hrs.

Definitions and theorems of group theory – defining properties of a group – examples of groups – group multiplication table – sub groups – cyclic groups – classes – molecular symmetry: introduction – symmetry elements – symmetry operations – product of symmetry operations of a group and the group theoretical rules – symmetry elements and optical isomerism – symmetry point groups – symmetries with multiple high order axes – classes of symmetry operations – systematic procedure for symmetry classification of molecules – examples – representations of groups – matrix representation of symmetry operations – character of a matrix – matrix representation for symmetry operation – group representation – character table – Great Orthogonality Theorem (GOT) – construction of character table for  $C_{2v}$ ,  $C_{3v}$ ,  $C_{4v}$ ,  $C_{2h}$ ,  $D_{2d}$  point groups – reducible and irreducible representations – direct product.

**UNIT V: APPLICATIONS OF GROUP THEORY**

15 hrs.

Hybridization of atomic orbitals: hybridization scheme in sigma and pi bonding –  $SO_3$ ,  $CH_4$  – spectroscopy: selection rules and polarizations – centrosymmetric complexes – vibronic polarization – non centrosymmetric complexes – polarization of electronically allowed transitions – example: formaldehyde – molecular vibrations – IR and Raman active vibrations of  $H_2O$ ,  $NH_3$ ,  $N_2F_2$ ,  $BF_3$ ,  $AB_4$ : tetrahedral and square planar –  $AB_6$ : Octahedral – exclusion rule, molecular orbital theory – LCAO and Huckel approximation – formulating SALC's with projection operators – SALC's and calculation of energies of  $\pi$ MOs of ethylene – 1, 3-butadiene – cyclopropenyl cation – benzene – transition metal complexes: molecular orbital theory – octahedral complexes with  $\pi$  – bonding and tetrahedral complexes.

**TEXT BOOK(S):**

Cotton F.A., (2014). *Chemical Applications of Group Theory*, (3<sup>rd</sup> ed.), New Delhi: John Wiley & Sons, Inc. Print. (Units IV & V)

Donald A. McQuarrie, (2011). *Quantum Chemistry*, (1<sup>st</sup> ed.), Chennai: Viva Books Private Limited. Print. (Units I, II, III)

Salahuddin Kunju A. and Krishnan G., (2015). *Group theory and its applications in Chemistry*, (2<sup>nd</sup> ed.), Delhi: PHI learning private limited. Print. (Units IV & V)

**REFERENCE BOOK(S):**

Ameta R., (2013). *Symmetry and group theory in chemistry*, New Delhi: New age international (P) limited, Publishers. Print.

Chandra A. K., (2008). *Introductory Quantum Chemistry*, (4<sup>th</sup> ed.), New Delhi: Tata McGraw –Hill Publishing Company Ltd. Print.

Ira. N. Levine, (2000). *Quantum Chemistry*, (6<sup>th</sup> ed.), New Delhi: Pearson education Inc. Prentice Hall. Print.

Lowell H. Hall, (1969). *Group theory and symmetry in chemistry*, New York: McGraw– Hill Book Company. Print.

Prasad R.K., (2010). *Quantum Chemistry*, (4<sup>th</sup> ed.), New Delhi: New Age International Pvt. Ltd. Publishers. Print.

Robert L. Carter, (1998). *Molecular symmetry and group theory*, New York: John Wiley & Sons, Inc. Print.

Veera Reddy K., (2009). *Symmetry and spectroscopy of molecules*, New Delhi: New Age International (P) Limited, Publishers. Print.

## PCH2401EI FORENSIC SCIENCE (THEORY)

### LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- identify and list the different types of physical evidences
- apply the analytical methods for the analysis of physical evidences
- relate all branches of science in crime investigation

### COURSE CONTENT:

#### UNIT I: INTRODUCTION AND PHYSICAL EVIDENCES I

12 hrs.

Definition and scope of forensic science – history of development of forensic science – crime scene – physical evidence – definition – types of physical evidence – class characteristics – individual characteristics.

Paint and glass as physical evidence: forensic examination, collection and preservation of evidence – comparison of glass fragments – floatation method, immersion method – glass fracture patterns.

#### UNIT II: PHYSICAL EVIDENCES II

12 hrs.

Hair: Morphology of hair – identification and comparison of hair – collection and preservation of hair evidence.

Fiber: types of fibers – comparison of natural and man – made fibers – collection of fiber evidence.

Soil: forensic characteristics of soil – comparison of soil specimens – density gradient tube techniques – collection and preservation of soil evidence

Firearms: bullet comparison – cartridge cases – gun powder residues – serial number restoration – arson and explosion investigation

#### UNIT III: PHYSICAL EVIDENCES III

12 hrs.

Finger prints: classifications – methods of detecting – preserving developed finger prints – foot prints and lifting – foot wear and tyre impressions.

Hand writing: comparison of genuine and forged writing – collection of samples – detection and deciphering erasures – obliterations, alterations and entries on questioned documents – ESDA – ink analysis – charred documents.

Typewriters: identification of make and model – collection of exemplars.

Voice examination: voice spectrograph – lie detectors.

#### UNIT IV: FORENSIC SEROLOGY AND TOXICOLOGY

12 hrs.

Blood: blood typing – forensic characterization of blood stains – paternity testing – forensic characterization of semen – collection of rape evidence – DNA – a forensic tool – recombinant DNA – DNA typing

Toxicology: toxicology of alcohol – breath test instruments (breath analyzer) techniques used in toxicology – heavy metal poisoning – classification of drugs – drug identification – color tests – micro crystalline test – viscera collection – collection and preservation of drug evidence – snake poisoning

#### UNIT V: WHITE COLLAR CRIMES

12 hrs.

White collar crimes – emergence of internet or cyber– crime – common types of cyber– crimes – forensic investigation of cyber – crime – recovery and protection of computer crime evidences – blue collar crimes – case study of all types of crimes.

#### TEXT BOOK(S):

Saferstein Richard, (1977). *Criminalistics – An Introduction to Forensic Science*, (5<sup>th</sup> ed.), Englewood Cliffs: Prentice Hall. Print.

#### REFERENCE BOOK(S):

Eckert G. William, (1997). *Introduction to Forensic Sciences*, (2<sup>nd</sup> ed.), Boca Raton: CRC Press. Print.

Reddy K.S.N. *The essentials of forensic medicine and toxicology*, (19<sup>th</sup> ed.), Medical book company. Print.

### PCH2401EP TEXTILE CHEMICAL PROCESSING

(LAB)

#### LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- detect the amount of water content in fabrics
- analyze the percentage of blend in fabrics
- compare the methods of finishing in fabrics

#### COURSE CONTENT:

60 hrs.

1. Desizing and estimation of weight loss in cotton fabric by acid desizing method
2. Scouring of cotton, wool and nylon fabrics
3. Bleaching of cotton, wool and nylon fabrics
4. Determination of moisture content in cotton fabric
5. Determination of percentage of cotton in a cotton – nylon and cotton – polyester blend
6. Analysis of fiber by dissection
7. Dyeing of cotton, wool and nylon (direct, acid and natural dyes)
8. Printing on cotton fabrics by Tie and Dye, Batik and screen printing (demonstration) methods
9. Analysis of starch and wax finishing in fabric
10. Collection of 20 textile samples with different finishing processes

**TEXT BOOK(S):**

- Vidyasagar P. V., (1998). *Handbook of textiles*, (1<sup>st</sup> ed.), New Delhi: Mittal Publications. Print.
- Srivastava S. B., *Recent processes of textile bleaching dyeing and finishing*, Delhi: Small business publications. Print.

**REFERENCE BOOK(S):**

- Satake M. and Mido Y., (1995). *Chemistry of Colour*, New Delhi: Discovery Publishing House. Print.
- Sushma Gupta, Neeru Garg and Renu Saini, (1995). *Text book of clothing and textile*, (2<sup>nd</sup> ed.), Ludhiana: Kalyani Publishers. Print.

**PCH2201CP PHYSICAL CHEMISTRY LAB II**

(LAB)

**LEARNING OUTCOME**

3 hrs./wk.

On successful completion of the course, the student will be able to

- apply the theoretical knowledge in laboratory
- analyze the data collected through an experiment
- design an experiment based on the theoretical background

**COURSE CONTENT:**

45 hrs.

**I. ELECTROLYTIC CONDUCTANCE AND IONIC EQUILIBRIA**

1. Verification of Kohlrausch's law
2. Conductometric titration of a mixture of strong and weak acid with a strong base
3. Determination of concentration of Barium chloride by precipitation titration
4. Determination of solubility product of a sparingly soluble salt
5. Determination of dissociation constants of phosphoric acid by pH titration

**II. PHOTOCHEMISTRY**

6. Verification of Beer–Lambert's law
7. Determination of stoichiometry and stability constant of a complex by Job's Continuous variation method

**III. SURFACE PLASMON OSCILLATION**

8. Evaluation of the surface plasmon oscillation of chemically reduced colloidal silver nanoparticles

**IV. NEPHELOMETRY**

9. Determination of sulphate using nephelometry

**V. SELF DESIGNED EXPERIMENT**

10. Self-designed experiment by the students based on the physical chemistry concepts

**REFERENCE BOOK(S):**

- Mendham J., Denney R. C., Barnes J.D. and Thomas M.J.K., (2009). *Vogel's Quantitative Chemical Analysis*, (6<sup>th</sup> ed.), New Delhi: Pearson education. Print.
- Viswanathan B. and Raghavan P. S., (2017). *Practical Physical Chemistry*, (1<sup>st</sup> ed.), New Delhi: Viva Books Pvt. Ltd. Print.

# PCH2501MO COORDINATION CHEMISTRY

## (THEORY)

### LEARNING OUTCOME

5 hrs. / wk.

On successful completion of this course, the student will be able to

- describe the stereochemistry and isomerism exhibited by the complexes
- compare the various theories of bonding in complexes
- analyse the electronic spectra of complexes

### COURSE CONTENT:

#### UNIT I. COORDINATION CHEMISTRY

15 hrs.

Recall the nomenclature of coordination compounds – types of ligands – coordination number – geometries – stereochemistry and isomerism – constitutional, geometrical and optical – coordination numbers 4 and 6 – theories of bonding – CFT – crystal field splitting in octahedral, square planar, tetrahedral complexes – CFSE – factors influencing the magnitude of  $\Delta_0$  – applications of CFT – Jahn-Teller distortions – limitations – LFT and MOT – applications to octahedral complexes – ( $\sigma$  - bonding) – tetrahedral, square planar complexes – comparison of different theories – stabilization of unusual oxidation states by coordination, applications of ORD.

#### UNIT II: MAGNETIC PROPERTIES AND ELECTRONIC SPECTRA OF METAL COMPLEXES

15 hrs.

Magnetic properties of tetrahedral and octahedral complexes – spin and orbital contribution quenching – spin cross over rule – microstates of electron configuration in free atoms and ions – term symbols for equivalent and non-equivalent electrons – possible term symbols for given configuration – p2 – d2 – splitting of terms in square planar, tetrahedral, octahedral fields – electronic spectra of various complexes – selection rules - spin orbit coupling -assignment and intensities of transitions – Orgel (d1 to d9 octahedral and tetrahedral complexes) and Tanabe Sugano diagrams(d1 ,d6 complexes and its applications) – calculation of  $\Delta_0$  and  $\beta$  and Racah parameters – examples from d2 , d3 d7, d8 octahedral complexes – CT spectra of metal complexes.

#### UNIT III: ELECTRON SPIN RESONANCE SPECTROSCOPY

15 hrs.

Electron Spin Resonance Spectroscopy – Introduction – position of ESR absorption – g factor and its applications – zero field splitting – Kramer's degeneracy – hyperfine structure – electron nucleus coupling – hyperfine splitting due to more than one nucleus – anisotropic effects – fine structure of ESR spectra – electron-electron coupling – hyperfine splitting constant from MO theory – McConnell equation – instrumentation – ESR study of H, D atoms; CH<sub>3</sub> and naphthalene radicals – applications of EPR in the structural study of Bis-salicylaldimine copper(II) , and metal complexes of Cu, Cr and Mn.

#### UNIT IV: REACTION MECHANISM OF METAL COMPLEXES – I

15 hrs.

Ligand substitution reactions in octahedral, square planar complexes – labile and inert complexes (application of VBT, MOT) – dissociation, association mechanism – Mechanism of hydrolysis reactions – acid hydrolysis – base hydrolysis – anation reactions – trans effect – trans influence – trans effect and its application-theories of trans effect – Thermodynamic and kinetic stability of complexes – factors affecting stability of metal complexes – experimental determination of stability constant of complexes.

**UNIT V: REACTION MECHANISM OF METAL COMPLEXES – II**

15 hrs.

Electron transfer reactions – one electron transfer reactions – inner sphere mechanism – outer sphere mechanism – two electron transfer reactions – complementary and non – complementary electron transfer reactions – synthesis of coordination compounds using electron transfer reactions – metal assisted reactions – Aldol condensation – ester hydrolysis – phosphate ester, amino esters and amide hydrolysis – template effect – synthesis of macrocyclic ligands – reaction of coordinated ligand.

**TEXTBOOK(S):**

James E. Huheey, (1993). *Inorganic Chemistry*, (4<sup>th</sup> ed.), Harper Collins College Publishers. Print.

Lee J. D., (1994). *Concise Inorganic Chemistry*, (5<sup>th</sup> ed.), ELBS, Print.

Cotton F.A. and Wilkinson G., (1998). *Advanced Inorganic Chemistry*, (5<sup>th</sup> ed.), New York: John Wiley & Sons, Inc., Print.

Shriver D.F., Atkins P.W. and Langford C.H., (1990). *Inorganic Chemistry*, New York: Oxford University Press, Print.

**REFERENCE BOOK(S):**

Aruldas G., (2001). *Molecular Structure and Spectroscopy*, New Delhi: Prentice-Hall of India Pvt. Ltd., Print.

Basolo, Pearson and Ralph., (1984). G, *Mechanism of Inorganic Reactions- A study of metal complexes in solution*. New Delhi: Wiley Eastern, Print.

Gary Wulfsberg, (2002). *Inorganic chemistry*, New Delhi: Viva books pvt. Ltd, Print.

Kaur H., (2010). *Spectroscopy*, Uttar Pradesh: Pragati Prakashan, Print.

Keith F. Purcell and John C. Kotz, (1997). *Inorganic Chemistry*, W.B. Saunders Company, Print.

Russell S. Drago, (1968). *Physical Methods in Inorganic Chemistry*, New Delhi: Affiliated East-West Press Pvt. Ltd., Print.

Wahid U. Malik, Tuli G.D., and Madan R.D., (2009). *Selected topics in inorganic chemistry*, (7<sup>th</sup> ed.), New Delhi: S.Chand, Print.

**PCH2502MO POLYMER CHEMISTRY****(THEORY)****LEARNING OUTCOME**

5 hrs. / wk.

On successful completion of the course, the student will be able to

- acquire an in-depth knowledge of mechanisms of polymerization
- undertake a study of structure and properties of polymers
- appreciate the role of polymers in everyday life

**COURSE CONTENT:****UNIT I: INTRODUCTION, MECHANISM AND KINETICS OF POLYMERIZATION:**

15 hrs.

Definitions – functionality – classification of polymers - Condensation (step or self-growth) polymerization: Flory Equal reactivity principle – kinetics of self-catalysed and acid-catalysed, condensation polymerization – Carother's equation – gelation and gel point - Addition (or vinyl) polymerization: Radical (or chain) polymerization –Ionic – cationic, anionic, co-ordination, stereo

regular polymerization - Co-polymerisation : Kinetics of free radical copolymerisation – Mayo and Lewis equation, reactivity ratios and co-polymerization behaviour – Q-e scheme of Alfred and Price

**UNIT II: MOLECULAR WEIGHT DISTRIBUTION AND DETERMINATION:** 15 hrs.

Molecular forces and chemical bonding – primary & secondary forces, intermolecular forces and physical properties – molecular weight – number- weight, viscosity and sedimentation average molecular weights – molecular weight and degree of polymerization – polydispersity and molecular weight distribution – polydispersity index – practical significance of degree of polymerization-determination of molecular weight-osmometric- light scattering- sedimentation and viscosity methods.

**UNIT III: STRUCTURE, PROPERTIES AND CHARACTERIZATION OF POLYMERS:** 15 hrs.

Chemical and geometrical structure – glass transition temperature – factors influencing T<sub>g</sub>, crystallinity in polymers – crystallisability-crystallites – effect of crystallinity on properties of polymers – polymer degradation – different types – thermal- mechanical- photo- ultrasonic waves- irradiation-oxidative and hydrolytic degradations. Rheology – Hooke-Newton, Maxwell-Voigt – Burger models. Characterization – chemical (end group analysis) – spectral – x-ray diffraction thermal and physical (analysis and testing) methods.

**UNIT IV: APPLICATIONS OF POLYMERS:** 15 hrs.

Conducting polymers – liquid crystalline polymers – polymer microgels – biopolymers – biomedical applications – surgical sutures – artificial organs – Bioartificial pancreas – polymers in drug delivery – synthetic textiles.

Polymer clay nanocomposites and metal polymer nanocomposites - supercapacitors – polymer modified electrodes.

**UNIT V: POLYMERS USED IN DAILY LIFE:** 15 hrs.

Preparation – properties and application of polyethylene – polypropylene – polyesters – polyvinylchloride – poly vinyl carbonate – polyamide – polytetrafluoroethylene – Natural and synthetic rubbers – environmental hazards – their degradability.

**TEXTBOOK(S):**

Billmeyer, Fred. W., (1994). *Text Book of Polymer Science*, New York: John Wiley and Sons, Print.

Gowariker, Viwanathan and Jayadev Sreedhar, (1986). *Polymer Science*, New Delhi: New Age International, Print.

**REFERENCE BOOK(S):**

Bahadur P., Sastry N.V., (2005). *Principles of polymer science*, (2<sup>nd</sup> ed.), Chennai: Narosa Publishing house, Print.

Ed., Pinnavaia T.J., Beall G.W., (2000). *Polymer Clay Nanocomposites*, England: John Wiley & Sons, Print.

Ghosh P., (2002). *Polymer Science and Technology*, (2<sup>nd</sup> ed.), New Delhi: Tata Mc-Graw-Hill Publishing company, Ltd., Print.

Misra, (1993). *Introductory Polymer Science*, Chennai: Wiley Eastern Ltd., Print.

Sujata V. Bhat, (2005). *Biomaterial*, (2<sup>nd</sup> ed.), New Delhi: Narora Publishing home, Print.

(For the following courses, content remains the same but the course code has been changed and the content is presented in this Academic Council booklet)

### PCH0402CP INORGANIC CHEMISTRY LAB (LAB)

#### LEARNING OUTCOME

5 hrs./ wk.

On successful completion of the course, the student will be able to

- design experiments for the separation of mixtures by chromatography
- plan the method of preparation, characterization of inorganic complexes
- analyze the inorganic cations in a mixture

#### COURSE CONTENT:

75 hrs.

##### I. CHROMATOGRAPHIC SEPARATIONS

Separations using, column (adsorption) - separation of Zn & Mg, Cu & Ni) – paper (ascending and radial) – TLC - Electrophoresis (Demonstration only).

##### II. PREPARATION AND CHARACTERISATION OF INORGANIC COMPLEXES

Tetramminecopper (II) sulphate monohydrate, mixed ligand complex (Cu<sup>2+</sup> oxine/phenanthroline/DMG).

##### III. ESTIMATION OF CATIONS IN A MIXTURE (ANY TWO)

Copper and Iron

Copper and Nickel

Copper and Zinc

Iron and magnesium

##### IV. ANALYSIS OF FOUR - CATIONS MIXTURE

Qualitative analysis of mixture of salts containing common and rare cations like Tungsten, Thallium, Selenium, Tellurium, Molybdenum, Cerium, Vanadium, and Zirconium.

#### REFERENCE BOOK(S):

Gurtu J.N. and Kapoor. R., (1989). *Advanced Experimental Chemistry*, New Delhi: S. Chand & Co., Print.

Jeffery G.H., J. Bassett, J. Mendham and R. C. Denney, (1989). *Vogel's Textbook of Quantitative Chemical Analysis*, (5<sup>th</sup> ed.), London: ELBS, Print.

Pass and Sutcliffe. H, (1974). *Practical Inorganic Chemistry*, (2<sup>nd</sup> ed.), London: Chapman and Hall, Print.

Venkateswaran V., R. Veeraswamy, A. R. Kulandaivelu, (1997). *Basic Principles of Practical Chemistry*, (2<sup>nd</sup> ed.), New Delhi: Sultan Chand & Sons, Print.

### PCH2501MO COORDINATION CHEMISTRY (THEORY)

#### LEARNING OUTCOME

5 hrs. / wk.

On successful completion of this course, the student will be able to

- describe the stereochemistry and isomerism exhibited by the complexes
- compare the various theories of bonding in complexes
- analyse the electronic spectra of complexes

## COURSE CONTENT:

### UNIT I: COORDINATION CHEMISTRY 15 hrs.

Recall the nomenclature of coordination compounds – types of ligands – coordination number – geometries – stereochemistry and isomerism – constitutional, geometrical and optical – coordination numbers 4 and 6 – theories of bonding – CFT – crystal field splitting in octahedral, square planar, tetrahedral complexes – CFSE – factors influencing the magnitude of  $\Delta_0$  – applications of CFT – Jahn-Teller distortions – limitations – LFT and MOT – applications to octahedral complexes – ( $\sigma$ -bonding) – tetrahedral, square planar complexes – comparison of different theories – stabilization of unusual oxidation states by coordination, applications of ORD.

### UNIT II: MAGNETIC PROPERTIES AND ELECTRONIC SPECTRA OF METAL COMPLEXES 15 hrs.

Magnetic properties of tetrahedral and octahedral complexes – spin and orbital contribution quenching – spin cross over rule – microstates of electron configuration in free atoms and ions – term symbols for equivalent and non-equivalent electrons – possible term symbols for given configuration –  $p^2$  –  $d^2$  – splitting of terms in square planar, tetrahedral, octahedral fields – Electronic spectra of various complexes – selection rules – spin orbit coupling – assignment and intensities of transitions – Orgel ( $d^1$  to  $d^9$  octahedral and tetrahedral complexes) and Tanabe Sugano diagrams ( $d^1$ ,  $d^6$  complexes and its applications) – calculation of  $\Delta_0$  and  $\beta$  and Racah parameters – examples from  $d^2$ ,  $d^3$ ,  $d^7$ ,  $d^8$  octahedral complexes – CT spectra of metal complexes.

### UNIT III: ELECTRON SPIN RESONANCE SPECTROSCOPY 15 hrs.

Electron Spin Resonance Spectroscopy – Introduction – position of ESR absorption –  $g$  factor and its applications – zero field splitting – Kramer's degeneracy – hyperfine structure – electron nucleus coupling – hyperfine splitting due to more than one nucleus – anisotropic effects – fine structure of ESR spectra – electron-electron coupling – hyperfine splitting constant from MO theory – McConnell equation – instrumentation – ESR study of H, D atoms;  $\text{CH}_3$  and naphthalene radicals – applications of EPR in the structural study of Bis-salicylaldehyde copper(II), and metal complexes of Cu, Cr and Mn.

### UNIT IV: REACTION MECHANISM OF METAL COMPLEXES – I 15 hrs.

Ligand substitution reactions in octahedral, square planar complexes – labile and inert complexes (application of VBT, MOT) – dissociation, association mechanism – Mechanism of hydrolysis reactions – acid hydrolysis – base hydrolysis – anation reactions – trans effect – trans influence – trans effect and its application – theories of trans effect – Thermodynamic and kinetic stability of complexes – factors affecting stability of metal complexes – experimental determination of stability constant of complexes.

### UNIT V: REACTION MECHANISM OF METAL COMPLEXES – II 15 hrs.

Electron transfer reactions – one electron transfer reactions – inner sphere mechanism – outer sphere mechanism – two electron transfer reactions – complementary and non-complementary electron transfer reactions – synthesis of coordination compounds using electron transfer reactions – metal assisted reactions – Aldol condensation – ester hydrolysis – phosphate ester, amino esters and amide hydrolysis – template effect – synthesis of macrocyclic ligands – reaction of coordinated ligand.

## TEXTBOOK(S):

- James E. Huheey, (1993). *Inorganic Chemistry*, (4<sup>th</sup> ed.), Harper Collins College Publishers. Print.
- Lee J. D., (1994). *Concise Inorganic Chemistry*, (5<sup>th</sup> ed.), London: ELBS, Print.
- Cotton F.A. and Wilkinson G., (1998). *Advanced Inorganic Chemistry*, (5<sup>th</sup> ed.), New York: John Wiley & Sons, Inc., Print.
- Shriver D.F, Atkins P.W. and Langford C.H., (1990). *Inorganic Chemistry*, New York: Oxford University Press, Print.

## REFERENCE BOOK(S):

- Aruldas G., (2001). *Molecular Structure and Spectroscopy*, New Delhi: Prentice Hall of India Pvt. Ltd., Print.
- Basolo, Pearson and Ralph., (1984). *G Mechanism of Inorganic Reactions - A study of metal complexes in solution*. New Delhi: Wiley Eastern, Print.
- Gary Wulfsberg, (2002). *Inorganic chemistry*, New Delhi: Viva books Pvt. Ltd, Print.
- Kaur H., (2010), *Spectroscopy*, Uttar Pradesh: Pragati Prakashan, Print.
- Keith F. Purcell and John C. Kotz, (1997). *Inorganic Chemistry*, W. B. Saunders Company, Print.
- Russell S. Drago, (1968). *Physical Methods in Inorganic Chemistry*, New Delhi: Affiliated East-West Press Pvt. Ltd., Print.
- Wahid U. Malik, Tuli G.D., and Madan R.D., (2009). *Selected topics in inorganic chemistry*, (7<sup>th</sup> ed.), New Delhi: S. Chand, Print.

## PCH2502MO POLYMER CHEMISTRY

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- acquire an in-depth knowledge of mechanisms of polymerization
- undertake a study of structure and properties of polymers
- appreciate the role of polymers in everyday life

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION, MECHANISM AND KINETICS OF POLYMERIZATION:

15 hrs.

Definitions – functionality – classification of polymers – Condensation (step or self-growth) polymerization: Flory Equal reactivity principle – kinetics of self-catalysed and acid-catalysed, condensation polymerization – Carother's equation – gelation and gel point – Addition (or vinyl) polymerization: Radical (or chain) polymerization – Ionic – cationic, anionic, co-ordination, stereo regular polymerization – Co-polymerisation: Kinetics of free radical copolymerisation – Mayo and Lewis equaton, reactivity ratios and co-polymerization behaviour – Q-e scheme of Alfred and Price.

##### UNIT II: MOLECULAR WEIGHT DISTRIBUTION AND DETERMINATION:

15 hrs.

Molecular forces and chemical bonding – primary & secondary forces, intermolecular forces and physical properties – molecular weight – number – weight, viscosity and sedimentation average molecular weights – molecular weight and degree of polymerization – polydispersity and molecular weight distribution – polydispersity index – practical significance of degree of polymerization –

determination of molecular weight-osmometric- light scattering- sedimentation and viscosity methods.

**UNIT III: STRUCTURE, PROPERTIES AND CHARACTERIZATION OF POLYMERS: 15 hrs.**

Chemical and geometrical structure – glass transition temperature – factors influencing T<sub>g</sub>, crystallinity in polymers – crystallisability – crystallites – effect of crystallinity on properties of polymers – polymer degradation – different types – thermal – mechanical – photo-ultrasonic waves – irradiation – oxidative and hydrolytic degradations. Rheology – Hooke – Newton, Maxwell-Voigt, – Burger models. Characterization – chemical (end group analysis) – spectral – x-ray diffraction thermal and physical (analysis and testing) methods.

**UNIT IV: APPLICATIONS OF POLYMERS: 15 hrs.**

Conducting polymers – liquid crystalline polymers – polymer microgels – biopolymers – biomedical applications – surgical sutures – artificial organs – bioartificial pancreas – polymers in drug delivery – synthetic textiles.

Polymer clay nanocomposites and metal polymer nanocomposites – supercapacitors – polymer modified electrodes.

**UNIT V: POLYMERS USED IN DAILY LIFE: 15 hrs.**

Preparation – properties and application of polyethylene – polypropylene – polyesters – polyvinylchloride – poly vinyl carbonate – polyamide – polytetrafluoroethylene – Natural and synthetic rubbers – environmental hazards – their degradability.

**TEXTBOOK(S):**

Billmeyer, Fred.W., (1994). *Text Book of Polymer Science*, New York: John Wiley and Sons, Print.

Gowariker, Viwanathan and Jayadev Sreedhar, (1986). *Polymer Science*, New Delhi: New Age International, Print.

**REFERENCE BOOK(S):**

Bahadur P. and Sastry N.V., (2005). *Principles of polymer science*, (2<sup>nd</sup> ed.), Chennai: Narosa Publishing house, Print.

Ed., Pinnavaia T.J. and Beall G.W., (2000). *Polymer Clay Nanocomposites*, England: John Wiley & Sons, Print.

Ghosh P., (2002). *Polymer Science and Technology*, (2<sup>nd</sup> ed.), New Delhi: Tata Mc-Graw-Hill Publishing company, Ltd., Print.

Misra, (1993). *Introductory Polymer Science*, Chennai: Wiley Eastern Ltd., Print.

Sujata V. Bhat, (2005). *Biomaterial*, (2<sup>nd</sup> ed.), New Delhi: Narora Publishing home, Print.

**PCH0402CP INORGANIC CHEMISTRY LAB**

**(LAB)**

**LEARNING OUTCOME**

**5 hrs./ wk.**

On successful completion of the course, the student will be able to

- design experiments for the separation of mixtures by chromatography
- plan the method of preparation, characterization of inorganic complexes
- analyze the inorganic cations in a mixture

COURSE CONTENT:

75 hrs.

**I. CHROMATOGRAPHIC SEPARATIONS**

Separations using, column (adsorption) – separation of Zn & Mg, Cu & Ni) – paper (ascending and radial) – TLC – Electrophoresis (Demonstration only).

**II. PREPARATION AND CHARACTERISATION OF INORGANIC COMPLEXES**

Tetramminecopper (II) sulphate monohydrate, mixed ligand complex (Cu<sup>2+</sup> oxine / phenanthroline / DMG).

**III. ESTIMATION OF CATIONS IN A MIXTURE (ANY TWO)**

Copper and Iron

Copper and Nickel

Copper and Zinc

Iron and magnesium

**IV. ANALYSIS OF FOUR - CATIONS MIXTURE**

Qualitative analysis of mixture of salts containing common and rare cations like Tungsten, Thallium, Selenium, Tellurium, Molybdenum, Cerium, Vanadium, and Zirconium.

**REFERENCE BOOK(S):**

Gurtu J.N. and Kapoor R., (1989). *Advanced Experimental Chemistry*, New Delhi: S. Chand & Co., Print.

Jeffery G.H., J. Bassett, J. Mendham and R. C. Denney, (1989). *Vogel's Textbook of Quantitative Chemical Analysis*, (5<sup>th</sup> ed.), London: ELBS, Print.

Pass and Sutcliffe H., (1974). *Practical Inorganic Chemistry*, (2<sup>nd</sup> ed.), London: Chapman and Hall, Print.

Venkateswaran V., R. Veeraswamy and A. R. Kulandaivelu, (1997). *Basic Principles of Practical Chemistry*, (2<sup>nd</sup> ed.), New Delhi: Sultan Chand & Sons, Print.

## PCH0421D NUCLEAR CHEMISTRY

### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- recall the basics of nuclear chemistry
- explain the structure of nucleus and know about the nuclear reactions
- discuss the biological effects of radiation

### COURSE CONTENT:

#### UNIT I: INTRODUCTION TO NUCLEAR STRUCTURE

Historical background – composition of the nucleus – isotopes, isobars, isotones and isomers – size of the nucleus – nuclear masses – binding energy – nuclear stability – nuclear forces – spin and nuclear moments – parity – nuclear models – liquid drop, shell and collective models.

#### UNIT II: RADIOACTIVITY AND NUCLEAR REACTIONS

Natural radioactivity – radioactive series – laws of radioactive decay – radioactive equilibrium – branching decay – determination of half-life

Nuclear reactions – energy changes in nuclear reactions – threshold energy – reaction cross section – compound nucleus – types of nuclear processes-elastic, inelastic scattering, transmutation reactions – high energy reactions

#### UNIT III: RADIOACTIVE DECAY AND INTERACTION OF RADIATION WITH MATTER

$\alpha$  decay –  $\beta$  decay –  $\beta$  spectra –  $\gamma$  decay – spontaneous fission- interaction of  $\alpha$  particles with matter –  $\beta$  particles – Bremsstrahlung –  $\gamma$  rays – neutron absorption – particle accelerators – cyclotron, bevatron, betatron – artificial transmutation

#### UNIT IV: DETECTION AND MEASUREMENT OF RADIATION, NUCLEAR FISSION AND FUSION

Detectors – gas ionization detectors, proportional counter – GM counter – solid state ionization detectors – scintillation detector – counting statistics

Nuclear fission – energy released during nuclear fission – fission products – theory of fission – critical assembly – nuclear reactors – atom bomb

Nuclear fusion – fusion reactions – energy of the stars – hydrogen bomb – energy from fusion reaction

#### UNIT V: APPLICATIONS OF RADIOACTIVITY AND BIOLOGICAL EFFECTS

Applications – tracer methods – tracer applications in chemistry – in medicine – in biology and agriculture – dating techniques – carbon dating – radio nucleides as radiation sources

Radio active waste disposal – Chemical and biological effects of radiation – spurs and  $\delta$  rays – dosimetry – dosimeters – chemical effects – biological effects.

#### TEXT BOOK(S):

Sastri M. N., (1984). *Introduction to Nuclear Science*, Chennai: Affiliated East-West press Pvt. Ltd., Print.

#### REFERENCE BOOK(S):

Glasstone, *Source Book of Atomic Energy*. Print.

Freidlander, Kennedy et al., (1964). *Nuclear and Radiochemistry*, John Wiley and Sons. Print.

Srivastava and Jain, (1983). *Elements of Nuclear Chemistry*, S. Chand & Co. Print.

## PCH0422D INDUSTRIAL CHEMISTRY

#### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- identify the various manufacturing processes adopted in chemical industries
- list the processes in textile industry
- discuss the impact of industries on the environment and the remedial measures to be adopted

#### COURSE CONTENT:

##### UNIT I: PAPER AND LEATHER INDUSTRIES

Manufacture of pulp – chemical processes – beating – refining – filling – sizing and colouring – manufacture of paper – calendaring.

Basic chemistry of skin proteins – different steps in leather manufacture – use of tanning, polymers, fat liquors and dyes – Bio-technological applications – effluent management – parameters for testing leather quality.

## UNIT II: TEXTILE INDUSTRY

Introduction – classification of textiles – manufacture and properties of textile fibres – different processes in textile industry – dyeing – scouring – drying - printing – bleaching – Synthetic fibres – manufacture and properties of rayon, nylon 66, nylon 6, Dacron or Terylene, orlon, saran, vinyon, Teflon, dynel – chemical finishing of textiles – fabric construction from solutions – fibres, composite fibres and multi-component fabrics – waste water treatment from textile mills.

## UNIT III: AGROCHEMICALS

Fertilizers – plant nutrients – types – requirements – fertility of soil – classification – natural fertilizers – manufacture, handling and application of N, P, K fertilizers – nomenclature in fertilizer industry – biofertilizers – pesticides pests and pest control – chemical control of insect – organo chlorine – organo phosphorus compounds- applications of pesticides – insecticides of plant origin – fungicides and herbicides – hazards of pesticide handling – insect growth regulators.

## UNIT IV: EFFLUENT TREATMENT

Water treatment – sources of water – impurities in water – Treatment of waste water – removal of suspended impurities – removal of bacteria and microorganism – removal of slime and algae-boiler water – De-aeration and de-oxygenation of water – removal of chlorine – chlorine demand.

## UNIT V: WASTE MANAGEMENT IN INDUSTRIES

Principles and equipment for aerobic and anaerobic treatment; adsorption, filtration, sedimentation – electrostatic precipitation, mist elimination, wet scrubbing, absorption, solid waste management, industrial safety – Corrosion – types of corrosive agents – prevention of corrosion – methods based on treatment of medium – methods based on external influence.

### TEXT BOOK(S):

Agarwal O.P., (1989). *Engineering Chemistry*, Delhi: Khanna Publishers. Print.

### REFERENCE BOOK(S):

Chakrabarthy B.N., (1991). *Industrial Chemistry*, Oxford and IBA Publishing Co. Pvt. Ltd. Print.

George t. Austin, (1985). *Shreve's Chemical Process Industries*, 5<sup>th</sup> ed., McGraw Hill. Print.

Shree Ramulu U.S., (1985). *Chemistry of Insecticides and Fungicides*, Oxford and IBH Publishing Co. Print.

Shree Ramulu U.S., (1985). *Chemistry of Herbicides*, Oxford and IBH Publishing Co. Print.

Sharma B.K., (1995). *Industrial Chemistry*, Meerut: Goel publishing House. Print.

Vidya sagar, (1998). *Handbook of Textiles*, New Delhi: Mittal Publishers. Print.

## PCH0423D SEPARATION TECHNIQUES

### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- describe the principles of chromatographic techniques
- recognize the principles of electrophoresis
- acquire the knowledge of solvent extraction

## COURSE CONTENT:

### UNIT I: INTRODUCTION:

Classification of separation methods – characteristics of separation processes – efficiency of separation.

### UNIT II: SOLVENT EXTRACTION:

Principle – efficiency – selectivity – extraction systems – extraction of uncharged metal chelates – Methods of extraction – Applications – solid Phase sorbents – Solid Phase formats (crown ethers, cryptands etc.) – automated solid phase extraction – SPME – applications.

### UNIT III: CHROMATOGRAPHY I:

Introduction – classification – paper – column – thin layer chromatography – HPTLC – ion exchange – size exclusion chromatography – Affinity chromatography.

### UNIT IV: CHROMATOGRAPHY II:

Gas Chromatography – principle – instrumentation – applications – GC MS – GC IR – pyrolysis GC – Super critical chromatography – HPLC – principle – instrumentation – applications – HPLC MS – Applications

### UNIT V: ELECTROPHORESIS:

Principle – factors affecting ionic migration – effect of temperature pH and ionic strength – electroosmosis – High performance capillary electrophoresis – capillary electrochromatography – applications – Gel electrophoresis.

### TEXT BOOK(S):

Srivastava V.K. and Srivastava K.K., (1981). *Introduction to Chromatography*, 2<sup>nd</sup> ed., New Delhi: S. Chand & Company Ltd. Print.

### REFERENCE BOOK(S):

Brown R., *Chromatograph*, 1<sup>st</sup> ed., Delhi: IVY publishing house. Print.

Fifield F.N. and Kealey D., *Principles and Practice of Analytical chemistry*, 5<sup>th</sup> ed., Blackwell Publishing. Print.

## PCH0424D GREEN CHEMISTRY

(Offered to Chemistry majors only)

### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- learn the basic principles of green chemistry
- appreciate the applications of green chemistry principles in organic synthesis
- get enlightened with the recent advances of green chemistry through scientific publications

### COURSE CONTENT:

#### UNIT I: NEED FOR GREEN CHEMISTRY

Introduction, Sustainability, Green Chemistry and Eco-Efficiency, Environmental Problems.

#### INCEPTION AND EVOLUTION OF GREEN CHEMISTRY

Twelve Principles of green chemistry, International organizations promoting green chemistry.

## UNIT II: GREEN REAGENTS AND CATALYSTS

DMC, polymer supported reagents, aid catalyst's, oxidation catalyst, polymer supported catalysts, PTC, Crown ethers, Bio-catalysts in organic synthesis – enzyme catalyzed reactions, microbial oxidations, microbial reductions.

## UNIT III: MICROWAVE INDUCED GREEN SYNTHESIS

Microwave assisted reactions in water and organic solvents, solvent free reactions, ultrasound assisted green synthesis, saponification, substitution, coupling reactions, Friedel – Crafts reaction, Diels-Alder reaction, Cannizzaro reaction, Reformatsky reaction.

## UNIT IV: AQUEOUS PHASE REACTIONS

Diels-Alder reactions, Claisen rearrangement, Aldol condensation, Knoevenagel reaction, Pinacol coupling, Benzoin condensation, reduction of carbon – carbon double bonds, carbonyl compounds, aromatic compounds, polymerization, photochemical reactions – cyclo addition, Electro-chemical synthesis – adiponitrile, sebacic acid.

## ORGANIC SYNTHESIS IN SOLID STATE

Michael addition, Grignard reaction, Nuclear halogenation, Nitration, Beckmann rearrangement, Dimerisation of fullerene, synthesis of  $\beta$ -lactam, synthesis of aziridines, synthesis of Quinoline.

## UNIT V: VERSATILE IONIC LIQUIDS AS GREEN SOLVENTS AND GREEN SYNTHESIS

Green solvents, reactions in acidic ionic liquids, neutral ionic liquids – classical examples of green synthesis – Green synthesis of catechol and adipic acid, methyl methacrylate, furfural from biomass, synthesis of Ibuprofen, paracetamol, citral, nicotinic acid – Ecofriendly applications of Tellurium in organic synthesis – green chemistry in sustainable development.

## TEXT BOOK(S):

Ahluwalia, Kidwai, (2006). *New Trends in Green Chemistry*, 2<sup>nd</sup> ed., New Delhi: Anamaya Publishers. Print.

## REFERENCE BOOK(S):

Sanghi, Srivastava, (2003). *Green Chemistry*, New Delhi: Narosa Publishing House. Print.

## DEPARTMENT OF BOTANY

### PREAMBLE:

The present curriculum of B.Sc. (Spl.) Botany was reviewed, and it was found necessary to introduce a few changes in semester III

### Core Course:

- BOT3402AT Biological techniques and Computer Applications is changed to BOT3505CM Biological techniques and Bioinformatics

The course profile along with the syllabus of the modified course is presented.

### COURSE PROFILE

#### B.Sc. (Spl.) Botany

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	BOT3401CM	FUNDAMENTALS OF MICROBIOLOGY	TH	4		4	AW2015	AUBOT	BOT
	BOT3402CM	BIOFERTILIZERS AND PLANT PATHOLOGY	TH	4		4	AW2015	AUBOT	BOT
	BOT3403CM	PLANT ANATOMY	TH	4		4	BA2018	AUBOT	BOT
	BOT3404CM	CELL BIOLOGY	TH	4		4	BA2018	AUBOT	BOT
	BOT3203CP	LAB FOR PLANT ANATOMY AND CELL BIOLOGY	LA		3	2	AW2015	AUBOT	BOT
	BOT3204CP	LAB FOR FUNDAMENTALS OF MICROBIOLOGY, BIOFERTILIZERS AND PLANT PATHOLOGY	LA		3	2	BA2018	AUBOT	BOT
	BOT3505CM	BIOLOGICAL TECHNIQUES AND BIOINFORMATICS	TH	5		5		AUBOT	BOT
		NON-MAJOR ELECTIVE	TH	2		2			
		VOCATIONAL COURSE				2			
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH/ SUCH	
		Total		30		30			

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
IV	BOT4405CM	BIOCHEMISTRY	TH	4		4	AW2015	AUBOT	BOT
	BOT4406CM	PLANT PHYSIOLOGY	TH	4		4	AW2015	AUBOT	BOT
	BOT4407CM	HORTICULTURE	TH	4		4	AW2015	AUBOT	BOT
	BOT4501CM	DEVELOPMENTAL BOTANY AND PLANT BREEDING	TH	5		5	AW2015	AUBOT	BOT
	BOT4203CP	LAB FOR BIOCHEMISTRY AND PLANT PHYSIOLOGY	LA		4	2	AW2015	AUBOT	BOT
	BOT4204CP	LAB FOR HORTICULTURE, DEVELOPMENTAL BOTANY AND PLANT BREEDING	LA		3	2	AW2015	AUBOT	BOT
IV		NON-MAJOR ELECTIVE	TH	2		2			
	BOT4201SS	HERBAL COSMETICS	TH	2		2	AV2014	AUBOT	BOT
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 /AY2016	ALLM	Centre for VE
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH/ SUCH	
			Total		30		27		

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	BOT5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	AUBOT	BOT
	BOT5401CM	GENETICS	TH	4		4	AW2015	AUBOT	BOT
	BOT5402CM	EVOLUTION AND PALAEOBOTANY	TH	4		4	AW2015	AUBOT	BOT
	BOT5501CM	ENVIRONMENTAL BIOLOGY AND APPLIED MICROBIOLOGY	TH	6		5	AY2016	AUBOT	BOT

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	BOT5203CP	LAB FOR ENVIRONMENTAL BIOLOGY AND APPLIED MICROBIOLOGY	LA		4	2	BA2018	AUBOT	BOT
		INTERDISCIPLINARY COURSE	TH	4		4			
	BOT0602LM	PLANTS, ENVIRONMENT AND HEALTH	PR	4			BA2018	AUBOT	BOT
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN						AUCH / SUCH	
		Total			30		23		
	VI	BOT6401CM	APPLIED BOTANY	TH	4		4	AW2015	AUBOT
BOT6501CM		MOLECULAR BIOLOGY	TH	5		5	AY2016	AUBOT	BOT
BOT6502CM		BIOTECHNOLOGY	TH	5		5	AY2016	AUBOT	BOT
BOT6201CP		LAB FOR APPLIED BOTANY	LA		3	2	AW2015	AUBOT	BOT
BOT6202CP		LAB FOR MOLECULAR BIOLOGY AND BIOTECHNOLOGY	LA		4	2	AW2015	AUBOT	BOT
		INTERDISCIPLINARY COURSE	TH	4		4			
BOT0602LM		PLANTS, ENVIRONMENT AND HEALTH	PR	4		6		AUBOT	BOT
VBC6101FV		ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
UIV6101FI		BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH / SUCH	
	Total			30		29			

**EXTRA CREDIT COURSES – Refer Pg. No. 292**

**SUMMER INTERNSHIP (OPTIONAL)**

Sem.	Course Code	Course Title	Course Type	Duration	Credits	Passed in Academic Council	Offered to	Offered by
III	BOT3201SI	SUMMER INTERNSHIP	TR	60 hrs. / 2 weeks at the end of semester II or IV	2	AZ2017	AUBOT	BOT
V	BOT5201SI							

**COURSES OFFERED TO OTHER DEPARTMENTS**

**NON-MAJOR ELECTIVE COURSES**

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	BOCO3201EI	GREEN PRACTICES IN PRODUCTION AND MARKETING	TH	2		2	AV2014	AUALLM	BOT & COM
	BOEN3202EI	ECOLOGY AND LITERATURE	TH	2		2	AZ2017	AUALLM	BOT & ENG
	BOTA3201EI	TAMIL AND BOTANY	TH	2		2	AV2014	AUALLM	BOT & TAM
IV	BOEC4201EI	NUTRITION ECONOMICS	TH	2		2	BA2018	AUALLM	BOT & ECO
	BOMA4201EI	MATHEMATICS IN PLANT SCIENCE	TH	2		2	AV2014	AUALLM	BOT & MAT
	BOSS4201EI	ECOLOGY AND SOCIETY	TH	2		2	AV2014	AUALLM	BOT & SOC

**INTERDISCIPLINARY COURSES**

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	BOZO5401DM	BIOSAFETY AND BIOETHICS	TH	4		4	AW2015	AUBOT& AUZOO	BOT& ZOO
	BOCH5401DT	MEDICINAL PHYTOCHEMISTRY	LT	3	1	4	AZ2017	AUBOT& AUCHE	BOT& CHE
VI	BOZO6401DM	FOREST AND WILD LIFE MANAGEMENT	TH	4		4	AW2015	AUBOT& AUZOO	BOT& ZOO
	BOMA6401DM	MATHEMATICAL APPLICATIONS IN LIFE SCIENCES	TH	4		4	BA2018	AUBOT& AUMAT	BOT& MAT

**SELF-LEARNING COURSES**

Sem.	Course Code	Course Title	Credits	Passed in Academic Council	Offered to	Offered by
II, III, IV, V & VI	BOT0401CD	INTERIOR DECORATION	4	AU2013	ALLM	BOT
	BOT0402CD	MAN AND MICROBES	4	AU2013	ALLM	BOT
	BOT0403CD	PLANT AND UNIVERSE	4	AU2013	ALLM	BOT

## BOT3505CM BIOLOGICAL TECHNIQUES AND BIOINFORMATICS

(THEORY)

LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- describe the basic principles & working mechanism of various instruments
- analyse biological data using bioinformatic tools
- construct three dimensional graphs using Libre Office

COURSE CONTENT:

UNIT I: MICROSCOPY

15 hrs.

Bright field (review) – phase contrast – dark field – fluorescence microscope and electron microscopy - (transmission and scanning) – scanning probe – atomic force microscope

UNIT II: SEPARATION & CHROMATOGRAPHIC TECHNIQUES

15 hrs.

Counter current distribution – partition adsorption chromatography – paper chromatography (ascending, descending & circular) – thin layer & column chromatography – gas chromatography – electrophoresis (agarose gel – polyacrylamide).

UNIT III: pH METRY & COLORIMETRY

15 hrs.

pH metry: pH indicators – buffer – calomel and glass electrode – henderson – hasselbach equation – related problems

Colorimetry: beer and lambert's law – absorption spectrum – spectrophotometer – UV-visible, fluorescence spectrophotometer.

UNIT IV: CENTRIFUGATION & SPECTROSCOPY

15 hrs.

RCF – sedimentation coefficient – types of rotors – differential – ultra & density gradient – zonal & isopycnic centrifugation – flame photometer & AAS (Atomic Absorption Spectroscopy).

UNIT V: BIOINFORMATICS

15 hrs.

Definition – databases and its types – DNA sequence databases – protein databases – sequence analysis pair wise alignment – PSI-BLAST, FASTA, BLAST – multiple sequence alignment – neighbour joining plot – phylogenetic analysis (Clustal W) – protein secondary structure prediction: ramachandran plot – swiss PROT – RASMOL – use of Bioedit software.

LibreOffice: Calc – (Review)

Working with Calc – Creating and saving documents – formatting data – creating charts – formatting 3D charts – working with graphs and tables using Pivot tables.

TEXT BOOK(S):

Boyer, R.F., (2000). *Modern Experimental Biochemistry*, California, USA: the Benjamin/ Cummings Publishing Company Inc. Print.

Mansfield R., (1994). *The Compact Guide to Microsoft and Office applications*, New Delhi, India: Tata McGraw Hill Publications. Print.

Mani, K. and Vijayaj, N., (2002). *Bioinformatics for Beginners*, (1<sup>st</sup> ed.), Coimbatore, India: Kalaikathir Achagam. Print.

REFERENCE BOOK(S):

Gube, J. and Cheung, G., (2006). *Straight to the point, Microsoft Excel 2003*, New Delhi, India: Firewall Media. Print.

Gurumani, N., (2005). *An Introduction to Biostatistics*, (2<sup>nd</sup> ed.), Chennai, India: HJP Publishing Pvt. Ltd. Print.

Jayaraman, J., (1999). *Laboratory Manual in Biochemistry*, New Delhi, India: New Age International Publishers Pvt. Ltd. Print.

Keith Wilson, and John Walker, (2005). *Practical Biochemistry-Principles & techniques*, New York: Cambridge University Press. Print.

Mount, D.W., (2001). *Bioinformatics*, New York: Cold Spring Harbor Laboratory Press. Print.

Palanivelu, P., (2000). *Laboratory Manual for Analytical Biochemistry & Separation Techniques*, Madurai, India: School of Biotechnology, Madurai Kamaraj University. Print.

Plummer, D.T., (1999). *An Introduction to Practical Biochemistry*, New Delhi, India: Tata Mc Graw Hill Publishing Company Ltd. Print.

## COURSE PROFILE

### M.Sc. Botany

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PGB1421M	BIOINSTRUMENTATION	TH	4		4	AZ2017	SPBOT	BOT
	PGB1422M	MICROBIOLOGY AND PLANT PATHOLOGY	TH	4		4	AZ2017	SPBOT	BOT
	PGB1423M	PLANT DIVERSITY – I	TH	4		4	BA2018	SPBOT	BOT
	PGB1424M	PLANT DIVERSITY – II	TH	4		4	BA2018	SPBOT	BOT
	PGB1321P	LAB FOR PLANT DIVERSITY I AND II	LA		3	3	BA2018	SPBOT	BOT
	PGB1425M	GENETICS AND EVOLUTION	TH	4		4	BA2018	SPBOT	BOT
	PGB1422P	LAB FOR MICROBIOLOGY AND PLANT PATHOLOGY	LA		4	4	AZ2017	SPBOT	BOT
	PGV1101PV	FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE
	PGV1102PV	PERSPECTIVES ON GENDER					AV2014 as PGV2101V	LDC ALLM	
	PIV1102PI	THE BIBLE AND SCIENCE						APCH/ SPCH	
		CLUB			1			SPBOT	BOT
		Total		30		28			
II	PGB2421M	BIOCHEMISTRY	TH	4		4	AZ2017	SPBOT	BOT
	PGB2422M	PLANT PHYSIOLOGY	TH	4		4	AZ2017	SPBOT	BOT

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PGB2421P	LAB FOR BIOMOLECULES AND PLANT PHYSIOLOGY	LA		5	4	AZ2017	SPBOT	BOT
	PGB2521M	PLANT SYSTEMATICS	TH	5		5	AZ2017	SPBOT	BOT
	PGB2422P	LAB FOR PLANT SYSTEMATICS	LA		5	4	AZ2017	SPBOT	BOT
		ELECTIVE COURSE	TH	4		4		SPALLM (Except Botany)	BOT
	PGV2103PV	HUMAN RIGHTS AND DUTIES	TH	2	1		AM2005 as PGV0104V	NON LDC ALLM	Centre for VE
	PGV2102PV	PRACTICING HUMAN RIGHTS					AM2005 as PGV0107V	LDC ALLM	
	PIV2102PI	RIGHTS, RESPONSIBILITIES AND THE BIBLE						APCH/ SPCH	
		CLUB		1				SPBOT	SPBOT
			Total	30		26			

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PGB3521M	PLANT ANATOMY AND EMBRYOLOGY	TH	5		5	BA2018	SPBOT	BOT
	PGB3321P	LAB FOR PLANT ANATOMY AND EMBRYOLOGY	LA		3	3	BA2018	SPBOT	BOT
	PGB3622M	CELL AND MOLECULAR BIOLOGY	TH	6		6	BA2018	SPBOT	BOT
	PGB3422P	LAB FOR CELL AND MOLECULAR BIOLOGY	LA		4	4	BA2018	SPBOT	BOT
	PGB3521O	RESEARCH METHODOLOGY AND COMPUTER APPLICATIONS /	TH	5		5	BA2018	SPBOT	BOT
	/ PGB3522O	MEDICINAL BOTANY AND PHYTOCHEMISTRY	LT	4	1	5	BA2018	SPBOT	BOT

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by	
				TH	LA					
III	PGB3421E	ENTREPRENEURIAL SKILLS IN LIFE SCIENCES	TH	4		4	BA2018	ALLM	BOT	
	PGB0604M	PROJECT	PR		2			SPBOT	BOT	
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1			ALLM	Centre for VE
		PIV3101PI							BIBLICAL ETHICS	
				Total	30		28			
IV	PGB4421M	PLANT BIOTECHNOLOGY	TH	4		4	BA2018	SPBOT	BOT	
	PGB4421P	LAB FOR PLANT BIOTECHNOLOGY	LA		4	4	BA2018	SPBOT	BOT	
	PGB4521M	APPLIED BOTANY	TH	5		5	BA2018	SPBOT	BOT	
	PGB4422P	LAB FOR APPLIED BOTANY	LA		5	4	BA2018	SPBOT	BOT	
	PGB4521O / PGB4522O	BIOSAFETY AND BIOETHICS / PREPARATION FOR COMPETITIVE EXAMS IN LIFE SCIENCES	TH	5		5	BA2018		SPBOT	BOT
		PGB0604M								
	PGV4103PV	IN TUNE WITH NATURE	TH	2		1			ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER							APCH / SPCH	
				30		29				

### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PGB2301MT	PGB3301MT	PGB4301MT	TH	3	SPBOT	BOT
MINI PROJECT	PGB2301MP	PGB3301MP	PGB4301MP	TH	3	SPBOT	BOT
COMPREHENSIVE VIVA	PGB2301MV	-	PGB4301MV	TH	3	SPBOT	BOT
COMPREHENSIVE – e-ASSESSMENT	-	-	PGB4201CE	TH	2	SPBOT	BOT

### COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

#### ELECTIVE COURSES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PGB2422E	HOME MANAGEMENT	TH	4		4	BA2018	SPALLM (Except Botany)	BOT
	PIS2421E	FITNESS AND WELLNESS							BOT & PED
III	PGB3421E	ENTREPRENEURIAL SKILLS IN LIFE SCIENCES	TH	4		4	BA2018	SPALLS	BOT

#### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Credits	Passed in	Offered to	Offered by
II / III / IV	PGB0401D	THE ART OF SCIENTIFIC WRITING	4	AZ2017	ALLM	BOT
	PGB0402D	FOOD SCIENCE AND HOUSEHOLD ARTS	4	AZ2017	ALLM	BOT

## DEPARTMENT OF ZOOLOGY

### PREAMBLE

The present curriculum of B.Sc. Zoology (Spl. in Biotechnology) was reviewed and based on which it is found necessary to introduce a few changes in the following courses:

- ZOO3501CM BIOCHEMISTRY has been changed to ZOO3503CM BIOCHEMISTRY
- ZOO3502CM ANIMAL PHYSIOLOGY has been changed to ZOO3504CM ANIMAL PHYSIOLOGY
- ZOO3205CP LAB IN PHYSIOLOGY AND ENVIRONMENTAL BIOLOGY has been changed to ZOO3206CP LAB IN PHYSIOLOGY AND ENVIRONMENTAL BIOLOGY
- ZOO4503CM MOLECULAR BIOLOGY has been changed to ZOO4505CM MOLECULAR BIOLOGY
- ZOO4504CM GENETICS has been changed to ZOO4506CM GENETICS
- ZOO4302CP LAB IN MOLECULAR BIOLOGY AND IMMUNOLOGY has been changed to ZOO4303CP LAB IN MOLECULAR BIOLOGY AND IMMUNOLOGY
- ZOO4202CP LAB IN GENETICS has been changed to ZOO4203CP LAB IN GENETICS
- ZOO5201CP LAB IN GENETIC ENGINEERING has been changed to ZOO5202CP LAB IN GENETIC ENGINEERING
- ZOO6301CP LAB IN PLANT AND ANIMAL BIOTECHNOLOGY has been changed to ZOO6302CP LAB IN PLANT AND ANIMAL BIOTECHNOLOGY
- ENZO4201EI LITERATURE AND ENVIRONMENT has been changed to ENZO4202EI LITERATURE AND ENVIRONMENT

The course profile along with the syllabi of the modified courses is presented.

### COURSE PROFILE

#### B.Sc. Zoology (Spl. in Biotechnology)

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	ZOO3401CT*	DEVELOPMENTAL BIOLOGY	LT	3	1	4		AUZOO	ZOO
	ZOO3503CM	BIOCHEMISTRY	TH	5		5		AUZOO	ZOO
	ZOO3504CM	ANIMAL PHYSIOLOGY	TH	5		5		AUZOO	ZOO
	ZOO3206CP	LAB IN PHYSIOLOGY AND ENVIRONMENTAL BIOLOGY	LA		4	2		AUZOO	ZOO
	ZOO3204CP	LAB IN CELL BIOLOGY AND BIOCHEMICAL TECHNIQUES	LA		4	2	AW2015	AUZOO	ZOO
		ALLIED COURSE	TH	5		4	AV2014	AUZOO	MAT
		NON-MAJOR ELECTIVE	LA	2		2	AV2014		
		VOCATIONAL COURSE				2	AV2014	AUZOO	ZOO

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH / SUCH	
		Total		30		27			
IV	ZOO4505CM	MOLECULAR BIOLOGY	TH	5		5		AUZOO	ZOO
	ZOO4506CM	GENETICS	TH	5		5		AUZOO	ZOO
	ZOO4502CM	IMMUNOLOGY	TH	5		5	AW2014	AUZOO	ZOO
	ZOO4203CP	LAB IN GENETICS	LA	3		2		AUZOO	ZOO
	ZOO4303CP	LAB IN MOLECULAR BIOLOGY AND IMMUNOLOGY	LA	5		3		AUZOO	ZOO
		NON-MAJOR ELECTIVE	TH	2		2	AV2014		
	ZOO4202SP	LAB IN BASIC CLINICAL DIAGNOSTICS	LA		2	2	BA2018	AUZOO	ZOO
		LIBRARY		1				AUZOO	ZOO
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH/ SUCH	
		Total		30		26			
V	ZOO5401CM	EVOLUTION	TH	4		4	AW2015	AUZOO	ZOO
	ZOO5503CT	BIOPROCESS AND MICROBIAL BIOTECHNOLOGY	LT	4	2	5	AZ2017	AUZOO	ZOO
	ZOO5402CM	GENETIC ENGINEERING	TH	4		4	AW2015	AUZOO	ZOO
	ZOO5202CP	LAB IN GENETIC ENGINEERING	LA	4		2		AUZOO	ZOO
		INTERDISCIPLINARY COURSES	TH	4		4	AW2015		
	ZOO5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AY2016	AUZOO	ZOO
	ZOO0601LM	WOMEN AND HEALTH	TH	4			AW2015	AUZOO	ZOO
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
		STUDIES							
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN						AUCH/ SUCH	
		Total			30	23			
VI	ZOO6501CM	PLANT AND ANIMAL BIOTECHNOLOGY	TH	6		5	AW2015	AUZOO	ZOO
	ZOO6502CM	ANIMAL BEHAVIOUR	TH	5		5	AW2015	AUZOO	ZOO
	ZOO6503CM	ECONOMIC ENTOMOLOGY	TH	5		5	AW2015	AUZOO	ZOO
	ZOO6302CP	LAB IN PLANT AND ANIMAL BIOTECHNOLOGY	LA	5		3		AUZOO	ZOO
		INTERDISCIPLINARY COURSES	TH	4		4	AW2015	AUZOO & AUBOT	ZOO & BOT
	ZOO0601LM	WOMEN AND HEALTH	PR	4		6		AUZOO	ZOO
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH/ SUCH	
		Total			30	29			

\* Content remains the same, course shifted to a different semester

### Extra Credit Courses – Refer Pg. No. 293

### COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

#### NON-MAJOR ELECTIVES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	CHZO3201EI	FOOD, NUTRITION AND HEALTH CARE	LA		2	2	AZ2017	AUALLM	ZOO & CHE
	ECZO3204EI	ECONOMICS OF DAIRY FARMING	TH	2		2	BA2018	AUALLM	ZOO & ECO
IV	ENZO4202EI	LITERATURE AND ENVIRONMENT	TH	2		2		AUALLM	ZOO & ENG
	SSZO4201EI	REPROGRAMMING OF THE BRAIN	TH	2		2	AZ2017	AUALLM	ZOO & SOC

#### INTERDISCIPLINARY COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
V	BOZO5401DM	BIOSAFETY AND BIOETHICS	TH	4	AW2015	ZOO & BOT	ZOO & BOT

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
	MAZO5401DM	MEDICAL STATISTICS	TH	4	BA2018	ZOO & MAT	ZOO & MAT
VI	BOZO6401DM	FORESTS AND WILD LIFE MANAGEMENT	TH	4	AW2015	ZOO & BOT	ZOO & BOT
	PHZO6401DM	BIOMEDICAL INSTRUMENTATION	TH	4	BA2018	ZOO & PHY	ZOO & PHY

#### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	ZOO0403CD	MYSTERIES OF BEHAVIOUR	TH	4	AU2013	ALLM	ZOO
IV & VI	ZOO0404CD	BIRD WATCHING	TH	4	AU2013	ALLM	ZOO
III	ZOO0401CD	SERICULTURE	TH	4	AU2013	ALLM	ZOO
V	ZOO0402CD	POULTRY SCIENCE	TH	4	AU2013	ALLM	ZOO

#### ZOO3503CM BIOCHEMISTRY

##### (THEORY)

##### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- interpret the biochemical basis of processes that occur in human body
- relate the interplay of macromolecules
- apply concepts learnt in clinical diagnosis

##### COURSE CONTENT:

##### UNIT I: CARBOHYDRATES

18 hrs.

Introduction – basic concepts and designs – laws of thermodynamics – biological oxidations – high energy compounds – Monosaccharides: structure – isomerism – ring structure of glucose – physical and chemical properties of monosaccharides – oligo and polysaccharides: homo and hetero polysaccharides – glycolysis – citric acid cycle and electron transport chain – role of carbohydrates in living systems.

##### UNIT II: PROTEINS

15 hrs.

Structure – classification and properties of amino acids – naturally occurring peptides and their functions – conformation of proteins and denaturation – classification of proteins – their structure and role – transamination and deamination reactions.

##### UNIT III: LIPIDS

12 hrs.

Structure – classification and properties of fatty acids and their derivatives – fats – structure and hydrolysis – lipogenesis and beta oxidation of fatty acids – role of lipids in living systems.

##### UNIT IV: NUCLEIC ACIDS

15 hrs.

Structure of bases – nucleosides and nucleotides – structural conformation and properties of DNA and RNA – biosynthesis and degradation of nucleic acids – role of nucleic acids in living systems.

##### UNIT V: VITAMINS AND BIOCATALYSTS

15 hrs.

Vitamins as co-enzymes – types and properties of enzymes – factors affecting enzyme action – enzyme inhibition – enzyme catalysis – catalytic mechanisms.

**TEXT BOOK(S):**

Sulochana H.R., (2010). *Principles of Biochemistry*, Chennai: PBS Book enterprises, Print.

**REFERENCE BOOK(S):**

Elliot W. H., and Elliot D.C., (2013). *Biochemistry and Molecular Biology*, India: Oxford University Press, Print.

Lehninger L.A., Nelson D.L. and Cox M.M., (2017). *Principles of Biochemistry*, (7<sup>th</sup> ed.), New York: W H Freeman and Comp., Print.

McKee T. and McKee R.J., (2013). *Biochemistry an Introduction*, (4<sup>th</sup> ed.), Philadelphia, USA: Wm.C. Brown Publishers, Print.

Sathanarayana U. and Chakrapani U., (2013). *Biochemistry*, (4<sup>th</sup> ed.), Kolkata: Elsevier Pvt., Ltd., Harayana and India Books and Allied Pvt., Ltd., Print.

Stryer L., (2012). *Biochemistry*, (7<sup>th</sup> ed.), New York: W.H. Freeman Publishers, Print.

Swaminathan M., (2008). *Essentials of food and nutrition*, (2<sup>nd</sup> ed.), India: The Bangalore printing and publishing co. ltd., Print.

## ZOO3504CM ANIMAL PHYSIOLOGY

### (THEORY)

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify the mechanisms of functioning of various organ systems
- relate the fundamental unity in physiological functions
- compare structure and function in various grades of animals

**COURSE CONTENT:**

**UNIT I: NUTRITION AND RESPIRATION**

15 hrs.

Types of feeding – particulate and liquid – digestion and absorption of carbohydrate – protein and fat – functions of minerals and vitamins – cellulose digestion in ruminants – respiratory organs – respiratory pigments – oxygen and carbon-di-oxide transport – respiratory quotient – respiratory control.

**UNIT II: THERMOREGULATION, OSMOREGULATION AND EXCRETION**

15 hrs.

Poikilotherms and homeotherms – physiological adaptations – thermostat – hibernation and aestivation – osmoconformers and osmoregulators with specific examples – osmotic and ionic balance – acid-base balance – structure and function of various excretory organs.

**UNIT III: CIRCULATION**

12 hrs.

Blood composition – coagulation – types of heart – pulmonary and systemic circulation – cardiovascular regulation – pace maker.

**UNIT IV: NEUROSENSORY MECHANISMS**

18 hrs.

Structure of neuron – synapse – neuromuscular junction – mechanism of impulse conduction – chemical transmitters – acetylcholine – adrenaline – mechano – photo and chemoreceptors and their physiology – effectors: ultra-structure of skeletal muscle and mechanism of muscle contraction.

## UNIT V: ENDOCRINE MECHANISMS

15 hrs.

Hormones in crustaceans and insects – hormones in color change in reptiles – hormones in metabolism and reproduction in mammals.

### TEXT BOOK(S):

Nielson S.K, (1990). *Physiology*, (5<sup>th</sup> ed.), New York: Cambridge press, Print.

### REFERENCE BOOK(S):

Eckert R. and Randall D., (1987). *Animal Physiology*, (2<sup>nd</sup> ed.), New York: CBS publishers and distributors, Print.

Hoar W.S., (1967). *General and Comparative Animal Physiology*, New Delhi, India: Prentice Hall, Print.

Strand F.L., (1983). *Physiology – A regulatory Approach System*, Meerut, India: Macmillan publishing company, Print.

## ZOO3206CP LAB IN PHYSIOLOGY AND ENVIRONMENTAL BIOLOGY

(LAB)

### LEARNING OUTCOME

4 hrs. / wk.

On successful completion of the course, the student will be able to

- develop practical knowledge about physiological processes in vertebrates
- identify and compare the functioning of various receptors
- evaluate the physical and chemical parameters of an aquatic environment

### COURSE CONTENT:

#### EXPERIMENTS / LAB:

60 hrs.

#### PHYSIOLOGY

1. Effect of temperature on the opercula activity of fresh water fish
2. Plasticity of pulse rate and heart beat in human.
3. Analysis of nitrogenous wastes in fish and mammal.
4. Uric acid crystal mounting.
5. Study of sensory receptors – mechano, olfactory and photoreceptors.

#### ENVIRONMENTAL BIOLOGY

6. Study of physical factors – temperature, humidity, light, wind velocity, water current, soil profile, substrate analysis.
7. Analysis of water quality – pH, CO<sub>2</sub>, O<sub>2</sub>, phosphate, salinity and alkalinity in water samples.
8. Measurement of primary productivity – light and dark bottle method
9. Estimation of biological oxygen demand
10. Analysis of fresh water plankton
11. Study of ecological succession – quadrature analysis

### REFERENCE BOOK(S):

Alison L.B., (1971). *Ecology of Fresh Water*, London: Heimemamm Educational books Ltd., Print.

Charles K.S., (1961). *Animal Ecology*, USA: Prentice Cliffs, N.J, Print.

Eugene P.O., (1971). *Fundamentals of Ecology*, (3<sup>rd</sup> ed.), USA: W.B. Saunderscom. Ltd., Print.

Hoar W.S, (1967). *A Laboratory Companion, General and Comparative Physiology*, New Delhi: Prentice Hall, Print.

Jeyaraj N., and Mahadevan A., (1994). *Animal Physiology Manual*, Tamil Nadu: Arte Publishers, Print.

Michael.P, (1984). *Ecological Methods for Field and Laboratory Investigations*, New Delhi: Tata McGraw Hill publishing company Ltd., Print.

Rastogi, S.C., (1982). *Experimental Physiology*, New Delhi: Wiley Eastern Ltd., Print.

Nielson S.K, (1990). *Physiology*, (5<sup>th</sup> ed.), New York: Cambridge press, Print.

Hill, Richard W., Gordon A. Wyse, and Margaret Anderson. (2008) *Animal Physiology*. Sunderland, MA: Sinauer Associates.

## ZOO4505CM MOLECULAR BIOLOGY

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify molecular interactions in gene expression and control
- relate genes to functions at molecular level
- apply the concepts learnt for research

#### COURSE CONTENT:

##### UNIT I: CHROMOSOME STRUCTURE AND TRANSPOSABLE ELEMENTS

16 hrs.

Structure and organization – bacteria and eukaryotic chromosomes – chromatin, histones, centromere and telomere – gene structure and architecture: introns and exons – repetitive DNA – restriction mapping – gene duplication – pseudogenes – transposable elements: mechanism of transposition – transposable elements in bacteria and eukaryotes – transposition *via* DNA and RNA intermediates.

##### UNIT II: DNA – MUTATION, REPAIR, REPLICATION AND RECOMBINATION

16 hrs.

DNA as genetic material – Griffith experiment - Hershey and Chase experiment – central Dogma of Molecular Biology – DNA mutation – mutagens and mode of action – types of DNA repair DNA repair mechanisms – semi-conservative replication – enzymes and proteins – prokaryotic and eukaryotic replication – replication models – recombination models and enzymes involved in recombination.

##### UNIT III: TRANSCRIPTION AND REGULATION OF GENE EXPRESSION

18 hrs.

Transcription apparatus – process of bacterial and eukaryotic transcription – RNA processing: Pre-mRNA – polyadenylation – capping – splicing – editing – Operon: structure – inducible and repressible operons – Lac operon – Trp operon – Attenuation – regulation in eukaryotes: methylation – histone modification – role of activators – enhancers.

##### UNIT IV: TRANSLATION

15 hrs.

Genetic code: degeneracy – reading frame – mechanism of translation – post-translational modification of proteins.

##### UNIT V: SIGNAL TRANSDUCTION

10 hrs.

Receptors – signaling pathways – types – G protein-coupled receptor – protein tyrosine kinase – second messengers – intracellular enzyme cascade.

#### TEXT BOOK(S):

Alberts B, Johnson A, Lewis J, Raff M, Roberts K, and Walter P., (2014). *Molecular Biology of the Cell*, (6<sup>th</sup> ed.), UK: Garland Science Publishers, Print.

#### REFERENCE BOOK(S):

Twyman R.M., (1998). *Advanced Molecular Biology*, (4<sup>th</sup> ed.), New Delhi: Viva books Pvt. Ltd. Print.

Brown T.A., (2007). *Genomes 3*, (3<sup>rd</sup> ed.), UK: Garland Science Publishers. Print.

Cooper G.M., (1997). *The Cell –Molecular Approach*, Washington DC: ASM Press. Print.

Marks F., Klingmuller U., and Decker, K.M., (2009). *Cellular Signal Processing*, USA: Garland Science, Taylor & Francis Group LLC. Print.

Watson J.D., Baker T.A., Bell S.P., Gann A., Levine M., and Losick R., (2004). *Molecular Biology of the Gene*, (5<sup>th</sup> ed.), USA: Pearson Education Inc. Print.

## ZOO4506CM GENETICS

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- interpret the basic principles of heredity
- demonstrate the application of genetics in animal and plant breeding
- relate principles of heredity to various genetic disorders in man and animals

#### COURSE CONTENT:

##### UNIT I: MENDEL'S WORK, DEVIATIONS AND SEX DETERMINATION

15 hrs.

Review of Mendel's work: mono and dihybrid ratios – modified Mendelian monohybrid and dihybrid ratios – linkage and crossing over – mapping of chromosomes – sex determination: bipotential nature of organisms – role of external and internal environments – chromosomal mechanism – gynandromorphism.

##### UNIT II: QUANTITATIVE GENETICS, SEX LINKED INHERITANCE AND CYTOPLASMIC

18 hrs.

Polygenic inheritance: skin pigmentation in man – height and weight in man – ear length in maize/ wheat – spotting in mice – multiple alleles: blood grouping in man – coat colour in rabbits and eye colour in *Drosophila* – related problems – sex-linked inheritance in man (colour blindness and hemophilia) and *Drosophila* (eye colour) – problems – extra nuclear or cytoplasmic inheritance: coiling of shell – kappa particles – milk factor and plastid inheritance.

##### UNIT III: HUMAN GENETICS

13 hrs.

Simple Mendelian traits – pedigree analysis – study on twins – nature Vs nurture – eugenics and genetic counseling – epigenetics.

##### UNIT IV: POPULATION GENETICS & APPLIED GENETICS

13 hrs.

Hardy-Weinberg theorem – derivation – factors affecting gene frequencies – application of Genetics in animal and plant breeding – problems.

## UNIT V: GENETIC BASIS OF DISEASES

16 hrs.

One-gene-one-enzyme concept – mutation – inborn errors of metabolism – hereditary diseases – their mode of inheritance (autosomal dominant – autosomal recessive – x-linked – y-linked) – chromosomal aberrations (structural and numerical) – ploidy.

### TEXT BOOK(S):

Pierce B.A., (2012). *Genetics – A Conceptual Approach*, (4<sup>th</sup> ed.), New York: W.H. Freeman and Co., Print.

### REFERENCE BOOK(S):

Tamrin R.H., (2007). *Principles of Genetics*, (7<sup>th</sup> ed.), India: Tata McGraw Hill Pub., Print.

Gardner E., (1975). *Principles of Genetics*, (5<sup>th</sup> ed.), India: John Wiley and sons Inc. Print.

Griffiths A.J.F., Wessler S.R., Carroll S.B. and Doebley J., (2012). *Introduction to Genetic Analysis*, New York: W.H. Freeman & Company, Print.

Klug W.S and Cumming M.R., (2003). *Essentials of Genetics*, (7<sup>th</sup> ed.), New Delhi, India: Replica Press Pvt. Ltd., Print.

Sinnot E.W, Dunn L.C. and Dobzhansky T., (2004). *Principles of Genetics*, (5<sup>th</sup> ed. Reprint), New Delhi: Tata McGraw Hill Pub. Co. Ltd., Print.

Strickberger W., (1978). *Genetics*, (2<sup>nd</sup> ed.), London: Macmillan Pub. Co. Inc., Print.

Winchester A.M., (1976). *Genetics*, (3<sup>rd</sup> ed.), New Delhi: Oxford and IBH Pub. Co., Print.

## ZOO4203CP LAB IN GENETICS

(LAB)

### LEARNING OUTCOME

3 hrs./ wk.

On successful completion of the course, the student will be able to

- apply genetic principles in understanding modern Molecular Biology
- design experiments pertaining to Mendelian genetics
- construct pedigree trees and use them to solve problems

### COURSE CONTENT:

#### EXPERIMENTS / LAB:

45 hrs.

1. Culture of *Drosophila*
2. Study of *Drosophila* – Isolation of virgin flies, life cycle and observation of giant chromosomes
3. Simple Mendelian traits and pedigree analysis
4. Multiple alleles – blood grouping
5. Multiple alleles – Inheritance of eye color in *Drosophila*
6. Observation of Barr body
7. Polygenic inheritance – height and weight in humans
8. Physical mutagenesis (UV) and survival curve – Bacterial culture
9. Testing of the Hardy-Weinberg equilibrium

### REFERENCE BOOK(S):

Jayaram K. and Jayaraman R., (1979). *Laboratory Manual in Molecular Genetics*, New Delhi: Wiley Eastern Ltd., Print.

Jayaraman K. and Krishnaswamy S., (1973). *Genetics – Experiments with Drosophila*, Madurai: Printed at Galaxy, Print.

Sinnot E.W., Dunn L.C. and Dobzhansky T., (1990). *Principles of Genetics*, (5<sup>th</sup> ed.), New Delhi: Tata McGraw Hill Pub. Co. Ltd., Print.

Winchester A.M., (1976). *Genetics*, (3<sup>rd</sup> ed.), Kolkata: Oxford and IBH Pub. Co., Print.

## ZOO4303CP LAB IN MOLECULAR BIOLOGY AND IMMUNOLOGY

(LAB)

### LEARNING OUTCOME

5 hrs. / wk.

On successful completion of the course, the student will be able to

- relate the principles of molecular interactions in different techniques
- design experiments for research and diagnostics
- interpret the reports of molecular and immunological techniques

### COURSE CONTENT:

#### EXPERIMENTS / LAB:

75 hrs.

Review: Safety precautions in Molecular Biology and Immunology lab.

1. Isolation of genomic DNA from mammalian tissue
2. Isolation of RNA from Mammalian tissue
3. Estimation of DNA by DPA method
4. Electrophoretic separation of DNA and RNA.
5. Determination of T<sub>m</sub> value of isolated DNA.
6. Study of lymphoid organs in chick/ mice – Demonstration
7. Isolation of T and B lymphocytes and identification by E-Rosette method
8. Raising polyclonal antibodies in fish to antigen BSA/ SRBC (Group work)
9. Immunoassay – Single radial immunodiffusion
10. ELISA – Demonstration

### REFERENCE BOOK(S):

Hudson L. and Hay F.C., (1989). *Practical Immunology*, (3<sup>rd</sup> ed.), London: Blackwell Publishing, Print.

Mehra N.K. and Gupta S.K., (1992). *A Handbook of practical and clinical Immunology*, (2<sup>nd</sup> ed.), 3 vol., New Delhi: CBS Publishers, Print.

Stites D.P. and Terr A.I., (1991). *Basic clinical Immunology*, (7<sup>th</sup> ed.), UK: Prentice – Hall International Ltd., Print.

Talwar G.P. and Gupta S.K., (1992). *A Handbook of practical and clinical Immunology*, (2<sup>nd</sup> ed.), New Delhi: CBS Publishers, Print.

Miller J.H., (1992). *A short course in Bacterial Genetics – Laboratory manual*, U.S.A.: Cold Spring Harbour laboratory press, Print.

Sambrook J., Fritsch E.F and Maniatis T., (1989). *Molecular cloning- A laboratory manual*, (2<sup>nd</sup> ed.), New York: CSH publishers, Print.

Boyer R., (2000). *Modern Experimental Biochemistry*, (3<sup>rd</sup> ed.), Portland: Pearson Education Inc., Print.

Palanivelu P., (2004). *Analytical Biochemistry and Separation Techniques – A laboratory manual for B.Sc. and M.Sc. students*, (3<sup>rd</sup> ed.), Madurai: Kalaimani Printers, Print.

Plummer T.D., (1990). *An Introduction to Practical Biochemistry*, (4<sup>th</sup> ed.), Europe: McGraw Hill Book Company, Print.

Sawhney S.K., and Singh R., (2001). *Introductory Practical Biochemistry*, New Delhi: Narosa Publishing House, Print.

### ZOO5202CP LAB IN GENETIC ENGINEERING (LAB)

#### LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- relate the basic principles of genetic engineering in biological research
- plan suitable techniques in biotechnology
- employ electrophoretic and cloning techniques

#### COURSE CONTENT:

#### EXPERIMENTS / LAB:

60 hrs.

1. Isolation of plasmid DNA from bacterial cells
2. Isolation of genomic DNA from bacterial cells
3. Electrophoretic separation of DNA
4. Elution and confirmation of DNA
5. Hybridization Techniques –Western blotting
6. Competent cell preparation, Transformation and selection
7. Polymerase Chain Reaction
8. Restriction analysis of DNA

#### REFERENCE BOOK(S):

Glover D.M. and Hames B.D., (2006). *DNA Cloning*, (2<sup>nd</sup> ed. & Vol. I, II, III), New York: IRL press at Oxford University Press, Print.

Miller J.H., (1972). *Molecular Genetics*, New York: Cold Spring Harbour, Print.

Sam brook J., Fritsh E.F. and Maniatis T., (2001). *Molecular Cloning*, (3<sup>rd</sup> ed., & 3 volumes), New York: Cold Spring Harbour Laboratory, Print.

### ZOO6302CP LAB IN PLANT AND ANIMAL BIOTECHNOLOGY

#### (LAB)

#### LEARNING OUTCOME

5 hrs. / wk.

On successful completion of the course, the student will be able to

- set-up tissue culture lab
- interpret chromosome plates
- apply the techniques for field experimentation

#### COURSE CONTENT:

#### EXPERIMENTS / LAB:

75 hrs.

1. Media preparation – MS media and McCoy's 5a
2. Establishment of plant tissue culture from isolated explants
3. Callogenesis, caulogenesis and rhizogenesis
4. Immobilization of cells – synthetic seed
5. Protoplast isolation
6. Primary cell culture – lymphocytes
7. Karyotyping using lymphocyte culture
8. Cell viability and cell counting
9. Preservation of cells and cultures

**REFERENCE BOOK(S):**

- Lindsey K., (2007). *Plant Tissue Culture – Manual*, New Delhi, India: Springer, Pvt. Ltd., Print.
- Freshney R.I., (2006). *Culture of Animal Cells – A Manual of Basic Techniques*, (5<sup>th</sup> ed.), Asia: John Wiley and Sons Pvt. Ltd., Print.
- Razdan M.K., (1994). *An Introduction to Plant Tissue Culture*, New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd., Print.
- Dubey R.C., (2004). *A Textbook of Biotechnology*, New Delhi: S. Chand & Co. Pvt. Ltd., Print.

(For the following course, content remains the same but the course has been shifted to a different semester and the content is presented in this Academic Council booklet)

**ZOO3401CT DEVELOPMENTAL BIOLOGY**

**(LAB CUM THEORY)**

**LEARNING OUTCOME**

**3T + 1L hrs./wk.**

On successful completion of the course, the student will be able to

- understand the early pattern of development of an animal.
- correlate the dynamic processes of cell movement to organogenesis.
- compare the various principles and processes of development and differentiation in some representative animal groups.

**COURSE CONTENT:**

**UNIT I: GAMETOGENESIS**

**9T hrs.**

Spermatogenesis, spermiogenesis- differentiation of spermatozoa, oogenesis, types of sperm and ova, Fertilization-approach of sperm to the egg- Activation of egg - Cortical reaction - fertilization membrane - changes in organization of egg.

**UNIT II: CLEAVAGE AND GASTRULATION**

**9T + 2L hrs.**

Patterns of cleavage – fate maps and gastrulation in frog and chick.  
 LAB: Chick embryo – 24 hrs., 48 hrs., 72 hrs. and 96 hrs. – Observation of live chick embryo – Blastoderm mounting.

**UNIT III: ORGANOGENESIS**

**9T hrs.**

Development of eye and heart in frog; Organizer – with experimental evidences.

**UNIT IV: MAMMALIAN EMBRYOLOGY**

**9T + 3L hrs.**

Placentation, types of placenta, physiology - deciduous, non-deciduous; Developmental stages - changes during gestation, parturition - *in vitro* fertilization – test tube babies. Teratology - definition,

malformation in legs, arms, hands and feet, drug - induced malformation.  
 LAB: T.S. of mammalian ovary, T.S. of chick ovary, T.S. of mammalian testis. Yolk sac placenta, polyembryony (Armadillo)

**UNIT V: METAMORPHOSIS**

9T + 10L hrs.

Metamorphosis in amphibia, insects and their hormonal regulation - thyroid hormones, ecdysone and juvenile hormone. Histological and physiological processes involved in limb regeneration.

LAB: Observation of frog development and tadpole tail regeneration.

**TEXT BOOK(S):**

Balinsky, B.I., (2001). *An Introduction to Embryology*, (5<sup>th</sup> ed.), Philadelphia, London: Holt – Saunders International. Print.

Carlson, B.M., (1998). *Patten's Foundation of Embryology*, (5<sup>th</sup> ed.), London: McGraw Hill Inc. Print.

**REFERENCE BOOK(S):**

Berril, N.J., (1980). *Developmental Biology*, New Delhi: Tata McGraw Hill Pub. Company Ltd. Print.

Bradley, P.M., (1925). *The Early Embryology of the Chick*, (3<sup>rd</sup> ed.), Toronto, The Blakiston Company. Print.

Browder, L.W., Erickson, C.A., and Jeffery, W.R., (1991). *Developmental Biology*, (3<sup>rd</sup> ed.), London: Saunder College Pub., Print.

Gilbert, S.F., (2006). *Developmental Biology*, (8<sup>th</sup> ed.), Sunderland, Massachusetts: Sinauer Associates Inc., Print.

**COURSE PROFILE**

**M.Sc. ZOOLOGY (SPECIALIZATION IN BIOTECHNOLOGY)**

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PGZ1527M	PHYSIOLOGY	TH	5		5	AV 2014	APZOO	ZOO
	PGZ1528M	BIOCHEMISTRY	TH	5		5	AV 2014	APZOO	ZOO
	PGZ1530M	MICROBIOLOGY	TH	5		5		APZOO	ZOO
	PGZ1423P	LAB IN MICROBIOLOGY	LA		5	4	AV 2014	APZOO	ZOO
	PGZ1424P	LAB IN PHYSIOLOGY AND BIOCHEMISTRY	LA		5	4	AV 2014	APZOO	ZOO
	PGV1101PV	FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE
	PGV1102PV	PERSPECTIVES ON GENDER					AV2014 as PGV2101V	LDC ALLM	
	PIV1102PI	THE BIBLE AND SCIENCE						APCH/ SPCH	
		LIBRARY		2					
	CLUB		1						

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
		TOTAL		30		24			
II	PGZ2526M	MOLECULAR BIOLOGY	TH	5		5	AV2014	APZOO	ZOO
	PGZ2527M	GENETICS AND EVOLUTION	TH	5		5	AV2014	APZOO	ZOO
	PGZ2528M	IMMUNOLOGY	TH	5		5	AV2014	APZOO	ZOO
	PGZ2322P	LAB IN IMMUNOLOGY	LA		4	3	AV2014	APZOO	ZOO
	PGZ2323P	LAB IN MOLECULAR BIOLOGY	LA		4	3	AV2014	APZOO	ZOO
	PGZ2423E	NUTRITION, HEALTH AND CHILD CARE	TH	4		4	AV2014	ALLM	ZOO
	PGV2103PV	HUMAN RIGHTS AND DUTIES	TH	2		1	AM2005 as PGV0104V	NON LDC ALLM	Centre for VE
	PGV2102PV	PRACTICING HUMAN RIGHTS					AM2005 as PGV0107V	LDC ALLM	
	PIV2102PI	RIGHTS, RESPONSIBILITIES AND THE BIBLE						APCH/ SPCH	
		LIBRARY		1					
		TOTAL		30		26			

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PGZ3523M	rDNA TECHNOLOGY	LT	4	2	5	AV2014	APZOO	ZOO
	PGZ3424M	STATISTICAL TOOLS IN BIOLOGICAL RESEARCH	TH	4		4	AV2014	APZOO	ZOO
	PGZ3425M	PLANT AND MICROBIAL BIOTECHNOLOGY	TH	4		4	AV2014	APZOO	ZOO
	PGZ35230/ PGZ35240	IMMUNOTECHNOLOGY / MOLECULAR DIAGNOSTICS AND FORENSICS	TH	5		5	AV2014	APZOO	ZOO
	PGZ3423P	LAB IN BIOTECHNOLOGY	LA		4	4	AV2014	APZOO	ZOO
	PGZ3422E	HUMAN REPRODUCTIVE BIOLOGY	TH	4		4	AV2014	APALLMS	ZOO

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PGZ0621M	PROJECT	PR		2				
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH/ SPCH	
		Total			30	27			
IV	PGZ4422M	BIODIVERSITY AND IPR	TH	4		4	BA2018	APZOO	ZOO
	PGZ4524M	ANIMAL BIOTECHNOLOGY	TH	5		5	AV2014	APZOO	ZOO
	PGZ4527M	DEVELOPMENTAL BIOLOGY	TH	5		5	AV2014	APZOO	ZOO
	PGZ4525O/ PGZ4526O	ECONOMIC ENTOMOLOGY / ANIMAL BEHAVIOUR	TH	5		5	AV2014	APZOO	ZOO
	PGZ0621M	PROJECT	LA		8	6	AV2014	APZOO	ZOO
		CLUB		1					
	PGV4103PV	IN TUNE WITH NATURE	TH	2		1		ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER						APCH/ SPCH	
	Total			30	26				

#### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PGZ2301MT	PGZ3301MT	PGZ4301MT	TH	3	APZOO	ZOO
MINI PROJECT	PGZ2301MP	PGZ3301MP	PGZ4301MP	TH	3	APZOO	ZOO
COMPREHENSIVE VIVA			PGZ4301MV	TH	3	APZOO	ZOO
COMPREHENSIVE – E-ASSESSMENT			PGZ4201CE	TH	2	APZOO	ZOO

#### COURSES OFFERED TO THE STUDENTS OF OTHER DEPARTMENTS

#### ELECTIVES COURSES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PGZ2423E	NUTRITION, HEALTH AND CHILD CARE	TH	4		4	AV2014	APALLM (Except ZOO)	ZOO
III	PGZ3422E	HUMAN REPRODUCTIVE	TH	4		4	AV2014	APALLS	ZOO

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
		BIOLOGY							

**SELF-LEARNING COURSES**

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II / III / IV	PGZ0422D	WILDLIFE IN INDIA	TH	4	AV2014	ALLM	ZOO
	PGZ0424D	NATURE WATCH	TH	4	AV2014	ALLM	ZOO
	PGZ0425D	GREEN TECHNOLOGY	TH	4	AV2014	ALLM	ZOO
	PGZ0426D	ENVIRONMENTAL MANAGEMENT	TH	4	AV2014	ALLM	ZOO

## DEPARTMENT OF BIOTECHNOLOGY

### PREAMBLE:

The present curriculum of B.Sc., Biotechnology (SF) and M.Sc. Biotechnology (SF) were reviewed and based on which it is found necessary to introduce few changes in the following courses:

#### Undergraduate

- BTE1401CT Animal Diversity is changed to BTE1402CT Animal Diversity

Besides this, the department introduces the following self-learning courses

- BTE0406CD The Science of Stem cells
- BTE0407CD Blue Biotechnology

#### Postgraduate

- PBT1431P Lab in Biological Methods is changed to PBT1433P Lab in Biological Methods

Besides this, the department introduces the following courses

- PBT2532O Nanobiotechnology
- PBT3532O Bioinstrumentation

The course profile along with the syllabi of the new and modified courses are presented.

### COURSE PROFILE

#### B.Sc., BIOTECHNOLOGY

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PART I	TAMIL / HINDI / FRENCH	TH	6	-	3 or 4		ALLM	TAM / ENG / FRE
	PART II	ENGLISH	TH	6	-	3 or 4		ALLM	ENG
	BTE1303FT	CELL BIOLOGY	LT	3	1	3	AZ 2017	SUBTE	BTE
	BTE1402CT	ANIMAL DIVERSITY	LT	3	2	4		SUBTE	BTE
		ALLIED COURSE	TH	5		4		SUBTE	CHE
	BTE1201FS	ENGLISH THROUGH BIOLOGY	TH	2		2	BA2018	SUBTE	BTE
	VBC1101FV	HEALTHY TRANSITION FROM ADOLESCENCE TO ADULTHOOD	TH	2		1	BA2018	ALLM	Centre for VE
	UIV1101FI	BIBLICAL ESSENTIALS FOR EMERGING ADULTS						AUCH/ SUCH	
	Total			30		20 / 22			
II	PART I	TAMIL / HINDI / FRENCH	TH	6		3 or 4			TAM / ENG / FRE

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PART II	ENGLISH	TH	6		3 or 4			
	BTE2402CM	BIOCHEMISTRY	TH	4		4	AV2014	SUBTE	BTE
	BTE2202CP	BIOCHEMISTRY LAB	LA		4	2	BA2018	SUBTE	BTE
		ALLIED COURSE		5		4		SUBTE	CHE
	BTE2201FS	ANALYTICAL BIOLOGY	TH	2		2	BA2018	SUBTE	BTE
	BTE2201NI	ENVIRONMENTAL BIOLOGY	TH	2		2	AV2014	SUBTE	BTE
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV2101FI	BIBLICAL FOUNDATION FOR FAMILY LIFE					BA2018	AUCH/ SUCH	
		<b>Total</b>		<b>30</b>		<b>21 / 23</b>			

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	BTE3402CM	PHYSIOLOGY	TH	4		4	BA2018	SUBTE	BTE
	BTE3403CM	MICROBIOLOGY	TH	4		4	BA2018	SUBTE	BTE
	BTE3502CM	DEVELOPMENTAL BIOLOGY	TH	5		5	AZ2017	SUBTE	BTE
	BTE3201CP	MICROBIOLOGY LAB	LA		4	2	AZ2017	SUBTE	BTE
	BTE3203CP	DEVELOPMENTAL BIOLOGY AND PHYSIOLOGY LAB	LA		3	2	AZ2017	SUBTE	BTE
		ALLIED COURSE	TH	5		4		SUBTE	MAT
		NON-MAJOR ELECTIVE	TH	2		2		ALLM	ALLM
		VOCATIONAL COURSE				2			
		LIBRARY		2				SUBTE	BTE
	VBC0102FV / VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH/ SUCH	
	<b>Total</b>		<b>30</b>		<b>26</b>				

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by	
				TH	LA					
IV	BTE4401CM	IMMUNOLOGY	TH	4		4	AV2014	SUBTE	BTE	
	BTE4501CM	PRINCIPLES OF GENETICS	TH	5		5	AV2014	SUBTE	BTE	
	BTE4502CM	MOLECULAR BIOLOGY	TH	5		5	AV2014	SUBTE	BTE	
	BTE4201CP	GENETICS LAB	LA		3	2	AV2014	SUBTE	BTE	
	BTE4202CP	MOLECULAR BIOLOGY LAB	LA		4	2	AZ2017	SUBTE	BTE	
	BTE4203CP	IMMUNOLOGY LAB	LA		3	2	AV2014	SUBTE	BTE	
	NON-MAJOR ELECTIVE				2		2			
	BTE4201SP	LAB IN AQUARIUM MAINTENANCE	LA	2		2	AV2014	SUBTE	BTE	
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE	
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE					AUCH/ SUCH			
		Total		30		26				
V	BTE5401CM	IMMUNOTECHNOLOGY	TH	4		4	AW2015	SUBTE	BTE	
	BTE5403CM	EVOLUTION	TH	5		4	AZ2017	SUBTE	BTE	
	BTE5502CM	rDNA TECHNOLOGY AND BIOSAFETY	TH	5		5	AY2016	SUBTE	BTE	
	BTE5201CP	rDNA AND IMMUNOTECHNOLOGY LAB	LA		4	2	AW2015	SUBTE	BTE	
		INTERDISCIPLINARY COURSES	TH	4		4				
	BTE5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	SUBTE	BTE	
	BTE0601LM	SOLID WASTE MANAGEMENT	PR	4			AW2015	SUBTE	BTE	
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE	
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN					AUCH/ SUCH			
		Total		30		23				

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
VI	BTE6202CP	INDUSTRIAL BIOTECHNOLOGY LAB	LA		4	2	AZ2017	SUBTE	BTE
	BTE6301CP	PLANT AND ANIMAL BIOTECHNOLOGY LAB	LA		5	3	AW2015	SUBTE	BTE
	BTE6401CM	PLANT BIOTECHNOLOGY	TH	4		4	AW2015	SUBTE	BTE
	BTE6402CM	ANIMAL BIOTECHNOLOGY	TH	4		4	AW2015	SUBTE	BTE
	BTE6403CM	INDUSTRIAL BIOTECHNOLOGY AND IPR	TH	4		4	AW2015	SUBTE	BTE
	BTE0601LM	SOLID WASTE MANAGEMENT	PR	4		6	AW2015	SUBTE	BTE
		INTERDISCIPLINARY COURSES	TH	4		4			
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH/ SUCH	
		Total		30	28				

Extra Credit Courses – Refer Pg. No. 293

COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

NON-MAJOR ELECTIVE

Sem.	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	BTCB3201EI	FOOD SAFETY AND CONSUMERISM	TH	2		2	BA2018	SUALLM	BTE & COM
	BABT3201EI	MARKET DEVELOPMENT FOR BIOTECHNOLOGY PRODUCT	TH	2		2	AZ2017	SUALLM	BTE & BBA
IV	BTFD4201EI	SILK REARING AND PROCESSING TECHNOLOGY	TH	2		2	BA2018	SUALLM	BTE & FDS
	BTMA4201EI	DEMOGRAPHY AND VITAL STATISTICS	TH	2		2	BA2018	SUALLM	BTE & MAT

### INTERDISCIPLINARY COURSES

Sem.	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
V	BTIT5402DT	COMPUTATIONAL BIOLOGY	LT	3	1	4	AZ2017	SUBTE & SUITM	BTE & ITM
	BTMA5401DM	APPLICATION OF STATISTICS IN GENETICS	TH	4		4	AW2015	SUBTE & SUMAT	BTE & MAT
VI	BTPH6402DM	BIOMEDICAL INSTRUMENTATION	TH	4		4	BA2018	SUBTE & SUPHY	BTE & PHY
	BTIT6401DT	CLINICAL INFORMATICS	LT	3	1	4	BA2018	SUBTE & SUITM	BTE & ITM

### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II / III / IV / V / VI	BTE0401CD	AQUARIUM MAINTENANCE	TH	4	AU2013	ALLM	BTE
	BTE0403CD	BIOMATERIALS	TH	4	AQ2009 as BTE0321E	ALLM	BTE
	BTE0404CD	MOLECULAR TECHNIQUES	TH	4	AQ2009 as BTE0421E	ALLM	BTE
	BTE0406CD	THE SCIENCE OF STEM CELLS	TH	4		ALLM	BTE
	BTE0407CD	BLUE BIOTECHNOLOGY	TH	4		ALLM	BTE

### BTE1402CT ANIMAL DIVERSITY

(LAB CUM THEORY)

#### LEARNING OUTCOME

3T + 2L hrs./wk.

On successful completion of the course the student will be able to

- recognize the significance of biodiversity in the sustenance of ecosystems
- probe the diversity spectrum of animals
- create an awareness on basic aspects relevant to biodiversity

#### COURSE CONTENT:

UNIT I: Diversity

10 hrs.

Basic levels: Genetic diversity – species diversity – ecosystem diversity – agro-biodiversity – biodiversity at global level – India as a mega diversity country – biodiversity hot spots – loss of biodiversity – reasons for loss – habitat fragmentation – human population explosion – deforestation – pollution – conservation strategies – zoogeographical distribution.

**UNIT II: Invertebrates**

**15 hrs.**

Classification of animal kingdom – general characteristics of invertebrates – symmetry in animal organization – Phylum Protozoa – general characteristics – life cycle of *Plasmodium vivax* – Phylum Porifera – general characteristics – canal system in sponges – coral reefs – Phylum Coelenterata – general characteristics – polymorphism in coelenterates – general characteristics of Phylum Platyhelminthes – Aschelminthes – parasitic adaptation of helminthes – general characteristics of Phylum Annelida (Earthworm) and Arthropoda (cockroach) – Echinodermata (Star fish) – water vascular system – general characteristics of Phylum Mollusca – economic importance of invertebrates.

**UNIT III: Chordates I**

**10 hrs.**

General characteristics of Chordates – classification – general characteristics of subphylum Hemichordata (Balanoglossus – tongue worm) – subphylum Urochordata and Cephalochordata and subphylum Vertebrata - general characteristics of Class Amphibia (parental care in Amphibians) – Class Pisces (types of scales) and Class Reptilia (poisonous and non-poisonous snakes) – classification up to orders –economically important forms.

**UNIT IV: Chordates II**

**10 hrs.**

General characteristics – Class Aves – different modes of flight – flight adaptations – beak and feet modifications in birds – Class Mammalia (kinds of teeth) – adaptive radiation in mammals (aquatic and terrestrial) – classification of Aves and Mammalia up to order – economically important forms.

**LAB:**

**30 hrs.**

1. A study representative species from each phylum of the animal kingdom
2. Group work- Mounting of setae in earthworm
3. Group work- Appendages of prawn
4. Group work- Placoid scales in Shark.
5. Visit to a National Park/Zoo/Sanctuary/Hot spots/industrial visit to study diversity and conservation strategies.

**TEXT BOOK(S):**

Ayyar, E. and Ananthkrishnan, T.N., (2002). *Manual of Zoology, Vol II Part II (Chordata)*, (4<sup>th</sup> ed.), Chennai: Viswanathan Publishers Ltd. Print.

Jordan, E.L. and Verma, P.S., (1983). *Invertebrate Zoology*, (5<sup>th</sup> ed.), New Delhi: S. Chand and Company Ltd. Print.

Kumar, U. and Asija. M.J. (2000). *Biodiversity – Principles and Conservation*, Jodhpur: Agrobios, Print.

Jordan, E.L. and Verma, P.S., (1983). *Chordate Zoology*, (5<sup>th</sup> ed.), New Delhi: S. Chand and Company Ltd. Print.

**REFERENCE BOOK(S):**

Agarwal, K.C., (1996). *Biodiversity*, New Delhi: Agro Botanical Publishers, India. Print.

- Bhamrah, K.J., (2001). *An introduction to birds*, (2<sup>nd</sup> ed.), New Delhi: Anmol publication Pvt Ltd. Print.
- Grimmett, R., Inskipp, C., Inskipp, T., (1999). *Birds of India Pakistan, Nepal, Bangladesh, Bhutan, Srilanka and the Maldives*, New Jersey: Princeton University Press, Print.
- Kumar, H.D., (1999). *Biodiversity and Sustainable Conservation*, New Delhi: Oxford and IBH Publishing Private Ltd, Print.
- Khan, T.I., (2001). *Global Biodiversity and Environmental Conservation*, Jaipur: Pointer Publishers, Print.
- Kenneth, V. and Kardong, G., (2007). *Vertebrates Comparative Anatomy, Function, Evolution*, (4<sup>th</sup> ed.), New Delhi: Tata McGraw- Hill Publishing Company Ltd, Print.
- Raven, P.H., Johnson, G.B., Losos, J.B and Singer, S.R, (2005). *Biology*, (7<sup>th</sup> ed.), New Delhi: Tata McGraw- Hill Publishing Company Ltd, Print.
- Rawlin, S.O., (1988). *Birds of Lady Doak Campus and Tallakulam area of Madurai*, Madurai: Lady Doak College Publication, Print.
- Rajendran, P., (2008). *Butterflies of Lady Doak College campus*, Madurai: Lady Doak College Publication, Print.
- Singh, M.P., Soma Dey, G. and Bilay, S.S., (2004). *Conservation of Biodiversity and Natural Resources*, New Delhi: Daya Publishing House, Print.
- Sinha, R.K. and Singh, D., (1999). *Global Biodiversity*, Jaipur: Ina Shree Publishers, Print.
- Salim Ali, (2002). *The Book of Indian Birds*, (13<sup>th</sup> ed.), New Delhi: Oxford University Press. Print.

## BTE0406CD THE SCIENCE OF STEM CELLS

### (THEORY)

#### LEARNING OUTCOME

On successful completion of the course the student will be able to

- infer the basics and sources of stem cells
- describe the concept of stem cell niche and types of stem cells
- apply the knowledge of stem cells in biomedical research

#### COURSE CONTENT:

##### UNIT I: STEM CELL BASICS

History – classification – based on sources and potency- properties – stem cell niche: introduction to stem cell niches, sources – bone marrow – epidermis – neural tissues- umbilical cord blood cells.

##### UNIT II: EMBRYONIC STEM CELLS

*In vitro* fertilization – culturing of embryos – isolation of human embryonic stem cells – blastocyst – inner cell mass – stimulation ES cells for differentiation – properties of ES cells.

##### UNIT III: ADULT STEM CELLS

Somatic stem cells – identification of adult stem cells – adult stem cell differentiation – trans differentiation – plasticity – different types of adult stem cells – iPSC.

##### UNIT IV: STEM CELL APPLICATIONS

Stem cells applications in cancer – diabetes – cardiovascular diseases – tissue engineering applications – ocular applications – stem cell therapy – stem cell banks.

## UNIT V: ETHICS AND REGULATIONS

Biosafety and stem cell research – preclinical regulatory considerations at national and international levels for stem cell therapy – stem cell policies – patent advocacy – science policies.

### REFERENCE BOOK(S):

Deb, K. and Totey, S., (2009). *Stem Cell: Basics and Applications*. Tata McGraw-Hill Education. Print.

Sarkar, A., (2009). *Stem Cell Culture*. New Delhi: Discovery Publishing Pvt. Ltd, Print.

Sarkar, A., (2009). *Human Stem Cells*. New Delhi: Discovery Publishing Pvt. Ltd, Print.

Sarkar, A., (2009). *Specific Stem Cells*. New Delhi: Discovery Publishing Pvt. Ltd, Print.

Lanza, R. and Atala, A., (2009). *Essentials of stem cell biology*. (2<sup>nd</sup> ed.), USA: Academic Press. Print.

### WEBSITE(S):

<https://stemcells.nih.gov/info/basics/3.htm>

<https://www.closerlookatstemcells.org/learn-about-stem-cells/types-of-stem-cells/>

<https://www.cryo-cell.com/cord-blood/about-stem-cells>

## BTE0407CD BLUE BIOTECHNOLOGY

### (THEORY)

### LEARNING OUTCOME

On successful completion of the course, the students will be able to

- explain the major forms of life in the sea and their characteristic features
- examine the various bioactive compounds present in the marine forms
- assess the anthropogenic impacts on the ocean

### COURSE CONTENT:

#### UNIT I: HISTORY OF OCEAN STUDIES

Need for ocean studies – definition of water bodies – ocean as an important component of hydrosphere – historical account on ocean studies – oceanographic exploration – international oceanographic organizations – oceanographic institutions in India – classification of marine environment – marine organisms – factors affecting life in the sea.

#### UNIT II: MARINE BIOACTIVE COMPOUNDS

Bioactive marine natural products – anti-bacterial – anti-fungal – anti-tumor compounds – anti-inflammatory / analgesic compounds – anti-viral and anti-parasitic agents – isolation and identification of marine bioactive compounds such as labile proteins – toxins – carotenoids – bioterminator – compounds from cyanobacteria - commercial development of marine natural products.

#### UNIT III: INDUSTRIAL MARICULTURE AND TECHNOLOGY

Seaweed cultivation – agar – algin – agarose and carrageen production – mussel farming – pearl culture – crab fattening – open-sea fish farming – biofertilizer – algal and fish biofertilizer – ornamental fish trade – pigment and enzyme production from marine flora and fauna.

#### UNIT IV: MAJOR MARINE POLLUTANTS

Types, sources and ecological effects on marine environment – sewage – heavy metal – pesticide – oil – nuclear – thermal and plastic pollution – ecological impact of pollutants on marine organisms – effect of mining and dredging operation on marine environment.

#### UNIT V: AQUARIUM TRADE AND HEALTH MANAGEMENT

Aquarium fish trade – status – major exporting and importing countries – captive breeding and rearing of marine ornamental fishes – diseases in aquaculture – techniques in health and quality management.

#### REFERENCE BOOK(S):

Sesshappa S., (1992). *Indian Marine biology*, New Delhi: South Asia Books. Print.

Megh R. Goyal, Hafiz Ansar Rasul Suleria and Shanmugam Kirubanandan, (2019). *Technological Processes for Marine Foods, From Water to Fork Bioactive Compounds, Industrial Applications, and Genomics*, USA: Apple Academic press. Print.

B.F. Chhapgar, (2006). *Marine Life in India*. Nioda, India: Oxford University Press. Print.

David, H., and Attaway, (2001). *Marine Biotechnology, Pharmaceutical and Bioactive Natural Products*, Volume 1. New York, USA: Plenum Press. Print.

George Karleskint, (2009). *Introduction to Marine Biology*, California, USA: Wadsworth Publishing Co Inc. Print.

Ninawe, A. S., Selvin Joseph and Seghal Kiran G, (2013). *Advances in Marine Biotechnology*, UK: LAP Lambert Academic Publishing. Print.

Santhanam, R. N., Ramanathan., and Jegatheesan, G., (1990). *Coastal Aquaculture in India*, New Delhi: CBS publishers and Distributors. Print

Sumich, J. L., (1999). *Introduction to the biology of Marine Life*, (7<sup>th</sup> ed.). USA: The McGraw Hill Companies Inc. Print.

#### COURSE PROFILE M.Sc., BIOTECHNOLOGY

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs. / wk.		Credits	Passed in	Offered to	Offered by
				TH	LA				
I	PBT1531M	CELL BIOLOGY AND DEVELOPMENTAL BIOLOGY	TH	6		5	BA2018	SPBTE	SPBTE
	PBT1532M	MICROBIOLOGY	TH	6		5	BA2018	SPBTE	SPBTE
	PBT1533M	SYSTEM PHYSIOLOGY	TH	6		5	BA2018	SPBTE	SPBTE
	PBT1433P	LAB IN BIOLOGICAL METHODS	LA		4	4		SPBTE	SPBTE
	PBT1432P	LAB IN MICROBIOLOGY	LA		4	4	BA2018	SPBTE	SPBTE
		LIBRARY			2				
		PGV0101PV / PGV0103PV	FOUNDATION COURSE ON WOMEN'S STUDIES /	TH	2		1	AV2014 as PGV0113V/	NON LDC

		HUMAN RIGHTS AND DUTIES					AM2005 as PGV0104V	ALLM	
	PGV0102PV / PGV0104PV	PERSPECTIVES ON GENDER / PRACTICING HUMAN RIGHTS	TH	2		1	AV2014 as PGV2101V/ AM2005 as PGV0107V	LDC ALLM	Centre for VE
	PIV1102PI	THE BIBLE AND SCIENCE						APCH/ SPCH	
		TOTAL		30		24			
II	PBT2531M	BIOCHEMISTRY	TH	5		5	BA2018	SPBTE	SPBTE
	PBT2532M	MOLECULAR BIOLOGY	TH	5		5	BA2018	SPBTE	SPBTE
	PBT2431P	LAB IN BIOCHEMISTRY	LH		4	4	BA2018	SPBTE	SPBTE
	PBT2432P	LAB IN MOLECULAR BIOLOGY	LH		4	4	BA2018	SPBTE	SPBTE
	PBT2531O / PBT2532O	BIOINFORMATICS / NANOBIO TECHNOLOGY	LT / TH	3 / 5	2	5 / 5	BA2018 /	SPBTE / SPBTE	SPBTE / SPBTE
	PBT2425E / PBT2426E	REPRODUCTIVE HEALTH FOR WOMEN / FOOD SCIENCE AND TECHNOLOGY	TH		4	4	AT2012	SPBTE / SPBTE	SPBTE / SPBTE
	PGV0101PV / PGV0103PV	FOUNDATION COURSE ON WOMEN'S STUDIES / HUMAN RIGHTS AND DUTIES					AV2014 as PGV0113V/ AM2005 as PGV0104V	NON LDC ALLM	Centre for VE
	PGV0102PV/ PGV0104PV	PERSPECTIVES ON GENDER/ PRACTICING HUMAN RIGHTS	TH	2		1	AV2014 as PGV2101V/ AM2005 as PGV0107V	LDC ALLM	
	PIV2102PI	RIGHTS, RESPONSIBILITIES AND THE BIBLE						APCH/ SPCH	
			LIBRARY			1			
		TOTAL		30		28			

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs. / wk.		Credits	Passed in	Offered to	Offered by
				TH	LA				
	PBT3531M	IMMUNOLOGY AND IMMUNOTECHNOLOGY	LT	4	2	5	BA2018	SPBTE	SPBTE

III	PBT3532M	PLANT AND ANIMAL BIOTECHNOLOGY	TH	5		5	BA2018	SPBTE	SPBTE
	PBT3431P	LAB IN PLANT AND ANIMAL BIOTECHNOLOGY	LA		4	4	BA2018	SPBTE	SPBTE
	PBT3531O / PBT3532O	BIOSTATISTICS / BIOINSTRUMENTATION	TH TH	5 5		5 5	BA2018 /	SPBTE SPBTE	SPBTE SPBTE
	PBT 3425E /	EMERGING INFECTIOUS DISEASES	TH	4		4	AT2012	SPBTE	SPBTE
	PBT 3427E	STEM CELL TECHNOLOGY					BA2018	SPBTE	SPBTE
	PBT0631M	PROJECT			4			SPBTE	SPBTE
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH/ SPCH	
		LIBRARY			1				
			TOTAL			30	24		
IV	PBT4531M	INHERITANCE BIOLOGY AND EVOLUTION	TH	5		5	BA2018	SPBTE	SPBTE
	PBT4532M	rDNA TECHNOLOGY	TH	6		5	BA2018	SPBTE	SPBTE
	PBT4533M	MICROBIAL BIOTECHNOLOGY, BIOSAFETY AND IPR	TH	5		5	BA2018	SPBTE	SPBTE
	PBT4431P	LAB IN rDNA TECHNOLOGY	LA		4	4	BA2018	SPBTE	SPBTE
	PBT0631M	PROJECT			7	6			
	PGV4103PV	IN TUNE WITH NATURE	TH	2		1		ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER						APCH/ SPCH	
		LIBRARY			1				
		TOTAL			30	26			

### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PBT2301MT	PBT3301MT	PBT4301MT	MT	3	SPBTE	BTE
MINI PROJECT	PBT2301MP	PBT3301MP	PBT4301MP	MP	3	SPBTE	BTE
COMPREHENSIVE – E- ASSESSMENT	-	-	PBT4201CE	CE	2	SPBTE	BTE

**COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS**  
**ELECTIVE COURSES**

Sem.	Course Code	Course Title	Course Type	Hrs. / wk.		Credits	Passed in	Offered to	Offered by
				TH	LA				
II	PBT2425E /	REPRODUCTIVE HEALTH FOR WOMEN /	TH	4		4	AT2012	SPLLM (EXCEPT BIOTECH)	SPBTE
	PBT2426E	FOOD SCIENCE AND TECHNOLOGY	TH	4		4	AT2012	SPLLM (EXCEPT BIOTECH)	SPBTE
III	PBT3425E /	EMERGING INFECTIOUS DISEASE /	TH	4		4	AT2012	SPALLM	SPBTE
	PBT3427E	STEM CELL TECHNOLOGY	TH	4		4	BA2018	SPALLM	SPBTE

**SELF LEARNING COURSES**

Sem.	Course Code	Course Title	Course Type	Credits	Passed in	Offered to	Offered by
II / III / IV	PBT0421D	ENVIRONMENTAL MANAGEMENT	TH	4	AT2012	ALLM	BTE
	PBT0422D	SERI BIOTECHNOLOGY	TH	4	AT2012	ALLM	BTE

**PBT1433P LAB IN BIOLOGICAL METHODS**  
**(LAB)**

**LEARNING OUTCOME**

4 hrs. / wk.

On successful completion of the course, students will be able to

- interpret the concepts of biology
- practice the appropriate skills in the field of biology
- apply the knowledge in cell biology, physiology and developmental biology research

**COURSE CONTENT:**

60 hrs.

**EXPERIMENTS/LAB:**

1. Phytochemical analysis (Qualitative)
2. Separation of phytochemicals by thin layer Chromatography.
3. Estimation of plant pigments
4. Osmoregulation in fish
5. Measurement of respiration rate of various plants and Lung capacity test in human
6. Measurement of blood pressure, bleeding and clotting time and ESR
7. APPT (Activated partial thromboplastin time) assay
8. Determination of haemin crystals and renal calculi
9. Histological analysis of normal and diseased spleen/head / kidney cells of fish
10. Developmental stages in Zebra fish embryo and chick
11. Tadpole tail/earthworm regeneration

## REFERENCE BOOK(S):

- Balinsky, B.I., (2012). *An Introduction to Embryology*, (5<sup>th</sup> ed.), Philadelphia, Holt-Saunders International. Print.
- Bradley, P.M., (1925). *The Early Embryology of the Chick*, (3<sup>rd</sup> ed.), Toronto: The Blakiston Company. Print.
- Carlson, B.M., (1998). *Patten's Foundation of Embryology*, (5<sup>th</sup> ed.). New Delhi: McGraw Hill Inc. Print.
- Celis, J. E., Carter, N., Simons, K., Small, J. V., Hunter, T., and Shotton, D, (2005). *Cell biology*, four-volume set: a laboratory handbook. USA: Academic Press. Print.
- Cruz, Y.P., (1993). *Laboratory exercises in developmental biology*, USA: Academic press, Inc. Print.
- Keibel, F. and Mall, F. P., (1912). *Manual of Human Embryology*, Philadelphia: J. B. Lippincott Company. Print.
- Laura, R. Keller, and John, H., (1998). *Experimental Developmental Biology: A Laboratory Manual*, USA: Academic Press. Print.
- Mukherjee, K. L., (1998). *Medical Laboratory Technology – a procedure manual for routine diagnostic tests*, USA: McGraw Hill Education. Print.
- Pappas, G.S., (1994) *Laboratory Manual of Histology*, (2<sup>nd</sup> ed.). England: Wm. C. Brown Publishers. Print.
- Sumner, A.T. and Sumner, B.E.H., (1969). *A Laboratory Manual of Microtechnique and Histochemistry*, Oxford: Blackwell Scientific Publications. Print.
- Westerfield, M. and Detrich, III, H. W., (2009). *Essential zebrafish methods: cell and developmental biology*, USA: Academic Press. Print.
- Wolpert, L., Tickle, C. and Arias, A. M., (2015). *Principles of development*, USA: Oxford University Press. Print.

## PBT25320 NANOBIO TECHNOLOGY

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course the student will be able to

- describe the basic scientific concepts and frontier developments underpinning nanoscience
- define the applications of nanotechnology in diagnosis and treatment
- evaluate the risks associated with nanotechnology research

#### COURSE CONTENT:

##### UNIT I: Introduction and history of nanobiotechnology

15 hrs.

Fundamental sciences and broad areas of nanobiotechnology – historical background – functional principles of nanobiotechnology – cell-nanostructure interactions – information-driven nanoassembly – energetic – chemical transformation – regulation – traffic across membranes – biomolecular sensing – self-replication – machine.

**UNIT II: DNA based Nanostructures**

15 hrs.

Introduction – DNA-protein nanostructures – methods – self assembled DNA nanotubes – nucleic acid Nanoparticles – DNA as a biomolecular template – DNA branching – metallization – properties – oligonucleotide – enzyme conjugates – DNA conjugates of binding proteins – non-covalent DNA – streptavidin conjugates – DNA-protein conjugates in microarray technology.

**UNIT III: Protein based Nanostructures**

15 hrs.

Overview – chemistry and structure – cell-wall polymers – self-assembly in suspension, re-crystallization at solid supports – formation of regularly arranged nanoparticles – cell as nanobio-machine – link between the signaling pathways – molecular movements as well as neuron function – concepts in nanobio-machines for information processing and communications.

**UNIT IV: Microbial Nanoparticles**

15 hrs.

Overview and concept of microbial nanoparticle production – methods of microbial nanoparticle production – applications of microbial nanoparticles – bacteriorhodopsin and its potential in technical applications – overview – structure – photoelectric applications – photochromic applications and applications in energy conversion.

**UNIT V: Pharmaceutically important nanomaterials**

15 hrs.

Drug nanoparticles – structure and preparation – liposomes – cubosomes and hexosomes – lipid based nanoparticles – liquid nanodispersions – solid lipid nanoparticles (SLP) – biofunctionalisation of SLP – characterization – nanoparticles for crossing biological membranes – fundamentals – physicochemical principles of nanosized drug delivery systems – nanotubes – nanorods – nanofibers – fullerenes for nanoscale drug delivery – carbon nanotubes biocompatibility and drug delivery.

**TEXT BOOK(S):**

Christof M. Niemeyer, Chad A. Mirkin, (2004). *Nanobiotechnology: Concepts, Applications and Perspectives*, Wiley Publishers. Print.

Liu and Shimohara, (2007). *Bio molecular computation for Bio nanotechnology*, London: Artech House. Print.

Trivedi, P.C, (2008). *Nanobiotechnology*, Jaipur: Pointer Publishers. Print.

Yadav, R.K, (2007). *Nanotechnology*, New Delhi: Mangalam Publishers and Distributors. Print.

**REFERENCE BOOK(S):**

Karkare, M, (2008). *Nanotechnology, Fundamentals and Application*. New Delhi: L.K. International Publishing House Pvt. Ltd. Print.

Hornyak, G.L, Dutta. J, Tibbals. H.F and Rao, A, (2008) *Introduction to Nanoscience*, (1<sup>st</sup> ed.), New York: CRC Press. Print.

Hornyak, G. L., Tibbals, H. F., Dutta, J. and Moore, J. J, (2008). *Introduction to nanoscience and nanotechnology*. New York: CRC press. Print.

Prasad, S.K, (2008). *Advanced Nanotechnology*, New Delhi: Discovery Publishing House Pvt. Ltd. Print.

Pradeep, T, (2007). *Nano: The Essentials Understanding nanoscience and nanotechnology*, New Delhi: Tata –McGraw Hill Publishing Company Ltd. Print.

Rao, C. N. R., Müller, A., and Cheetham, A. K, (Eds.). (2006). *The Chemistry of Nanomaterials: Synthesis, Properties and Applications*, USA: John Wiley and Sons. Print.

REFERENCE WEBSITE(S):

[www.nanohub.org/education/nanotechnology101](http://www.nanohub.org/education/nanotechnology101)

[www.utexas.edu/research/ceer/greenmaterial/lecture\\_mptes.htm](http://www.utexas.edu/research/ceer/greenmaterial/lecture_mptes.htm)

[nano.ece.uci.edu/nano\\_04.htm](http://nano.ece.uci.edu/nano_04.htm)

**PBT35320 BIOINSTRUMENTATION**

**(THEORY)**

LEARNING OUTCOME

5 hrs./wk.

On successful completion of this course, students will be able to

- develop knowledge on the principles of various bioinstrumentation devices
- differentiate the usefulness of sensitive biomedical techniques
- apply the knowledge of instrumentation in biomedical research

COURSE CONTENT:

UNIT I: MICROSCOPIC TECHNIQUES

15 hrs.

Principles and applications of light – phase contrast – fluorescence microscopy – scanning – transmission electron microscopy – confocal microscopy – scanning tunneling microscopy – sample preparation methods – patch clamping – advances of microscopy.

UNIT II: ISOLATION TECHNIQUES

15 hrs.

Cell disruption techniques – sonication – french press – enzymatic – non-enzymatic techniques – isolation of proteins – salting in/out – ammonium sulphate precipitation – nucleic acids – polar solvents precipitation – lipids – extraction by differential solubility.

UNIT III: SEPARATION TECHNIQUES

15 hrs.

Sedimentation – separation methods – ultracentrifugation – differential centrifugation – density gradient centrifugation – chromatography – gel filtration – size exclusion – affinity – ion exchange – GLC – HPLC – HPTLC – electrophoresis – separation of DNA and protein – SDS PAGE – pulsed field gel electrophoresis (PFGE) – capillary electrophoresis – 2D-electrophoresis – isoelectric focusing – blotting methods – western – southern and northern.

UNIT IV: CHARACTERIZATION OF BIOMOLECULES

15 hrs.

Spectroscopy - electromagnetic spectrum of light – Beer-Lambert law – UV-visible spectrophotometry –infrared spectroscopy – Raman spectroscopy – fluorescence spectroscopy and Mass-spectrometry – atomic absorption and NMR spectrophotometry – optical rotatory dispersion (ORD) and circular Dichroism (CD) – LC-MS/MS – MALDI TOF- MS. X-ray diffraction and crystallography – phasing methods – multiple isomorphous replacement (MIR) and multiwavelength anomalous diffraction (MAD).

UNIT V: TRACER TECHNIQUES

15 hrs.

Radioactive labelling methods – types and detection and measurement of radioactivity – Biosafety measures in handling radio isotopes with reference to AERB guidelines and Good laboratory practices – non-radioactive labeling techniques – use of fluorophores and fluorochromes and their applications in life science and biotechnology – Medical imaging systems – PET – CT – MRI – fMRI – SPECT.

**TEXT BOOK(S):**

Upadhyay, A., Upadhyay, K. and Nath, N., (2003). *Biophysical Chemistry – Principles and Techniques*, (3<sup>rd</sup> ed.), Mumbai: Himalaya Publishing House. Print.

Wilson, K. and Walker, J., (2010). *Principles and Techniques of Biochemistry and Molecular Biology*, (7<sup>th</sup> ed.), Cambridge: Cambridge University Press. Print.

**REFERENCE BOOK(S):**

Brown, S.B., (1980). *An Introduction to Spectroscopy for Biochemists*, London: Academic Press. Print.

Carr, J. J. and Brown, J. M., (2001). *Introduction to Biomedical Equipment Technology*, (Vol. 4), New Jersey: Prentice Hall. Print.

Cotterill, R., (2002). *Biophysics – An Introduction*. England: John Wiley and Sons Ltd. Print.

De Robertis, E.D.P., and De Robertis, Jr. E.M.F., (2001). *Cell and Molecular Biology*, (8<sup>th</sup> ed.), London: Lippincott Williams and Wilkins. Print.

Skoogs, Holler, and Nieman, (2006). *Principles of Instrumental Analysis*, Philadelphia: Thomson books. Print.

Pattabhi, V., and Gautham, N., (2004). *Biophysics*, New Delhi: Narosa Publishing House. Print.

Wilson, K., and Walker, J., (2000). *Practical Biochemistry - Principles and Techniques*, (5<sup>th</sup> ed.), UK: Cambridge University Press. Print.

Willard, H.H., Merritt, L.L., Dean, J.A. and Settle, F.A., (1968). *Instrumental Methods of Analysis*, (6<sup>th</sup> ed.), CBS Publishers and Distributors. Print.

## DEPARTMENT OF COMPUTER SCIENCE

### PREAMBLE

The present curriculum of B.Sc. Computer Applications, B.Sc. Information Technology and Management, M.Sc. Computer Science and M.Sc. Information Technology were reviewed and based on which it is found necessary to introduce a few changes in the following courses:

Undergraduate:

Industrial Training:

- **CSC/ITM5201TC TRAINING IN RECENT TRENDS IN INFORMATION TECHNOLOGY** will be conducted during the morning session for 2 hrs. in semester V for 60 hrs. for which the evaluation pattern is modified for 2017 batch onwards.

### INDUSTRIAL TRAINING

\* Mandatory for completion of B.Sc. Computer Applications and B.Sc. Information Technology and Management

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Place	Period
				TH	LA			
V	CSC/ITM5201TC	TRAINING IN RECENT TRENDS IN INFORMATION TECHNOLOGY	LT	2	2	2	Within the college campus	60 hrs.
<b>EVALUATION PATTERN</b>								
<b>FORMATIVE ASSESSMENT</b>						<b>SUMMATIVE EXAMINATION</b>		
Continuous Assessment						Theory & Viva		
60						40		

Besides this, the department introduces an interdisciplinary course

- **ITMA5401DT DISCRETE MATHEMATICS WITH PYTHON** is offered to B.Sc. Mathematics with Computer Applications (SF) and B.Sc. Information Technology and Management (SF) students

Postgraduate:

The present curriculum of M.Sc., Computer Science and M.Sc., Information Technology were reviewed based on the admission norms of Madurai Kamaraj University. In order to prepare the students to be technically competent to meet the challenges of the R & D and industrial needs, it required changes which includes re-organization and updating of the content of the major courses offered in semesters I and IV. The course profile and content of semesters I and II were passed in Academic Council booklet BA2018.

Besides this, the department introduces one elective and two self-learning courses

- **PTM3401EL ANDROID APP DEVELOPMENT** as an elective course
- **PCS0402CD DIGITAL MARKETING USING SOCIAL MEDIA** and **PTM0402CD GREEN COMPUTING** as self-learning courses

The course profile for semesters III and IV along with the syllabi of the modified and new courses are presented.

**COURSE PROFILE**  
**B.Sc. COMPUTER APPLICATIONS**

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	CSC3502CM	OBJECT ORIENTED PROGRAMMING – II	TH	5		5	BA2018	SUCSC	CSC
	CSC3403CM	RELATIONAL DATABASE MANAGEMENT SYSTEM	TH	4		4	AV2014	SUCSC	CSC
	CSC3501CM	OPERATING SYSTEM CONCEPTS	TH	5		5	AW2015	SUCSC	CSC
	CSC3201CP	LAB - II (OBJECT ORIENTED PROGRAMMING – II)	LA		4	2	AV2014	SUCSC	CSC
	CSC3202CP	LAB - III (RDBMS)	LA		3	2	AV2014	SUCSC	CSC
	CSC3401AA	BUSINESS ACCOUNTING	TH	5		4	AV2014	SUCSC	CSC
	NON-MAJOR ELECTIVE				2	2		SUALLM	ALLM
	VOCATIONAL COURSE					2		ALLM	CED
	VBC0102FV / VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH / SUCH	
		LIBRARY		1				SUCSC	CSC
	TOTAL			30		27			
IV	CSC4502CM	DATA COMMUNICATION AND NETWORKS	TH	6		5	AV2014	SUCSC	CSC
	CSC4303CP	VISUAL PROGRAMMING - I	LA		5	3	AZ2017	SUCSC	CSC
	CSC4302CP	PHP PROGRAMMING	LA		5	3	AV2014	SUCSC	CSC
	CSC4501CM	SOFTWARE ENGINEERING	TH	5		5	AV2014	SUCSC	CSC
	CSC4201CP	DATA COMMUNICATION AND NETWORKING USING JAVA	LA		3	2	AV2014	SUCSC	CSC

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
IV	NON-MAJOR ELECTIVE			2		2		SUALLM	ALLM
	CSC4201SP	ANIMATION	LA		2	2	AV2014	SUCSC	CSC
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE					AUCH / SUCH		
	TOTAL				30		24		

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by	
				TH	LA					
V	CSC5301CP	LAB IV (WEB PROGRAMMING USING ASP.NET)	LA		6	3	AW2015	SUCSC	CSC	
	CSC5501CT	STATISTICS USING R	LT	4	2	5	AW2015	SUCSC	CSC	
	CSC5502CT	CLOUD COMPUTING	LT	4	2	5	AW2015	SUCSC	CSC	
	CSC5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	SUCSC	CSC	
	CSC0601LM	WEB BASED COMMUNITY PROJECT	PR	2	2		AW2015	SUCSC	CSC	
	CSC5201TC	TRAINING IN RECENT TRENDS IN INFORMATION TECHNOLOGY	TR			2	BA2018	SUCSC	CSC	
	INTERDISCIPLINARY COURSE				4		4		SUALLM	ALLM
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE	
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN					AUCH / SUCH			
	TOTAL				30		23			
VI	CSC6402CT	LINUX PROGRAMMING	LT	3	2	4	AW2015	SUCSC	CSC	
	CSC6501CT	COMPUTER GRAPHICS	LT	4	2	5	AW2015	SUCSC	CSC	

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
VI	CSC6501CM	OPERATIONS RESEARCH	TH	5		5	AZ2017	SUCSC	CSC
	CSC6502CM	MOBILE COMPUTING	TH	5		5	AW2015	SUCSC	CSC
	INTERDISCIPLINARY COURSE		TH	4		4	AW2015	SUALLM	ALLM
	CSC0601LM	WEB BASED COMMUNITY PROJECT	PR	4		6		SUCSC	CSC
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH / SUCH	
	TOTAL			30		30			

Extra Credit Courses – Refer Pg. No. 293

### COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

#### NON-MAJOR ELECTIVES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in	Offered to	Offered by
				TH	LA				
III	CACS3202EP	MULTIMEDIA FOR BUSINESS APPLICATIONS	LA		2	2	BA2018	SUALLM	COS & CSC
	BACS3201EP	ADVERTISING	LA		2	2	AV2014	SUALLM	BBA & CSC
	CSMA3201EI	BASICS IN DISCRETE MATHEMATICS	TH	2		2	AV2014	SUALLM	CSC & MAT
	CSHN3201EP	COMPUTER DOCUMENTATION TOOL FOR HINDI	LA		2	2	AV2014	SUALLM	CSC & HIN
	CSEN3201EI	ENGLISH FOR E-PRESENTATION	TH	2		2	AV2014	SUALLM	CSC & ENG
	C SHO3201EP	BUSINESS MANAGEMENT TECHNOLOGY	LA		2	2	BA2018	SUALLM	CSC & HON
IV	BACS4201EP	PROJECT MANAGMENT	LA		2	2	AV2014	SUALLM	BBA & CSC

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in	Offered to	Offered by
				TH	LA				
IV	CACS4201EP	COMMERCIAL WEBSITE PREPARATIONS	LA		2	2	AZ2017	SUALLM	COE & CSC
	C SHO4201EP	DATA ANALYSIS AND INTERPRETATION USING STATISTICAL PACKAGE	LA		2	2	BA2018	SUALLM	CSC & HON
	CSMA4201EP	NUMERICAL METHODS USING SCILAB	LA		2	2	BA2018	SUALLM	CSC & MAT
	CSEN4202EP	ANIMATION FOR LANGUAGE AND LITERATURE	LA		2	2	BA2018	SUALLM	CSC & ENG
	CSPH4201EP	INTRODUCTION TO SATELLITE IMAGE PROCESSING AND GIS	LA		2	2	AY2016	SUALLM	CSC & PHY

### INTERDISCIPLINARY COURSES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in	Offered to	Offered by
				TH	LA				
V	CSPH5401DT	DIGITAL IMAGE PROCESSING	LT	3	1	4	AW2015	SUCSC & SUPHY	CSC & PHY
	CSPH5402DT	GEOINFORMATICS	LT	3	1	4	AZ2017	SUCSC & SUPHY	CSC & PHY
VI	CSPH6401DT	THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS	LT	3	1	4	AW2015	SUCSC & SUPHY	CSC & PHY
	CSMA6401DT	APPLICATION OF FUZZY SETS USING MATLAB	LT	3	1	4	BA2018	SUCSC & SUMAT	CSC & MAT

### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Credits	Passed in	Offered to	Offered by
III / IV	CSC0401CD	DATA WAREHOUSING	4	AU2013	ALLM	CSC

## B.Sc. INFORMATION TECHNOLOGY AND MANAGEMENT

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by	
				TH	LA					
III	ITM3502CM	OBJECT ORIENTED PROGRAMMING – II	TH	5		5	BA2018	SUITM	ITM	
	ITM3403CM	RELATIONAL DATABASE MANAGEMENT SYSTEM	TH	4		4	AV2014	SUITM	ITM	
	ITM3501CM	OPERATING SYSTEM CONCEPTS	TH	5		5	AV2014	SUITM	ITM	
	ITM3201CP	LAB - II (OBJECT ORIENTED PROGRAMMING - II)	LA		4	2	AV2014	SUITM	ITM	
	ITM3202CP	LAB - III (RDBMS)	LA		3	2	AV2014	SUITM	ITM	
	ITM3401AA	IT SERVICES AND MARKETING	TH	5		4	AV2014	SUITM	ITM	
	NON-MAJOR ELECTIVE			TH		2	2	AV2014		
	VOCATIONAL COURSE						2		ALLM	CED
	III	VBC0102FV / VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
		UIV3101FI	CIVICS AND THE BIBLE						AUCH / SUCH	
		LIBRARY		1				SUITM	ITM	
		<b>TOTAL</b>		<b>30</b>		<b>25</b>				
IV	ITM4502CM	DATA COMMUNICATION AND NETWORKING	TH	6		5	AV2014	SUITM	ITM	
	ITM4303CP	VISUAL PROGRAMMING - I	LA	5		3	AW2017	SUITM	ITM	
	ITM4503CM	ORGANIZATIONAL BEHAVIOUR	TH	5		5	AV2014	SUITM	ITM	
	ITM4501CM	SOFTWARE ENGINEERING	TH	5		5	AV2014	SUITM	ITM	
	ITM4201CP	DATA COMMUNICATION AND NETWORKS USING JAVA	LA		3	2	AV2014	SUITM	ITM	
	ITM4201SP	ANIMATION	LA		2	2	AV2014	SUITM	ITM	
	NON-MAJOR ELECTIVE			TH	2		2			
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014	ALLM	Centre for VE	
UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH / SUCH			
		<b>TOTAL</b>		<b>30</b>		<b>26</b>				

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by	
				TH	LA					
V	ITM5502CT	CLOUD COMPUTING	LT	4	2	5	AW2015	SUITM	ITM	
	ITM5501CM	HUMAN RESOURCE MANAGEMENT	TH	6		5	AW2015	SUITM	ITM	
	ITM5301CP	LAB IV (WEB PROGRAMMING USING ASP.NET)	LA		6	3	AW2015	SUITM	ITM	
	ITM5201CM	INTRODUCTION TO RESEARCH METHODOLOGY	TH	2		2	AW2015	SUITM	ITM	
	ITM0601LM	WEB BASED COMMUNITY PROJECT	PR	4			AW2015	SUITM	ITM	
	ITM5201TC	TRAINING IN RECENT TRENDS IN INFORMATION TECHNOLOGY	TR			2	BA2018	SUITM	ITM	
	INTERDISCIPLINARY COURSES			TH	4		4		SUALLM	ITM
	VBC0202FV / VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014	SUALLM	Centre for VE	
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN						AUCH / SUCH		
	TOTAL			30		23				
VI	ITM6402CT	LINUX PROGRAMMING	LT	3	2	4	AW2015	SUITM	ITM	
	ITM6502CM	OPERATIONS RESEARCH	TH	5		5	AZ2017	SUITM	ITM	
	ITM6403CT	PHP PROGRAMMING	LT	3	3	4	AW2015	SUITM	ITM	
	ITM6501CM	MANAGERIAL ACCOUNTING	TH	5		5	AW2015	SUITM	ITM	
	INTERDISCIPLINARY COURSE			TH	4		4	AW2015	SUALLM	ITM
	ITM0601LM	WEB BASED COMMUNITY PROJECT	PR	4		6		SUITM	ITM	
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE	
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH / SUCH		
		TOTAL			30		29			

## COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

### INTERDISCIPLINARY COURSES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in	Offered to	Offered by
				TH	LA				
V	BAIT5401DT	SOFTWARE PROJECT MANAGEMENT	LT	3	1	4	AW2015	SUBBA & SUITM	BBA & ITM
	BTIT5402DT	COMPUTATIONAL BIOLOGY	LT	3	1	4	AZ2017	SUBTE & SUITM	BTE & ITM
	ITMA5402DM	PARALLEL INTERCONNECTION NETWORKS	TH	4		4	AZ2017	SUITM & SUMAT	ITM & MAT
	ITMA5403DM	FORMAL LANGUAGES AND AUTOMATA THEORY	TH	4		4	BA2018	SUITM & SUMAT	ITM & MAT
	ITMA5401DT	DISCRETE MATHEMATICS WITH PYTHON	LT	3	1	4		SUITM & SUMAT	ITM & MAT
VI	ITMA6401DT	APPLICATION OF FUZZY SETS USING MATLAB	LT	3	1	4	BA2018	SUITM & SUMAT	ITM & MAT
	BAIT6401DT	ENTERPRISE RESOURCE PLANNING	LT	3	1	4	AW2015	SUBBA & SUITM	BBA & ITM
	BTIT6401DT	CLINICAL INFORMATICS	LT	3	1	4	BA2018	SUBTE & SUITM	BTE & ITM

### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Credits	Passed in Academic Council	Offered to	Offered by
III / IV	ITM0401CD	CODE HACKING	4	AU2013	ALLM	CSC

### COURSE PROFILE

#### M.Sc. COMPUTER SCIENCE

From 2019 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PCS1601CT	8051 MICRO CONTROLLER AND EMBEDDED SYSTEMS	LT	4	2	6	BA2018	SPCSC	CSC
	PCS1501CP	J2EE PROGRAMMING	LA		5	5	BA2018	SPCSC	CSC
	PCS1401CM	MATHEMATICAL FOUNDATION IN COMPUTER SCIENCE	TH	4		4	BA2018	SPCSC	CSC

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PCS1402CM	OPERATING SYSTEMS	TH	4		4	BA2018	SPCSC	CSC
	PCS1403CM	DESIGN AND ANALYSIS OF ALGORITHMS	TH	4		4	BA2018	SPCSC	CSC
	PCS1402CP	WEB APPLICATION DEVELOPMENT	LA		4	4	BA2018	SPCSC	CSC
	PGV1101PV	FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2	1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE	
	PGV1102PV	PERSPECTIVES ON GENDER				AV2014 as PGV2101V	LDC ALLM		
	PIV1102PI	THE BIBLE AND SCIENCE					APCH/ SPCH		
			LIBRARY / SEMINAR		1				
TOTAL				30	28				
II	PCS2501CP	PYTHON PROGRAMMING	LA		5	5	BA2018	SPCSC	CSC
	PCS2501CM	GRAPH THEORY	TH	5		5	BA2018	SPCSC	CSC
	PCS2601CT	SOFTWARE TESTING	LT	4	3	6	BA2018	SPCSC	CSC
	PCS2501MO/ PCS2502MO	CLOUD COMPUTING / BIG DATA ANALYTICS	LT	3	2	5	BA2018	SPCSC	CSC
	PCS2401EP	ANIMATION	LA		4	4	BA2018	SPALLM (Except CSC and IT)	CSC
	PGV2103PV	HUMAN RIGHTS AND DUTIES	TH	2	1	AM2005 as PGV0104V	NON LDC ALLM	Centre for VE	
	PGV2102PV	PRACTICING HUMAN RIGHTS				AM2005 as PGV0107V	LDC ALLM		
PIV2102PI	RIGHTS, RESPONSIBILITIES AND THE BIBLE					APCH/ SPCH			
		LIBRARY / SEMINAR		2					
TOTAL				30	26				

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PCS3501CM	DIGITAL IMAGE PROCESSING	TH	5		5		SPCSC	CSC
	PCS3701CT	INTERNET OF THINGS	LT	4	3	7		SPCSC	CSC
	PCS3501MO / PCS3502MO	AUTOMATA THEORY / EMBEDDED SYSTEMS	TH	5		5		SPCSC	CSC

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PCS3501CT	NETWORK PROGRAMMING	LT	3	2	5		SPCSC	CSC
	PCS3301CP	LAB II (DIGITAL IMAGE PROCESSING)	LA		3	3		SPCSC	CSC
	PCS3501MP	MINI PROJECT	LA			5		SPCSC	CSC
		ELECTIVES	LA		4	4		ALLM	CSC
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH / SPCH	
	TOTAL				30	35			
IV	PCS4621PM	PROJECT	PR			6		SPCSC	CSC
	PGV4103PV	IN TUNE WITH NATURE	TH	2		1		ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER						APCH / SPCH	
TOTAL						7			

IVBC: Self-Study

Total number of credits for 2018 batch (Semester I to IV) – 96

#### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PCS2301MT	PCS3301MT	PCS4301MT	TH	3	SPCSC	CSC
COMPREHENSIVE VIVA	PCS2301MV	-	PCS4301MV	TH	3	SPCSC	CSC
COMPREHENSIVE – E- ASSESSMENT	-	-	PCS4201CE	TH	2	SPCSC	CSC

#### COURSE OFFERED TO STUDENTS OF OTHER DEPARTMENTS

#### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	PCS0421CD	CYBER SECURITY	TH	4	BA2018	SPALLM	SPCSC
III	PCS0402CD	DIGITAL MARKETING USING SOCIAL MEDIA	TH	4		SPALLM	SPCSC

## ELECTIVE COURSES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PCS2401EP	ANIMATION	LA		4	4	BA2018	SPALLM (Except CSC and IT)	SPCSC
III	PCS3401EL	PC HARDWARE AND TROUBLESHOOTING	LA		4	4	BA2018	SPALLMS	SPCSC

### PCS3501CM DIGITAL IMAGE PROCESSING

(THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course the student will be able to

- explain the basic concepts of image processing
- infer the different filtering techniques involved in image processing
- demonstrate the concept image compression and segmentation

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION TO IMAGE PROCESSING

15 hrs.

Digital image processing – introduction – working environment – image representation – reading images – displaying images – writing images – data classes – image types – converting between data classes and image types – array indexing – M-function programming

##### UNIT II: SPATIAL DOMAIN AND FREQUENCY DOMAIN PROCESSING

15 hrs.

Intensity transformation functions – histogram processing and function plotting – spatial filtering – 2-D discrete fourier transformation – filtering in the frequency domain – obtain frequency domain filters from spatial filters – generating and Sharpening frequency domain filters

##### UNIT III: IMAGE RESTORATION AND COLOR IMAGE PROCESSING

20 hrs.

Model of the image degradation / restoration process – noise models – restoration in the presence of noise only, frequency domain filtering – direct inverse filtering – wiener filtering – constrained least square filtering – Lucy – richardson algorithm – geometric transformation – color image representation – converting to other color spaces – basic of color image processing – color transformation – spatial filtering of color images – working in RGB vector space – wavelets in image processing

##### UNIT IV: IMAGE COMPRESSION AND MORPHOLOGICAL IMAGE PROCESSING

15 hrs.

Coding redundancy – inter pixel redundancy – psycho visual redundancy – morphological image processing – preliminaries – dilation and erosion

##### UNIT V: IMAGE SEGMENTATION

10 hrs.

Point, line and edge detection – line detection using Hough transform – thresholding – region based segmentation.

#### TEXT BOOK(S):

Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins, (2007). *Digital Image Processing Using MATLAB*, New Delhi: Pearson Education Inc. Print. UNIT – I: Chapter 1, UNIT – II: Chapter 2.1 to 2.5, 3.1 to 3.6, UNIT – III: Chapter 4.1 to 4.9, 5.4, 6 & 7.5, UNIT – IV: Chapter 8.1 to 8.4, 9.1 & 9.2, UNIT – V: Chapter 10.1 to 10.3.3, 10.4

## REFERENCE BOOK(S):

Jayaraman S., Esakkirajan S. and Veerakumar T., (2009). *Digital Image Processing*, New Delhi: Tata McGraw Hill. Print.

Chanda B. and Dutta Majumder D., (2007). *Digital Image Processing and Analysis*, New Delhi: Prentice Hall of India. Print.

Scott E. Umbaug, (1988). *Computer Vision and Image Processing*, New Delhi: Prentice – Hall International. Print.

## WEBSITE(S):

<https://www.mathworks.com/discovery/digital-image-processing.html>

<https://nptel.ac.in/courses/117105135/>

## PCS3701CT INTERNET OF THINGS

### (LAB CUM THEORY)

## LEARNING OUTCOME

4T+3L hrs./wk.

On successful completion of the course the students will be able to

- infer comprehensive understanding of the Internet of Things and its architecture
- demonstrate experiments with IoT resources
- experiment the use of Internet for physical things

## COURSE CONTENT:

### UNIT I: INTRODUCTION

10 hrs.

Internet of things (IoT) – IoT conceptual framework – IoT architectural view – technology behind IoT – sources of IoT – M2M communication

### UNIT II: DESIGN PRINCIPLES FOR CONNECTED DEVICES & WEB CONNECTIVITY

13 hrs.

Introduction – IoT/M2M systems layers and designs standardization – communication technologies – data enrichment, data consolidation and device management at gateway – ease of designing and affordability – introduction to web connectivity – web communication protocols for connected devices – message communication protocols for connected devices – web connectivity for connected devices network using gateway, SOAP, REST, HTTP, RESTful and webSockets

### UNIT III: INTERNET CONNECTIVITY PRINCIPLES AND DATA ACQUIRING, ORGANISING, PROCESSING AND ANALYTICS

12 hrs.

Introduction – internet connectivity – internet-based communication – IP addressing in the IoT – media access control – application layer protocols: HTTP, HTTPS, FTP, Telnet and others – introduction to data acquiring and storage – organizing the data – transactions, business processes, integration and enterprise systems – analytics – knowledge acquiring, managing and storing processes

### UNIT IV: SENSOR TECHNOLOGY

12 hrs.

Introduction on sensors, participatory sensing, RFIDs, and wireless sensor networks – participatory sensing, industrial IoT and automotive IoT – actuator – sensor data communication protocols – radio frequency identification technology

### UNIT V: PROTOTYPING THE EMBEDDED DEVICES FOR IOT AND M2M

13 hrs.

Introduction – embedded computing basics – embedded platforms for prototyping – things always connected to the internet – introduction on prototyping and designing the software for the IoT

applications – prototyping embedded device software – devices, gateways, internet and web/cloud services software development – prototyping online component APIs and web APIs.

**LIST OF LAB EXPERIMENTS:**

45 hrs.

1. Installation of Arduino implementation of circuit design and interface to perform various experiments
2. Perform Arduino Uno wired and wireless connectivity
3. Read a switch input as a binary digital value
4. Control LED brightness using sensor data
5. Drive a servo motor along simple trajectories
6. Driving DC motors in both directions at variable speed
7. Perform RGB LED display using Arduino
8. Perform remote lighting control using Arduino
9. Study of temperature sensor and write program for monitoring temperature using Arduino
10. Perform sound and buzzer sensor using Arduino
11. Perform integrating GPS module with Arduino to display data (latitude, longitude, altitude and time) using API
12. Perform reading RFID tags
13. Develop real time clocks
14. Perform NFC using Arduino
15. Configure MQTT protocol using Arduino
16. Study and configure Raspberry Pi
17. Design WAP for LED blink using Raspberry Pi
18. Configure Zigbee Protocol using Raspberry Pi
19. Develop location aware experiment using MySQL, PHP and Arduino

**TEXT BOOK(S):**

Raj Kamal, (2017). *Internet of Things Architecture and Design Principal*, Chennai: McGraw Hill Education (India) Private Limited, Print. Unit I: Chapter 1, Unit II: Chapter 2 and 3, Unit III: Chapter 4 and 5, Unit IV: Chapter 7, Unit V: Chapter 8 and 9

**REFERENCE BOOK(S):**

Adeel Javed, (2016). *Building Arduino Projects for the Internet of Things: Experiments with Real World Applications*, USA: Apress. Print.

Adrian McEwen and Hakim Cassimally, (2014). *Designing the Internet of Things*, First Edition. United Kingdom: John Wiley and Sons Limited. Print.

Rajkumar Buyya and Amir Vahid Dastjerdi, (2016). *Internet of Things: Principles and Paradigms*, USA: Morgan Kaufmann an imprint of Elsevier. Print.

**PCS3501MO AUTOMATA THEORY**

**(THEORY)**

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- deduce hierarchy of problems arising in Computer Science
- demonstrate regular, context free, context sensitive grammars using strings and tokens
- design deterministic and non-deterministic machines and push down Automata

## COURSE CONTENT:

### UNIT I: FINITE AUTOMATA

15 hrs.

Mathematical preliminaries and notation – central concepts of automata theory – strings – alphabets – languages – operations – an informal picture of finite automata – deterministic finite automata – non-deterministic finite automata – finite automata with epsilon ( $\epsilon$ ) – transitions – conversions and equivalence – equivalence between NFA with and without epsilon – transitions – NFA to DFA conversion – minimization of FSM – equivalence between two FSM's – finite automata with output – Moore and Melay machines

### UNIT II: REGULAR LANGUAGES AND CONTEXT FREE GRAMMAR

20 hrs.

Regular expressions – applications of regular expressions – algebraic rules for regular expressions – identity rules – constructing finite automata for a given regular expressions – conversion of finite automata to regular expressions – pumping lemma for regular languages – closure properties and decision properties of regular sets – context free grammars – definition – example – right linear and left linear grammars – equivalence between regular linear grammar and finite automata – derivation trees – sentential forms – right most and leftmost derivation of strings – ambiguity in context free grammars

### UNIT III: PUSH DOWN AUTOMATA

15 hrs.

Push down automata – definition and model – languages of a PDA – acceptance of CFG – acceptance by final state and acceptance by empty state – equivalence of CFG and PDA – deterministic Push Down automata – chomsky hierarchy of languages – linear bounded automata and context sensitive language

### UNIT IV: TURING MACHINE

10 hrs.

Turing machine – definition – model and design – programming techniques for turing machine – extensions to the basic turing machine – restricted turing machines – church's hypothesis – counter machine – variants of turing machines

### UNIT V: COMPUTABILITY THEORY

15 hrs.

Decidability – decidable languages – halting problem – universal turing machine – undecidable problem – Rice's theorem – post's correspondence problem – turing reducibility – time complexity – measuring complexity – class P – class NP – NP-completeness advanced topics – new paradigms of computing – DNA computing – membrane computing

## TEXT BOOK(S):

Hopcroft H.E. and Ullman J. D., (2006). Introduction to Automata Theory Languages and Computation, (3<sup>rd</sup> ed.), New York: Pearson Education, Print. Chapters 1.5, 2.1 - 2.3, 2.5, 3, 6, 8, 9.3, 9.4

Peter Linz, (2012). An Introduction to Formal Languages and Automata, (5<sup>th</sup> ed.), USA: Cathleen Sether, Print. Chapters 1, 2, 4, 5, 11.3, 11.4, Appendix A

Michael Sipser, (2006). Introduction to the Theory of Computation, (2<sup>nd</sup> ed.), USA: Thomson Course Technology, Print. Chapters 4, 5.1, 5.2, 7.1 - 7.4

## REFERENCE BOOK(S):

Shanthi D., N. Uma Maheswari and S. Jeyanthi, (2017). *Theory of Computation*, Chennai: yesdee publishing Pvt. Ltd. Print.

Harry R. Lewis and Christos H. Papadimitriou, (2002). *Elements of the Theory of Computation*, (2<sup>nd</sup> ed.), New Delhi: PHI Learning Private Limited. Print.

Mishra K. L. P. and Chandrashekar N., (2012). *Theory of Computer Science – Automata languages and computation*, (3<sup>rd</sup> ed.), New Delhi: PHI Learning Private Limited. Print.

## PCS3501CT NETWORK PROGRAMMING

(LAB CUM THEORY)

### LEARNING OUTCOME

3T+2L hrs./wk.

On successful completion of the course, the student will be able to

- infer concepts related to network and distributed computing
- explain the key protocols which support the network communication
- interpret major technologies and protocols used in network communications and security

### COURSE CONTENT:

#### UNIT I: INTRODUCTION TO ISO AND TCP/IP

6 hrs.

Introduction – protocol layers – OSI model – TCP/IP protocol suite – addressing

#### UNIT II: NETWORK LAYER

12 hrs.

IP4 addresses – classful addressing, classless addressing, delivery and forwarding of IP packets – introduction to internet protocol (IP) – datagrams – fragmentation – options – checksum – introduction to ARP (Address Resolution Protocol) and RARP – address mapping – ARP protocol – ATM ARP – introduction to internet control message protocol (ICMP) – messages – debugging tools – ICMP package

#### UNIT III: ROUTING PROTOCOLS

9 hrs.

Introduction to unicast routing – intra and inter domain Routing – RIP – link state routing – OSPF – path vector routing – BGP – introduction to multicasting and address – IGMP – multicast routing – routing protocol

#### UNIT IV: TRANSPORT AND APPLICATION LAYER PROTOCOL

9 hrs.

Introduction UDP – user datagram – UDP services and applications – introduction TCP – TCP services – TCP features – segment – TCP connection – state transition diagram – windows in TCP – flow control, error control and congestion control – TCP timers and options – host configuration using DHCP

#### UNIT V: CRYPTOGRAPHY NETWORK SECURITY

9 hrs.

Traditional ciphers – modern ciphers – asymmetric key ciphers – message integrity – message authentication – digital signature – entity authentication

#### LAB EXERCISES:

30 hrs.

Implementation of

- Socket program for client and server communication
- client server communication using object stream
- reading IP and port ID from command line and sending message to server
- client server program using byte stream
- multicasting program.
- window chat program.
- working of URL

- address conversion routines
- traditional ciphers cryptography techniques
- asymmetric key cryptography techniques
- user authentication process for real time applications
- biometric authentication using finger print

**TEXT BOOK(S):**

Behrouz A Forouzan, (2010). *TCP/IP protocol suite*, (4<sup>th</sup> ed.), New Delhi: Tata McGraw Hill. Print.  
Chapter 2,5,6, 7,8,9,11,12,14,15,18,29

**REFERENCE BOOK(S):**

Elliote Rusty Harlod, (2000). *JAVA Network Programming*, Sebastopol: O'Reilly Publications. Print.  
Charles M. Kozierok. *TCP/IP Guide: A Comprehensive, Illustrated Internet Protocols Reference*, San Francisco: No Starch Press, (1st, Kindle ed.).

**WEBSITE(S):**

[https://www.tutorialspoint.com/java/java\\_networking.htm](https://www.tutorialspoint.com/java/java_networking.htm)  
<http://www.javatpoint.com/java-networking>  
[https://www.tutorialspoint.com/ipv4/ipv4\\_tcpip\\_model.htm](https://www.tutorialspoint.com/ipv4/ipv4_tcpip_model.htm)  
<http://tutorials.jenkov.com/java-networking/index.html>  
[http://enggedu.com/lab\\_exercise/network\\_lab/network\\_lab\\_exercise\\_programs.php](http://enggedu.com/lab_exercise/network_lab/network_lab_exercise_programs.php)  
[https://vaibhav2501.files.wordpress.com/2012/02/tcp\\_ip-protocol-suite-4th-ed-b-forouzan-mcgraw-hill-2010-bbs.pdf](https://vaibhav2501.files.wordpress.com/2012/02/tcp_ip-protocol-suite-4th-ed-b-forouzan-mcgraw-hill-2010-bbs.pdf)

## PCS3301CP LAB II (DIGITAL IMAGE PROCESSING)

(LAB)

**LEARNING OUTCOME**

3 hrs./wk.

On successful completion of the course, the student will be able to

- interpret on various image processing techniques
- illustrate the different techniques for noise removal
- develop their skills in image enhancement and segmentation

**COURSE CONTENT:**

**BASIC IMAGE PROCESSING OPERATIONS** 15 hrs.

Bitmap image – color image – gray scale image – image addition (morphing) – image subtraction (detect motion) – multiplication (increase brightness) – division (decrease brightness) – mask region of interest – crop, resize, rotate – negative form of an image – scaling – rotation– shearing

**IMAGE ENHANCEMENT IN SPATIAL AND FREQUENCY DOMAIN** 10 hrs.

Preprocessing of an image in spatial domain – linear filers – non-linear filters – enhancement in frequency domain – low pass filter – high pass filter

**NOISE REMOVAL USING SPATIAL FILTERS** 10 hrs.

Linear Filter – minimum, maximum, median – alpha trimmed – mid nonlinear filter – arithmetic mean – geometric mean – contra harmonic – harmonic Y mean filter

## COLOR IMAGE REPRESENTATION AND EDGE DETECTION USING MORPHOLOGICAL OPERATION

10 hrs.

Convert a color image to gray scale image – convert a color image to indexed image – convert an indexed color image to color image – convert a color image to gray scale image – dilation – erosion – opening – closing

### REFERENCE BOOK(S):

Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins., (2010, reprint 2018). *Digital Image Processing Using MATLAB*, (2<sup>nd</sup> ed.), New Delhi: Pearson Education Inc. Print.

Rudra Pratap, (2010), *Getting Started with Matlab*, New Delhi: Oxford University Press Inc., Print.

### WEBSITE(S):

<https://www.mathworks.com/discovery/digital-image-processing.html>

<https://nptel.ac.in/courses/117105135/>

<https://www.udemy.com/dip-digital-image-processing-matlab/>

## PCS0402CD DIGITAL MARKETING USING SOCIAL MEDIA (THEORY)

### LEARNING OUTCOME

On successful completion of the course the student will be able to

- illustrate the concepts of digital marketing
- create a social media marketing campaign
- apply appropriate social media tools
- construct a plan to improve marketing efforts for businesses using social media

### COURSE CONTENT:

#### UNIT I: INTRODUCTION TO DIGITAL MARKETING

Introduction to digital marketing – traditional marketing and digital marketing – 3i principles of digital marketing – digital marketing strategies – benefits of digital marketing – digital marketing trends

#### UNIT II: SEARCH ENGINE OPTIMIZATION

Introduction to search engines – SEO process – role of keywords in SEO – onpage optimization – offpage optimization – pay per click

#### UNIT III: E-MARKETING

Introduction – email marketing process – mobile app marketing strategies – mobile marketing goals – creating a mobile website – mobile search ads

#### UNIT IV: SOCIAL MEDIA MARKETING

Introduction to social media marketing – social media marketing vs. social media optimization – benefits of social media marketing – social media statistics – social media strategy – impact of social media on SEO

#### UNIT V: CASE STUDY

Facebook Marketing – Twitter Marketing – YouTube Marketing

Data Lake and analytics in amazon – Business Analytics

Mobile App Analytics

**TEXT BOOK(S):**

Ian Dodson, (2016). *The Art of Digital Marketing: The Definitive Guide to creating Strategic, Targeted and Measurable Online Campaigns*, (Kindle Edition), Canada: John Wiley and Sons. Print. Chapters: 1, 2, 5, 8

Todd Kelsey, (2017). *Introduction to Social Media Marketing: A Guide for Absolute Beginners*, (Kindle Edition), USA: Apress, Print. Chapters: 1, 3

**REFERENCE BOOK(S):**

Damian Ryan, (2014). *Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation*, (3<sup>rd</sup> ed.), United Kingdom: Kogan Page. Print.

**WEBSITE(S):**

<https://www.slideshare.net/webtrainings/digital-marketing-training-syllabus>

<https://www.digitalvidya.com/blog/introduction-to-digital-marketing/>

<https://www.theaccountancy.co.uk/wp-content/uploads/2017/11/Digital-Marketing-for-Beginners.pdf>

<http://www.nationalarchives.gov.uk/documents/archives/begginer-review-guide-to-social-media.pdf>

**COURSE PROFILE****M.Sc. INFORMATION TECHNOLOGY**

From 2018 batch onwards

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	PTM3501CT	FINANCIAL ACCOUNTING USING SOFTWARE PACKAGES IN ACCOUNTING	LT	3	2	5		SPITM	CSC
	PTM3601CT	OBJECT ORIENTED ANALYSIS AND DESIGN	LT	4	2	6		SPITM	CSC
	PTM3501MO/ PTM3502MO	ARTIFICIAL INTELLIGENCE / EMBEDDED SYSTEMS	T	5		5		SPITM	CSC
	PTM3502CT	CLOUD COMPUTING	LT	3	2	5		SPITM	CSC
	PTM3401CP	WEB APPLICATION DEVELOPMENT (JSON, AJAX, JQUERY, HTML)	LA		4	4		SPITM	CSC
	PTM3501MP	MINI PROJECT	LA			5		SPITM	CSC
	PTM3401EL	ANDROID APPLICATION DEVELOPMENT	LA		4	4		SPALLS	CSC
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
PIV3101PI	BIBLICAL ETHICS	APCH/ SPCH							
	TOTAL				30	35			

IV	PTM4601PM	PROJECT	PR			6		SPITM	CSC
	PGV4103PV	IN TUNE WITH NATURE	TH	2	1			ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER						APCH/SPCH	

IVBC: Self-Study

Total number of credits for 2018 batch (Semester I to IV) – 97

#### EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
TERM PAPER	PTM2301MT	PTM3301MT	PTM4301MT	TH	3	SPITM	ITM
COMPREHENSIVE VIVA	PTM2301MV	-	PTM4301MV	TH	3	SPITM	ITM
COMPREHENSIVE – E- ASSESSMENT	-	-	PTM4201CE	TH	2	SPITM	ITM

#### COURSE OFFERED TO STUDENTS OF OTHER DEPARTMENTS

#### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	PTM0401CD	MANAGEMENT INFORMATION SYSTEM	TH	4	BA2018	SPALLM	SPITM
III	PTM0402CD	GREEN COMPUTING	TH	4		SPALLM	SPCSC

#### ELECTIVE COURSES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PTM2401EP	PROGRAMMATIC DEVELOPMENT USING APEX AND VISUALFORCE	LA		4	4	BA2018	SPALLM (Except CSC & IT)	SPITM
III	PTM3401EL	ANDROID APPLICATION DEVELOPMENT	LA		4	4		SPALLMS	SPITM

### PTM3501CT FINANCIAL ACCOUNTING USING SOFTWARE PACKAGES IN ACCOUNTING (LAB CUM THEORY)

#### LEARNING OUTCOME

3T+2L hrs./wk.

On successful completion of the course, the student will be able to

- analyze the basic principles of accountancy
- infer basic knowledge about handling accounting software
- management Information System created through accounting package Tally

## COURSE CONTENT:

### UNIT I: INTRODUCTION TO ACCOUNTING

15 hrs.

Introduction to accounting – concepts – conventions – advantages and disadvantages – rules of debit and credit – preparation of journal – ledger – trial balance – final accounts – preparation of final accounts – simple adjustments subsidiary books and cash book

### UNIT II: RATIO ANALYSIS

15 hrs.

Introduction to accounting ratios – nature, importance and limitations of ratio analysis – advantages – classification of accounting ratios and interpretations – inter firm and intra firm comparisons

### UNIT III: MARGINAL COSTING

15 hrs.

Definition – features – advantages – disadvantages of marginal costing – break even analysis

## EXPERIMENTS / LAB EXERCISES:

### UNIT IV: INTRODUCTION OF TALLY & ACCOUNTING VOUCHERS

15 hrs.

Creation, alteration and deletion of companies – creation of primary and secondary groups – creation of ledgers – single and multiple – display in trial balance – various types of accounting vouchers – creation of new voucher types – display of day book

### UNIT V: STOCK GROUPS & GST

15 hrs.

Creation of stock groups – stock items – unit of measurement – inventory vouchers – GST transactions

## TEXT BOOK(S):

Jain S. P., (1999). *Financial Accounting and Analysis*, New Delhi: Sultan Chand & company. Print. Chapters 1 - 5

## REFERENCE BOOK(S):

Nadhani K.K., (2010). *Accounting with Tally*. New Delhi: BPB Publications. Print.

Pillai R.S.N. and Bagavathi, (2003). *Management Accounting for Management*, New Delhi: Sultan chand and company Ltd. Print.

## WEBSITE(S):

<http://ww.business.com>

<http://ww.taxsites.com>

<http://ww.mhhe.com>

<http://ww.tallyguru.com>

## PTM3601CT OBJECT ORIENTED ANALYSIS AND DESIGN

### (LAB CUM THEORY)

## LEARNING OUTCOME

4T + 2L hrs. /wk.

On successful completion of the course, the student will be able to

- apply the UML concepts in real time applications
- deduce the use of UML analysis and design diagrams
- evaluate use Cases Advanced Modeling Techniques

## COURSE CONTENT:

### UNIT I: COMPLEXITY

10 hrs.

Inherent complexity of software – structure of complex systems – bringing order to chaos – on designing complex systems – categories of analysis and design methods – object model: evolution of object model – elements of object model – applying the object model – foundations of the object model

**UNIT II: CLASSES AND OBJECTS**

10 hrs.

Nature of an object – relationship among objects – nature of a class – relationship among classes – interplay of classes and objects – on building quality classes and objects – invoking a method – classification: importance of proper classification – identifying classes and objects – key abstraction and mechanisms – a problem of classification

**UNIT III: BASIC BEHAVIOURAL MODELING**

10 hrs.

Object diagram – class diagram – interactions – use cases – use case diagrams – interaction diagrams – activity diagrams

**UNIT IV: ADVANCED BEHAVIOURAL MODELING**

15 hrs.

Events and signals – state machines – processes and threads – time and space – state chart diagrams

**UNIT V: ARCHITECTURAL MODELING**

15 hrs.

Components – deployment – collaborations – pattern and frameworks – component diagram – deployment diagrams – systems and models – case study

**EXPERIMENTS:**

30 hrs.

Open source software like StarUML, ArgoUML, Alma, UMLet can be used for the following exercises:

Implement the class diagram, object diagram, collaboration diagram, sequence diagram, component diagram & deployment diagram for the following applications:

1. Student Information System
2. Stock Maintenance system
3. Library Management System
4. Passport Automation System
5. Online Course Registration System
6. Exam Registration Process
7. Online Quiz System
8. Payroll System
9. Student Mark Analysis System
10. Course Registration System
11. ATM Processing

**TEXT BOOK(S):**

Grady Booch, (2002). *Object –Oriented analysis and Design with Applications*, Indian: Pearson Education. Print. Chapters 1- 4

Grady Booch, James Rumbaugh and Ivar Jacobson, (2000). *The Unified Modeling Languages User Guide*, New Delhi: Addison Wesley. Print. Chapters 5,6,7,8

**REFERENCE BOOK(S):**

Ali Bahrami, (1999). *Object Oriented Systems Development*, New Delhi: Irwin-McGraw Hill. Print.

Kendall Scott, (1977). *UML Distilled-Applying the standard Object Modeling Language*. Print.

**WEBSITE(S):**

<http://www.ooad.org>

<http://www.sts.tu-harburg.de/teaching/ws-98.99/OOA+D/entry.html>

<http://www.devshed.com/c/a/Practices/Introducing-UMLObjectOriented-Analysis-and-Design/>

<http://www.sun.com/training/catalog/courses/OO-226.xml>

## PTM3501MO ARTIFICIAL INTELLIGENCE

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify the fundamental concepts in Artificial Intelligence
- analyse the goals and methods of Artificial Intelligence
- illustrate the applications which involve perception, reasoning and learning

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION

10 hrs.

Intelligent agents – agents and environments – good behavior – nature of environments – structure of agents – problem solving – problem solving agents – example problems – searching for solutions

##### UNIT II: SEARCHING TECHNIQUES

15 hrs.

Uninformed search strategies – breadth-first search – uniform-cost search – depth-first search – depth-limited search – iterative deepening search – bidirectional search – informed search strategies – greedy best first search – A\* search – optimality of A\* – memory bounded heuristic search – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments

##### UNIT III: CONSTRAINT SATISFACTION PROBLEMS & ADVERSARIAL SEARCH

15 hrs.

Defining constraint satisfaction problems (CSP) constraint propagation: inferences in CSPs – backtracking search for CSP – local search for constraint satisfaction problems – structure of problems. adversarial search: games – optimal decisions in games – Alpha-Beta pruning

##### UNIT IV: LOGICAL AGENT & FIRST-ORDER LOGIC

15 hrs.

Logical agent – knowledge-based agents – Wumpus world – logic – propositional logic: a very simple logic – first order logic – representation revisited – syntax and semantics for first order logic – using first order logic – knowledge engineering in first order logic

##### UNIT V: NATURAL LANGUAGE PROCESSING & ROBOTICS

20 hrs.

Language models – N-gram character models – smoothing n-gram models – model evaluation – N-gram word models – text classification – classification by data compression – information retrieval – IR scoring functions – IR system evaluation – IR refinements – pagerank algorithm – HITS algorithm – question answering – information extraction – probabilistic models for information extraction – machine reading – robotics – introduction – robot hardware – effectors – robotic perception – localization and mapping – other types of perception – machine learning in robot perception

#### TEXT BOOK(S):

Stuart J Russell and Peter Norvig, (2016). *Artificial Intelligence – A Modern Approach*, (3<sup>rd</sup> ed.), New Delhi: Pearson India Education Services. Print. Chapters 2,3,4,5,6,7,8,22:22.1- 22.4.2,22.4.6 & 25.1-25.3.3

#### REFERENCE BOOK(S):

Elaine Rich and Kevin Knight, (2009). *Artificial Intelligence*, (3<sup>rd</sup> ed.), New Delhi: Tata McGraw Hill. Print.

George F. Luger, (2005). *Artificial Intelligence-Structures and Strategies for Complex Problem Solving*, (5<sup>th</sup> ed.), Pearson Education: New Delhi: NHI. Print.

# PTM3502CT CLOUD COMPUTING

(LAB CUM THEORY)

LEARNING OUTCOME

3T + 2L hrs. /wk.

On successful completion of the course, the student will be able to

- identify the critical aspects in the design of different systems using cloud services
- apply the key dimensions of the research challenges in cloud computing
- analyze concepts in the design space of big data and cloud computing

COURSE CONTENT:

## UNIT I: INTRODUCTION TO CLOUD COMPUTING

10 hrs.

Introduction to cloud computing – cloud types – NIST model, cube model, deployment models, service models – understanding cloud architecture – benefits of cloud computing – disadvantages of cloud computing

## UNIT II: CLOUD SERVICES

10 hrs.

Software as a Service (SaaS) – Platform as a Service (PaaS) – Infrastructure as a Service (IaaS) – Identity as a Service (IDaaS) – Compliance as a Service (CaaS)

## UNIT III: CLASSIC DATA CENTER AND VIRTUALIZED DATA CENTER

10 hrs.

Features of classic data center – storage networking technologies – overview of virtualization – virtualization techniques

## UNIT IV: STORAGE IN VIRTUALIZED DATA CENTER

10 hrs.

Storage virtualization overview – virtual machine storage – block level and file level virtualization

## UNIT V: CLOUD SECURITY AND DISASTER RECOVERY

5 hrs.

Introduction to general security – advantages of cloud based solutions – introducing business continuity and disaster recovery – understanding the threats

LAB EXERCISES:

30 hrs.

1. Sharing of data in Google App engine
2. Cloud academy
3. Cloud bus
4. Cloud game
5. Open nebula
6. Windows Azure
7. Installation of Jolicloud net book OS, Chromium OS
8. Working with Blog, Wikis, Web Mail Services, Web Conferencing
9. Virtualization of OS
10. Sandbox installation
11. Working with Zoho
12. Google Analytics in user created Google Site
13. Google Translate
14. Calendar Apps
15. Cloud Lab
16. Project Management Apps
17. Working with the Cloud Storage such as Google Drive, Amazon Cloud Drive, Drop Box, Adrive

## TEXT BOOK(S):

Barrie Sosinsky, (2012). *Cloud Computing Bible*, (Kindle ed.), Indiana: Wiley India Pvt Ltd. Print. Chapters: 1,3

EMC Education Services, *Cloud Infrastructure and Service*, (Student ed.), Tamil Nadu: ICT Academy. Print. Chapters: 2 - 4

Kris Jamsa, (2011). *Cloud Computing*, (Jones & Bartlett Student ed.), United Kingdom: Jones and Bartlett. Print. Chapters: 2 - 5, 9,10

## REFERENCE BOOK(S):

Haley Beard, (2008). *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs*, United States: Emereo Pvt. Limited. Print.

Michael Miller, (2008). *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*, (2<sup>nd</sup> ed.), India: Que Publishing. Print.

## WEBSITE(S):

[www.infoworld.com/d/cloud-computing/](http://www.infoworld.com/d/cloud-computing/)

<http://cecs.wright.edu/~pmateti/Courses/2350/Labs/Cloud/CloudComputing.html>

<https://www.windowsazure.com/en-us/>

## PTM3401CP WEB APPLICATION DEVELOPMENT

(JSON, AJAX, JOQUERY, HTML)

(LAB)

## LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- classify different tags used for web development
- apply advanced web programming concepts and techniques
- integrate web applications with database and web server applications

## COURSE CONTENT:

### UNIT I: HTML 5

10 hrs.

Main Structure – elements – attributes – tags – text – forms – frames – tables – video and audios – geo location – app cache – web workers – server sent events – drag and drop – canvas – storage offline.

Create static web page for various applications using the HTML5 tags, its attributes and elements

### UNIT II: JAVASCRIPT

15 hrs.

Introduction – syntax – data types – variables – operators – functions – events – methods (string, number, math, date) – arrays – conditional and looping statements – type conversion – regular expression

create dynamic and interactive web pages for various applications by implementing custom client side scripts

### UNIT III: JSON & ANGULAR JS

10 hrs.

Introduction – syntax – Json Vs XML – datatypes – objects – arrays – parse – stringify – Json HTML basics of angular JS – features – MVC – angular expressions – built in filters – custom filters – angular forms – form controller – validating form – form events – error handling – CSS transform  
Implementing online shopping application using JSON and ANGULAR JS

**UNIT IV: AJAX**

10 hrs.

Introduction – AJAX request – AJAX response – AJAX XML file – AJAX database

Updating parts of webpages using AJAX

**UNIT V: JQUERY & NODE.Js**

15 hrs.

Introduction – syntax – jQuery Selectors – jQuery Events – jQuery effects – jQuery HTML – jQuery

Traversing – jQuery AJAX

Node.js: asynchronous JavaScript – file system – building server – express js – working with data – working with Socket.io – processor and cluster – error handling

Simplify the web application development using jQuery library

**REFERENCE BOOK(S):**Bruce Lawson and Remy Sharp. (2010). *Introducing HTML5*, USA: New Riders. Print.Jon Duckett. (2014). *JavaScript and JQuery*, United States: John Wiley & Sons. Print.Steve Holzner. (2006). *Ajax for Dummies*, United States: Wiley Publishing. Print.**WEBSITE(S):**<http://archive.oreilly.com/oreillyschool/courses/javascript2/Javascript%20JSON%20and%20Ajax%20v2.pdf><https://jquery.com/>**PCS3502MO / PTM3502MO EMBEDDED SYSTEMS****(THEORY)****LEARNING OUTCOME**

5 hrs. / wk.

On successful completion of the course, the student will be able to:

- describe the meaning of an embedded system
- explain the reasons for the importance of embedded systems
- infer the relationship between programming languages and embedded systems

**COURSE CONTENT:****UNIT I: INTRODUCTION TO EMBEDDED REAL TIME SYSTEMS**

8 hrs.

Fundamental components of Embedded systems – Examples of embedded systems –

Hardware fundamentals - software Architecture – Real time Operating system –

Multitasking – Real time kernel – Memory mapped I/O devices – Interrupts introduction

**UNIT II: DATA REPRESENTATION AND GETTING THE MOST OUT OF C**

10 hrs.

Fixed precision Binary numbers – Binary representation of Integers – representation of real numbers

– C Data types – typedefs – Manipulating Bits at I/O port – Accessing Memory mapped I/O devices

– structures – variant access – Programming in Assembly – register usage conventions – instruction

sequencing – procedure call – return – parameter passing.

**UNIT III: ARCHITECTURE AND DESIGN OF AN EMBEDDED SYSTEM**

12 hrs.

Architecture styles – Architecture patterns – Architecture of card verification system – Practices followed in design – Design checklist

**UNIT IV: IMPLEMENTATION ASPECTS IN EMBEDDED SYSTEMS**

15 hrs.

Intel I/O instructions – synchronization – Transfer Rate – Latency - Interrupt driven I/O - Direct

Memory Access – Foreground/Background Systems – Multithreaded Programming – Shared

Resources and Critical Sections - Readability – Future Maintenance – Performance –

Miscellaneous tips.

**UNIT V: ESTIMATION MODELLING IN EMBEDDED SOFTWARE**

5 hrs.

Introduction - What is Estimation? – Factors affecting estimation – The basic steps of Estimation – How to perform Estimation – Do's and Don'ts of Estimation.

**UNIT VI: VALIDATION AND DEBUGGING OF EMBEDDED SYSTEM**

10 hrs.

Introduction – Why is software testing difficult? – Differences between Application and Embedded Testing – Validation Types and Methods – Target Testing.

**TEXT BOOK(S):**

Sriram V Iyer and Pankaj Gupta, (2004). *Embedded Realtime System Programming*, (2<sup>nd</sup> ed.), New Delhi: Tata McGraw- Hill Publishing Company Limited, Print.

Daniel W. Lewis, (2002). *Fundamentals of Embedded Software: Where C and Assembly Meet*, (2<sup>nd</sup> ed.), United Kingdom: Pearson Publication, Print.

**REFERENCE BOOK(S):**

Jonathan W. Valvano, (2002). *Embedded Microcomputer Systems*, Hong Kong: Thomson Asia Pvt. Ltd., Print.

Ren Arald, (2002). *Embedded Controller Hardware Design*, New Delhi: Tata McGraw Hills Pvt. Ltd, Print.

Raj Kamal, (2004). *Embedded Systems Architecture, Programming and Design*, New Delhi: Tata McGraw Hill, Print.

**REFERENCE SITE(S):**

[www.embedded.com](http://www.embedded.com)

[www.esconline.com](http://www.esconline.com)

[www.microcontroller.com](http://www.microcontroller.com)

**PTM3401EL ANDROID APPLICATION DEVELOPMENT****(LAB)****LEARNING OUTCOME**

4 hrs. /wk.

On successful completion of the course, the student will be able to

- describe the various layouts and widgets in Android Application
- develop applications on Mobile platform
- create and deploy Android Application

**COURSE CONTENT:****INTRODUCTION**

15 hrs.

Basics of android – android studio – android SDK – installing and configuring android SDK tools and manager – creating first android application – activities, fragments and intents: applying styles and themes to an activity – displaying a dialog window – activities – linking activities using intents – adding fragments dynamically

To include ios.

**ANDROID USER INTERFACE**

15 hrs.

frame layout – linear layout – table layout – relative layout – basic views –text view – button–checkbox – radio button – picker views – time picker date picker–list views–spinner view–list fragments – dialog fragment – pictures and menus with views: image view – images witcher grid view – context menu.

## MESSAGING AND NETWORKING

10 hrs.

SMS Messaging – sending and receiving SMS messages – feedback after sending a message – location based services: displaying maps – web services using HTTP – downloading text content – integrate SMS gateway using API to send and receive messages

## DATABASE CONNECTIVITY

10 hrs.

SQLite database – SQLite data types – cursors and content values – adding, updating and deleting content

## PUBLISHING ANDROID APPLICATION

10 hrs.

Preparing for publishing – versioning your application – digitally signing your android application – deploying APK files – using the adb.exe tool – using a web server – publishing on the Android market.

### TEXT BOOK(S):

Wei-Meng Lee, (2006), *Beginning Android Application Development*, (4<sup>th</sup> ed.), New Delhi: Tata McGraw-Hill. Print. Chapters: 1-12.

J. F. DiMarzio, (2017). *Beginning Android Programming with Android Studio*, (4<sup>th</sup> ed.), Indiana: John Wiley and Sons, Inc. Print.

### REFERENCE BOOK(S):

Ronan Schwarz, Phil Dutson, James Steele, Nelson To, (2011), *The Android Developer's Cookbook - Building Applications with the Android SDK*, (2<sup>nd</sup> ed.), New Delhi: Pearson India. Print.

Reto Meier, (2011), *Professional Android 2 Application Development*, Indiana: John Wiley and Sons, Inc. Print.

### WEBSITE(S):

<https://developer.android.com/training/basics/firstapp/index.html>

<https://www.androidauthority.com/android-app-development-complete-beginners-65>

<https://www.mindinventory.com/android-application-development.php>

## PTM0402CD GREEN COMPUTING

### (THEORY)

### LEARNING OUTCOME

On successful completion of the course, the student will be able to

- realize the need of Green computing for sustainable environment
- describe the strategies, frameworks, processes and management of green IT
- develop optimized software and hardware designs using Green Computing techniques

### UNIT I: GREEN IT OVERVIEW

Introduction – environmental concerns and sustainable development – environmental impacts of IT – Green IT – holistic approach to greening IT – greening IT – applying IT for enhancing environmental sustainability – green IT standards and eco-labelling of IT – enterprise green IT strategy – green washing – green IT: burden or opportunity.

### UNIT II: GREEN DEVICES-HARDWARE AND SOFTWARE

Life cycle of a device or hardware – reuse – recycle and dispose green software: introduction – processor power states – energy – saving software techniques – evaluating and measuring software impact to platform power

### UNIT III: GREEN DATA CENTRES AND DATA STORAGE

Data centres and associated energy challenges – data centre it infrastructure – data centre facility infrastructure: implications for energy efficiency – IT infrastructure management – green data centre metrics – storage media power characteristics – energy management techniques for hard disks system – level energy management

### UNIT IV: GREEN NETWORKS AND COMMUNICATIONS

Introduction – objectives of green network protocols – green network protocols and standards

### UNIT V: GREEN CLOUD COMPUTING AND ENVIRONMENTAL SUSTAINABILITY

Cloud computing – cloud computing and energy usage model – features of cloud enabling green computing – towards energy efficiency of cloud computing – green cloud architecture – case study – IaaS provider

### TEXT BOOK(S):

San Murugesan and Ganadharan G. R., (2012). *Harnessing Green IT: Principles and Practices*, United Kingdom: Wiley & IEEE. Print.Chapters:1,2,3,5.1-5.5,6.2-6.4,7.1-7.3,16.2-16.7

### WEBSITE(S):

<http://pdf.th7.cn/down/files/1508/Harnessing%20Green%20IT.pdf>

<http://www.iolo.com/resources/articles/eco-friendly-tips-for-your-computer/>

<https://www.lifewire.com/what-is-remote-access-2377975>

<https://get.gotomypc.com/>

## DEPARTMENT OF FASHION DESIGNING

### PREAMBLE

The present curriculum of B.Sc., Fashion Designing were reviewed and based on which it is found necessary to introduce few changes in the following courses:

#### Core Courses and Support Courses

FDS1101CP Basic Fashion Illustration is changed to FDS1201CP Basic Fashion Illustration

FDS1402FM Fashion Studies is changed to FDS1403FM Fashion Studies

FDS1501CM Fiber and Yarn Science is changed to FDS1404CM Fiber and Yarn Science

FDS3401CT Fabric Formation, Structure and Design is changed to FDS3402CT Fabric Formation, Structure and Design

FDS3402CM History of Fashion is changed to FDS3504CM History of Fashion

FDS6401CT Fashion Photography and Modelling and FDS5201EP Fashion Styling are replaced by the course FDS4401CT Fashion Photography and Styling

FDS4407CM Fashion Marketing and FDS5401CM Fashion Retailing and Buying are replaced by the course FDS4501CM Fashion Retailing and Marketing

FDS4501CT Wet Processing is changed to FDS4502CT Wet Processing

FDS5501CM Technical Textiles is changed to FDS5502CM Technical Textiles

FDS4405CM Fashion Merchandising is changed to FDS5503CM Fashion Merchandising

FDS6302CP Computer Aided Designing – II is changed to FDS6303CP Computer Aided Designing – II

Besides this, the department introduces the following courses

- FDS5301CM Textile Printing
- FDS6503CM Organisation of Garment Unit
- FDS6504CM Apparel Quality Control

Diploma and Certificate courses which were offered by Lady Doak Community College since 2016 are being offered by the Department of Fashion Designing from 2018

Diploma Course:

**Diploma in Apparel Designing**

Certificate Courses:

**CDM0601 BASICS IN DRESS MAKING**

**CAE0602 INTRODUCTION TO AARI EMBROIDERY**

**CME0603 INTRODUCTION TO MACHINE EMBROIDERY**

**CEM0604 INTRODUCTION TO HAND EMBROIDERY**

**CJH0605 INTRODUCTION TO JUTE HANDICRAFT**

**CFP0606 BASIC FABRIC PAINTING**

**CFP0801 ADVANCED FABRIC PAINTING**

The course profile along with the syllabi of the new and modified courses are presented.

**COURSE PROFILE**  
**B.Sc. FASHION DESIGNING**

From 2019 batch onwards

Sem	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	PART I	TAMIL, HINDI, FRENCH	TH	6		3 or 4		ALLM	TAM / HIN / FRE
	PART II	ENGLISH	TH	6		3 or 4		ALLM	ENG
	FDS1403FM	FASHION STUDIES	TH	4		4		SUFDS	FDS
	FDS1404CM	FIBER AND YARN SCIENCE	TH	4		4		SUFDS	FDS
	FDS1402AT*	FUNDAMENTALS OF CLOTHING CONSTRUCTION	LT	2	3	4		SUFDS	FDS
	FDS1201CP	BASIC FASHION ILLUSTRATION	LA		3	2		SUFDS	FDS
	VBC1101FV	HEALTHY TRANSITION FROM ADOLESCENCE TO ADULTHOOD	TH	2		1	BA2018	ALLM	Centre for VE
	UIV1101FI	BIBLICAL ESSENTIALS FOR EMERGING ADULTS						AUCH/ SUCH	
		<b>TOTAL</b>			<b>30</b>		<b>21/23</b>		
II	PART I	TAMIL, HINDI, FRENCH	TH	6		3 or 4		ALLM	TAM / HIN / FRE
	PART II	ENGLISH	TH	6		3 or 4		ALLM	ENG
	FDS2301CM*	PATTERN DRAFTING AND CONSTRUCTION - KIDS WEAR	TH	3		3		SUFDS	FDS
	FDS2301CP*	KIDS WEAR	LA		5	3		SUFDS	FDS
	FDS2401AP	ADVANCED FASHION ILLUSTRATION	LA		5	4	AV2014	SUFDS	FDS
	FDS2201FS***	FASHION COMMUNICATION	TH	2		2		SUFDS	FDS
	ELECTIVE	ENVIRONMENTAL ELECTIVE	TH	2		2	AV2014	ALLM	CES
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE

Sem	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	UIV2101FI	BIBLICAL FOUNDATION FOR FAMILY LIFE					BA2018	AUCH/ SUCH	
		TOTAL		30		21 / 23			

From 2018 batch onwards

Sem	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	FDS3301CP	GARMENT CONSTRUCTION IN WOMEN'S WEAR	LA		5	3	AW2015	SUFDS	FDS
	FDS3402CT	FABRIC FORMATION STRUCTURE AND DESIGN	LT	3	2	4		SUFDS	FDS
	FDS3503CM	GARMENT DESIGNING AND PATTERN MAKING FOR WOMEN'S WEAR	TH	5		5	BA2018	SUFDS	FDS
	FDS3504CM	HISTORY OF FASHION	TH	5		5		SUFDS	FDS
	FDS3302EC	CLOTHING SELECTION AND CARE	TH	3		3	AW2015	SUFDS	FDS
	FDS3201CP**	SURFACE EMBELLISHMENT	LA		3	2		SUFDS	FDS
		NON- MAJOR ELECTIVE	TH	2		2	AV2014	ALLM	FDS
		VOCATIONAL COURSE				2			
		LIBRARY			1				
	VBC0102FV/ VBC0103FV	CIVIC EDUCATION / FAMILY LIFE EDUCATION	TH	1		1	AV2014	ALLM	Centre for VE
	UIV3101FI	CIVICS AND THE BIBLE						AUCH/ SUCH	
	TOTAL		30		27				
IV	FDS4501CM	FASHION RETAILING AND MARKETING	TH	5		5		SUFDS	FDS
	FDS4406CM	GARMENT DESIGNING AND PATTERN MAKING	TH	4		4	AW2015	SUFDS	FDS

Sem	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
IV		FOR MEN'S WEAR							
	FDS4302CP	GARMENT CONSTRUCTION IN MEN'S WEAR	LA		5	3	AW2015	SUFDS	FDS
	FDS4502CT	WET PROCESSING	LT	3	3	5		SUFDS	FDS
	FDS4401CT	FASHION PHOTOGRAPHY AND STYLING	LT	3	2	4		SUFDS	FDS
		NON – MAJOR ELECTIVE	LA	2		2			
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES / FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV4201FI	HUMAN RIGHTS IN THE BIBLE						AUCH / SUCH	
		LIBRARY		1					
			TOTAL		30		25		
V	FDS5502CM	TECHNICAL TEXTILES	TH	5		5		SUFDS	FDS
	FDS5503CM	FASHION MERCHANDISING	TH	5		5		SUFDS	FDS
	FDS5301CM	TEXTILE PRINTING	TH	3		3		SUFDS	FDS
	FDS5401CT	EVENT DESIGN AND MANAGEMENT	LT	3	2	4	BA2018	SUFDS	FDS
	FDS5402CT*	DRAPING TECHNIQUES IN FASHION	LT	3	2	4		SUFDS	FDS
	FDS5202CP	COMPUTER AIDED DESIGNING – I	LA		4	2	BA2018	SUFDS	FDS
	FDS5501TC	FASHION DESIGNING INTERNSHIP – I				5	BA2018	SUFDS	FDS
		LIBRARY		1					
	VBC0202FV/ VBC0203FV	HUMAN RIGHTS AND DUTIES/ FOUNDATION COURSE ON WOMEN'S STUDIES	TH	2		2	AV2014 / AY2016	ALLM	Centre for VE
	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN						AUCH/ SUCH	
		TOTAL		30		30			

Sem	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
VI	FDS6504CM	APPAREL QUALITY CONTROL	TH	5		5		SUFDS	FDS
	FDS6503CM	ORGANISATION OF GARMENT UNIT	TH	5		5		SUFDS	FDS
	FDS6301CP	FASHION PORTFOLIO PREPARATION AND PRESENTATION	LA		5	3	AY2016	SUFDS	FDS
	FDS6303CP	COMPUTER AIDED DESIGNING - II	LA		5	3		SUFDS	FDS
	FDS6402CT	FASHION CRAFT	LT	2	3	4	BA2018	SUFDS	FDS
	FDS6301EC**	HOME FURNISHING	TH	3		3		SUFDS	FDS
	FDS6301TC	FASHION DESIGNING INTERNSHIP - II				3	BA2018	SUFDS	FDS
		LIBRARY			1				
	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1		1		ALLM	Centre for VE
	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP						AUCH/ SUCH	
	TOTAL			30		27			

\* Content remains the same, hours have been changed

\*\* Content remains the same, course shifted to a different semester

\*\*\* Content remains the same, credit has been changed

### COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS NON-MAJOR ELECTIVES

Sem	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
III	ALFD3201EP	GARMENT DESIGNING AND SEWING SKILL	LA		2	2	AW2015	ALLM	FDS & ALM
	ENFD3201EI	INTRODUCTION TO FASHION JOURNALISM	TH	2		2	BA2018	ALLM	FDS & ENG
IV	BTFD4201EI	SILK REARING AND PROCESSING TECHNOLOGY	TH	2		2	BA2018	ALLM	FDS & BTE

Sem	Course Code	Course Title	Course Type	Hrs. / Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	CBFD4201EI	FASHION BUSINESS AND ENTREPRENEURIAL SKILL DEVELOPMENT	TH	2		2	BA2018	ALLM	FDS & COB

## FDS1403FM FASHION STUDIES

### (THEORY)

#### LEARNING OUTCOME

4 hrs. /wk.

On successful completion of the course, the student will be able to

- recognize the meaning of fashion
- interpret the current trends in fashion
- relate colour and design with figure types

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION TO FASHION

11 hrs.

Terms related to the fashion industry – fashion – style – fad – classic and collection – chic – custom made – pret a porter – mannequin – fashion show – trend – forecasting – high fashion – fashion cycle – haute couture – couturier – fashion director – fashion editor line – knockoff – avant garde – bridge – buying house – apparel – fashion merchandising – sample.

##### UNIT II: DESIGNING AND ITS TYPES

12 hrs.

Design – definition – types – structural and decorative design – requirements of a good structural and decorative design – elements of design – line – shape or form – colour – size – texture – application of structural and decorative design in a dress – principles of design – balance – formal and informal – rhythm – through repetition – radiation and gradation – emphasis – harmony – proportion – application of principles of designs in a dress.

##### UNIT III: COLOUR

13 hrs.

Colour – definition – colour theories – prang colour chart and munsell colour system – dimensions of colour – hue – value – intensity – standard colour harmonies – application in dress design – colour in principles of design – application of the same in dress design.

##### UNIT IV: FIGURE IRREGULARITIES

12 hrs.

Designing dresses for unusual figures – becoming and unbecoming – figure types – stout figure – thin figure – slender figure – narrow shoulders – broad shoulders – round shoulders – large bust – flat chest – large hip – large abdomen – round face – small face – prominent chin and jaw – prominent forehead.

##### UNIT V: FASHION PSYCHOLOGY

12 hrs.

Adoption of fashion – trickle up – trickle down – trickle across – fashion cycle – factors influencing fashion – fashion designer.

#### TEXT BOOK(S):

G. J. Sumathi, (2004). Elements of Fashion and Apparel Design, New Delhi: New Age International

Pvt. Ltd. Print.

**REFERENCE BOOK(S):**

Bina Abling, (1988). *Fashion Sketch Book*, New York: Fairchild Publications. Print.

Judith Rasband, (2001). *Wardrobe Strategies for women*, London: Delmar Publishers. Print.

Mc Jimsey and Harriet, (1973). *Art and Fashion in clothing selection*, Iowa: State University Press. Print.

**FDS1404CM FIBRE AND YARN SCIENCE**

**(THEORY)**

**LEARNING OUTCOME**

**4 hrs./wk.**

On successful completion of the course, the student will be able to

- know the process of fibre to yarn manufacture
- differentiate properties of natural and manmade fibre
- recognize the types of yarn and its quality parameters

**COURSE CONTENT:**

**UNIT I: INTRODUCTION TO FIBRES**

**8 hrs.**

Textile fibres – definition– classification of textile fibres – according to their nature and origin – essential and desirable properties of textile fibres – staple and filament – comparison of natural and manmade fibres.

**UNIT II: NATURAL FIBRES**

**12 hrs.**

Cotton fibres – properties and uses – Jute fibre – extraction – properties and uses – Flax fibre properties and uses – Hemp fibres – properties and uses – Silk fibre – Life cycle of silk worm – silk reeling and throwing – properties and uses – Wool fibre – varieties of wool – differences between worsted and woolen fibre – properties and uses – brief study of hair fibres.

**UNIT III: MAN MADE FIBRES**

**12 hrs.**

Regenerated fibres – Viscose rayon – manufacturing process – properties and uses – Modal– properties and uses – Lyocell – properties and uses – Bamboo – properties and uses – synthetic fibres – Polyester – manufacturing process– properties and uses – Nylon 6 – manufacturing process – properties and uses – Nylon 6,6 – manufacturing process – properties and uses– Polypropylene – properties and uses – Acrylic – properties and uses.

**UNIT IV: YARN MANUFACTURING PROCESS**

**14 hrs.**

Introduction to ginning – Conventional spinning – mixing and blending – flow process – Carding – Drawing – Combing – Simplex – Ring frame – differences between carded and combed yarn.

**UNIT V: YARN AND ITS TYPES**

**14 hrs.**

Yarn – definition – yarn twist – types and effects – classification of yarn – simple and fancy yarns – Quality parameter while sourcing yarn – sewing threads types and its properties.

**TEXT BOOK(S):**

Bernard Corban P, (1998). *Fiber to Fabric*, (6<sup>th</sup> ed.), Singapore: McGraw Hill Publication. Print.

Joseph Pretal J., (1990). *Fabric Science*, (5<sup>th</sup> ed.), New York: Fairchild Publications. Print.

**REFERENCE BOOK(S):**

Gohl E.P.G and Vilensky L.D., (1999). *Textile Science*, New Delhi: CBS Publications and Distributors. Print.

Gopalakrishnan R. and Angappan P., (2010). *Textile Testing*, S.S.M.I.I.T staff and students Co-op stores Ltd. Print.

Klein W. G, (1988). *The Technology of Short Staple Spinning*, Machester: Textile Institute Print.

Lewin, M and Peare E.M, (1985). *Fiber Science and Technology*, (Vol. IV), Singapore: Book Company. Print.

## FDS1201CP BASIC FASHION ILLUSTRATION

(LAB)

### LEARNING OUTCOME

3 hrs./wk.

On successful completion of the course, the student will be able to

- apply the elements and principles of colour and design
- illustrate techniques in fashion sketching
- draw figures in proportion

### LIST OF PRACTICALS:

45 hrs.

1. Introduction to sketching
2. Free hand drawing
3. Stick figures – male and female – 7, 8 and 10 head theory
4. Block figures – male and female front view – back view – side view – 7, 8 and 10 head theory
5. Flesh figures – male and female front view – back view – side view – 7, 8 and 10 head theory
6. Prang's colour chart
7. Value chart
8. Intensity chart
9. Application of colour harmony in garments – analogues – monochromatic – single complementary – double complementary – split complementary and triad color harmony

### TEXT BOOK(S):

Patrick John Ireland, (2005). *Fashion Design Illustration*, New Delhi: B.T Batsford Ltd. Print.

### REFERENCE BOOKS:

Sharon Lee Tate, (2007). *Inside Fashion Design*, (5<sup>th</sup> ed.), United States: Pearson Education. Print.

Thames and Hudson, (2010). *Basic Illustrations*, London: A V A Publishing Distributors. Print.

## FDS3402CT FABRIC FORMATION, STRUCTURE AND DESIGN

(LAB CUM THEORY)

### LEARNING OUTCOME

3T + 2L hrs./wk.

On successful completion of the course, the student will be able to

- identify the basics of fabric formation
- compare the different types of textile design and fabric structure
- evaluate the fabric structure and design

## COURSE CONTENT:

### UNIT I: INTRODUCTION TO WEAVING

13 hrs.

Loom – parts and types – preparatory process for weaving – winding – warping – sizing – loom operations – objectives – primary motions – shedding – picking – beat – up – secondary motions – let-off – take-up – shuttle less looms and types.

### UNIT II: WOVEN FABRIC STRUCTURE

7T + 15L hrs.

Study of design draft and peg plan – structure of basic weaves – plain – twill variation – satin – sateen – honey comb – huck-a-back – extra warp and extra weft – pile – introduction to dobby and jacquard.

#### LIST OF PRACTICALS:

Design, draft and draw peg plan for the following Weaves:

1. Plain Weaves and its variation
2. Twill Weave and its variation
3. Satin weave
4. Sateen weave
5. Honey comb weave
6. Huck-a-Back weave
7. Extra warp and Extra Weft figuring

### UNIT III: INTRODUCTION TO KNITTING

10 hrs.

Knitting – definition – classification – elements – weft knitting machines circular – warp knitting machine – raschel – tricot.

### UNIT IV: KNITTED FABRIC STRUCTURE

7T + 7L hrs.

Study of knitted structure – knit – tuck – miss stitch – study of single jersey – rib – interlock – purl structure – raschel and tricot – common defects in knitted fabrics – comparison between knitted and woven fabrics.

#### LIST OF PRACTICALS:

1. Single Jersey
2. Plain
3. Rib
4. Interlock
5. Purl Structure
6. Raschel
7. Tricot

### UNIT V: INTRODUCTION TO NON-WOVEN AND TEXTILE DESIGN

8T + 8L hrs.

Non-woven: introduction – methods of production using carding machine – parallel laying – cross laying – air laying – wet laying – dry laying – wood pulp – spun laying – flash spinning – melt blown – chemical bonding – thermal bonding – solvent – needle felting – hydro entanglement – applications

Textile design: introduction – motif – repeats – types of textile design – natural – geometric – conventional – abstract – historical.

## LIST OF PRACTICALS:

1. Motif creation
2. Repeat Structures
  - a. Brick
  - b. Drop
  - c. Directional
  - d. Non-directional
3. Turning pattern
  - a. Flipping horizontal
  - b. Flipping vertical
  - c. Turnings spot
4. Diamond and ogee-based designs.

## TEXT BOOK(S):

- Gokarneshan N., (2005). *Fabric Structure and Design*, New Delhi: New Age International Publishers. Print.
- Horrocks, A.R. and Anand S.C., (2000). *Handbook of Technical Textiles*, U.K: Wood head Publishing Ltd. Print. Chapters: 6.1 – 6.12.
- Shailaja D. Naik and Jacquie A. Wilson, (2006). *Surface Designing of Textile Fabrics New Delhi: New Age International Publishers*. Print. Chapters: 2.1 – 2.8.

## REFERENCE BOOK(S):

- Ajgonkar D.B., (1998). *Principles of Knitting*, Mumbai: Universal Publishing. Print.
- Allen C. and Cohen I. J., (2010). *Fabric Science*, New York: Fair Child Publications. Print.
- Bernard P.C., (1982). *Textiles Fiber to Fabric*, (6<sup>th</sup> ed.), Singapore: McGraw Hill Book Co. Print.
- Marks R. and Robinson T.C., (1989). *Principles of Weaving*, Manchester: The Textile Institute, Print.
- Spencer D., (1989). *Knitting Technology*, UK: Butterworth Heinemann Ltd. Print.
- Chapman R., (2010). *Applications of Nonwovens in Technical Textiles*, Wood head Publishing, Print.

## FDS3504CM HISTORY OF FASHION (THEORY)

### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- relate the evolution of fashion from different parts of the world
- apply inspiration from past history to create a trend
- identify traditional textiles of India

### COURSE CONTENT:

#### UNIT I: HISTORY OF INDIAN FASHION

16 hrs.

Beginning of costume – terminologies in history of Indian costume – Indus Valley and Harappa Period (3300– 1300BC), Vedic Period (1500– 500BC), Gupta Period (7<sup>th</sup> century AD), Mughal Period – British Rule.

- UNIT II: INDIAN HISTORICAL COSTUMES** 15 hrs.  
 Indian historical costumes in different states – Tamil nadu – Kerala – Andhra pradesh – Punjab – Gujarat – Maharashtra – Rajasthan – Uttar Pradesh – Madhya Pradesh – Jammu and Kashmir.
- UNIT III: TRADITIONAL TEXTILES AND DESIGNS** 16 hrs.  
 Paithani – Himru – Mashru – Patola – Ikat – Chanderi – Maheswari – Banaras – Pochampalli, Kanchipuram – Dhakai cotton – Baluchari – Traditional designs techniques – Madhubani – Kalamkari – Sanganer – Tie and Dye – Batik – Block printing – Traditional embroidery designs.
- UNIT IV: HISTORY OF WORLD FASHION** 15 hrs.  
 Rome – Egypt – Greek – French – English – China – Srilanka – Arab and Peninsula.
- UNIT V: EVOLUTION OF HAUTE COUTURE** 13 hrs.  
 Clothes and fashion – fashion as art – Charles Frederick Worth and the beginning of haute couture – the omnipresence of fashion – changing shapes – fashion and gender.

**TEXT BOOK (S):**

Daniel Delis Hill, (2011). *History of World Costume and Fashion*, United States of America: Prentice hall Pearson Publishers. Print.

Gertrud L, (2000). *A History of Fashion*, Germany: Konemann Publishers. Print.

**REFERENCE BOOK(S):**

Konemann G. L., (2007). *A History of Fashion– in the 20th century*, New York: Fair Child Books. Print.

Manmeet S., (2005). *History of Fashion*, (1<sup>st</sup> ed.), New Delhi: Kalyani Publishers. Print.

Shailaja. D. Naik, (1996). *Traditional Embroideries of India*, New Delhi: APH Publishing Co-operation. Print.

**FDS4502CT WET PROCESSING**

**(LAB CUM THEORY)**

**LEARNING OUTCOME** 3T + 3L Hrs./wk.

On successful completion of the course, the student will be able to

- know the methods of textile processing
- differentiate the preparatory processes
- apply different types of dyes on fabric

**COURSE CONTENT:**

**UNIT I: PREPARATORY PROCESSES** 8 hrs.

Preparatory process – sequences of wet processing – singeing – gas singeing machine – roller singeing machine – advantages and disadvantages.

**UNIT II: DESIZING AND SCOURING** 9 hrs.

Desizing – methods – acid desizing – enzyme desizing – degumming and weighting of silk – process – advantages and disadvantages – scouring – process – advantages and disadvantages.

**UNIT III: BLEACHING AND MERCERIZATION** 9 hrs.

Bleaching – objectives – methods – hydrogen peroxide – hypochlorite bleaching – sodium chlorite – mercerization – objectives – process.

**UNIT IV: DYEING METHODS** 11 hrs.  
Dyeing – methods of dyeing – machineries used for dyeing process – batch – winch – jigger – padding mangle – HT beam jet – package dyeing – garment dyeing.

**UNIT V: TYPES OF DYES** 8 hrs.  
Dyeing of textiles– natural – synthetic fibers – acid dyes – basic dyes – direct dyes – vat dyes – reactive dyes – disperse dyes – sulphur dyes.

**LIST OF PRACTICALS:** 45 hrs.

1. Preparation of samples for Desizing
2. Preparation of samples for Scouring
3. Preparation of samples for Bleaching
4. Preparation of samples for Mercerizing
5. Dyeing of cotton fabric using Direct dye
6. Dyeing of polyester fabric using Disperse dye
7. Dyeing of silk fabric using Acid dye
8. Dyeing of cotton fabric using Natural dye
9. Dyeing of cotton fabric using Reactive dye
10. Dyeing of cotton fabric using Basic dye

**TEXT BOOK(S):**

Barker.F, (2010). *Oranameniation and Textile Design*, Chandigarh: Abhishek Publications. Print.  
Hemalatha.J, (2010). *Techniques of Dyeing and Printing*, New Delhi: Ane Books Pvt Ltd. Print.

**REFERENCE BOOK(S):**

Lewis D.M., (1990), *Wool Dyeing*, England: SDC Publications. Print.  
Peters R. H., (1970), *Textile Chemistry*, (Vol I & II) Manchester: Textile Institute. Print.  
Radolph S. J. and Anna L., (2002). *Textiles*, (9<sup>th</sup> ed.), New Jersey: Langford Prentice Hall. Print.  
Robinson S. and Robinson P., (1982). *Beginners Guide to Fabric Dyeing and Printing*. London: Technical books. Print.  
Shenai V. A., (1981). *Technology of Textile Processing*, Mumbai: Sevale Publications. Print.  
Smith J.L., (2003). *Textile Processing*, Chandigarh: Abhishek Publications. Print.

## **FDS4501CM FASHION RETAILING AND MARKETING**

**(THEORY)**

**LEARNING OUTCOME** 5 hrs./wk.

On successful completion of the course, the student will be able to

- identify the buying procedures at the market
- know about the different kinds of retail operations
- develop knowledge about research methods and forecasting

**COURSE CONTENT:**

**UNIT I: INTRODUCTION TO MARKETING** 13 hrs.

Definition to marketing – classification of market – features of market – uniqueness of fashion marketing – market week – world' fashion markets.

**UNIT II: MARKETING STRATEGY** 15 hrs.  
Marketing mix – product – price – place – promotion (4p's theory) – entry strategy – vrio – value response imitations and organization – Ansoff's marketing strategy.

**UNIT III: RETAILING INDUSTRY** 15 hrs.  
Introduction – types of retailing – online fashion retailing – models in e-retailing – offline fashion retailing – franchise retailing – value directed retailing – service oriented retailing – cataloging – benefits of catalog.

**UNIT IV: CHANGING DIMENSIONS OF FASHION RETAILING** 16 hrs.  
Growth of private labels – retailers into manufacturing – concentration of retail power – logistics and distribution – supply chain and logistics – globalization of retailing – relationship marketing– opportunities in Indian e-tailing – multi- products and niche products – the buying selling cycle.

**Unit V: RESEARCH AND FASHION FORECASTING** 16 hrs.  
Marketing plan – outlining the scope – identifying the sources of information – researching the industry – understanding the market – identifying the targeted customers – fashion research – fashion forecasting – fiber – trend – colour – customer research process – types of research – selection and types of data – selection and types of sample.

**TEXT BOOK(S):**

Chandra bose D., (2006). *Modern Marketing*, Delhi: PHI Learning Pvt Ltd. Print.

Gini S.F., (1999). *Fashion from concept to consumer*, United States of America: Prentice hall Publications. Print.

Kitty G. D., (2003). *Inside the Fashion Business*, New Jersey: Pearson Education. Print

**REFERENCE BOOK(S):**

Philip K., (1999). *Principles of marketing*, New Jersey, Pearson Education. Print.

Ticker, (2013). *India Business of Fashion Report*, (Vol1), Images Yearbook. Print.

Dickerson Kitty G., (2003). *Inside the Fashion Business*, (7<sup>th</sup> ed.), New Delhi: Pearson education. Print.

Frings Gini Stephens, (2003). *Fashion from Concept to Consumers*, (7<sup>th</sup> ed.), New Delhi: Pearson Education. Print.

Underhill and Paco, (2008). *Why We Buy Science of Shopping*, New York: Simon & Schuster. Print

**FDS4401CT FASHION PHOTOGRAPHY AND STYLING**  
**(LAB CUM THEORY)**

**LEARNING OUTCOME** 3T + 2L hrs./wk.

On successful completion of the course, the student will be able to

- define the basics of photography
- express the feel of the product
- combine style with design

**COURSE CONTENT:**

**UNIT I: INTRODUCTION TO PHOTOGRAPHY AND CAMERA** 10 hrs.

Principles of photography – camera handling – types of camera – basics of digital photography – shutter speed – aperture – ISO – components and accessories involved in photography.

**UNIT II: LIGHTING IN PHOTOGRAPHY** 10T +9L hrs.

Nature of light – the human vision – light source – understanding the camera and lighting techniques – types of colour – outdoor – indoor light – over and under exposure.

**UNIT III: UNDERSTANDING THE MODELLING** 10T + 6L hrs.

Introduction to fashion modelling – ethics of modelling – body language and attitude – types of modeling walk – cat walk and ramp walk technique – grooming etiquette.

**UNIT IV: INTRODUCTION TO FASHION STYLING** 10 hrs.

Definition – fashion styling – design collection and presentation on various style of fashion makeup tools – skin tone – color combinations – accessories coordination – classic – retro – rustic.

**UNIT V: TYPES OF STYLING AND FACE MAKEOVER** 10T + 10L hrs.

Hairdo – highlighted messy bun side swept bangs – french twist – french braid – bridal – fishtail – mermaid – eye makeup – natural – smokey – retro.

**LAB:**

- I. Photographs with various lightings
- II. Photographs with various backgrounds
- III. Close-Up and Long shots with different Hairdo
- IV. Modelling snaps with different types of makeup – Classic – Retro – Nude and Vibrant
- V. Highlighting the styling of designer costume
- VI. Product photography
- VII. Ghost – Mannequin photography

**TEXT BOOK(S):**

John Cantine, Susan Howard and Brady Lewis, (2000). *Shot by Shot*, (3<sup>rd</sup> ed.), Pittsburgh Film makers. Print.

**REFERENCE BOOK(S):**

Frost Lee, (2004). *Teach Yourself Photography*, (3<sup>rd</sup> ed.), New York: McGraw–Hill Education. Print.  
Peterson Bryan, (2006). *Learning to See Creativity: Design, Color & Composition in Photography*. USA: Amphoto books. Print.

**FDS5503CM FASHION MERCHANDISING**

**(THEORY)**

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify the merchandising procedures in the industry
- interpret how a store's fashion products are sourced
- recognize the costing methodology in merchandizing

**COURSE CONTENT:**

**UNIT I: INTRODUCTION TO MERCHANDISING** 15 hrs.

Definition – scope of merchandising – merchandising terminology – types of merchandising – functions of merchandising – responsibilities of the merchandiser – skill sets of the merchandiser.

**UNIT II: MERCHANDISING PLAN** 15 hrs.

Managing merchandise – fashion seasons – six-month planning – merchandising calendar – category and assortment planning – sales forecasts.

**UNIT III: MERCHANDISE COORDINATION** 15 hrs.

Design and merchandising coordination – design process and creative process – line development – principles and technologies – measurement charts and size grading – garment analysis – fit analysis.

**UNIT IV: SOURCING, COSTING AND PRICING** 15 hrs.

Costing – elements of costing – importance of costing – pricing strategies – pricing formula – mark up and mark down – negotiations and order procurement – sourcing strategies – sourcing options – sourcing process – international sourcing and domestic sourcing – vendor identification.

**UNIT V: PRODUCTION AND QUALITY CONTROL** 15 hrs.

Production system – types of production systems – production planning and control – skill inventory – line balancing and goal setting.

**TEXT BOOK(S):**

Frings G. S., (1999). *Fashion from Concept to Consumers*, (7<sup>th</sup> ed.), New Jersey: Pearson Education. Print.

**REFERENCE BOOK(S):**

Dickerson, K. G., (2003). *Inside the Fashion Business*, (7<sup>th</sup> ed.), South Asia: Dorling Kindersley Pvt. Ltd. Print.

Rajkishore Nayak and Rajiv Padhye, (2015). *Garment Manufacturing Technology*, Wood head Publishing. Print.

Foreign Trade Policy, (2014). *Procedure & Handbook*, (Vol I&II), Nabhi Publications. Print.

*India Business of Fashion Report*, (2013). (Vol I), Images Yearbook. Print.

**FDS5301CM TEXTILE PRINTING**

**(THEORY)**

**LEARNING OUTCOME**

3 hrs./wk.

On successful completion of the course, the student will be able to

- recognize the importance of printing
- identify the different methods of printing
- apply the techniques used for printing

**COURSE CONTENT:**

**UNIT I: INTRODUCTION OF PRINTING** 8 hrs.

Printing– Introduction of printing – differences between printing and dyeing – preparation of fabric for printing – cotton – linen – polyester – wool – silk – methods and styles of printing – preparation of printing paste – selection of thickening agents.

**UNIT II: DIRECT PRINTING**

10 hrs.

Introduction – block printing – brief history – preparation of design – blocks, table, print paste and printing process – stencil printing – brief history – preparation of fabric – stencils – material used for preparing stencil – process involved and techniques used – roller printing – process and techniques.

**UNIT III: SCREEN PRINTING**

9 hrs.

Introduction – brief history – flat screen and rotary screen printing – preparation of screen – print paste – screen printing process – discharge printing – chemicals used – process involved.

**UNIT IV: RESIST PRINTING**

9 hrs.

Introduction – brief history – batik printing – equipment's required – process sequence and technique used – tie and dye – brief history – equipment's required – process sequence – and techniques used.

**UNIT V: RECENT PRINTING METHOD**

9 hrs.

Ink jet printing – techniques and its application – heat transfer printing – techniques and its application – photo printing – fixation and after treatment – techniques and its application.

**TEXT BOOK(S):**

Hemalatha. J., (2010). *Techniques of Dyeing and Printing*, New Delhi: Ane Books Pvt Ltd. Print.

**REFERENCE BOOK(S):**

Sara J Radolph and Anna L Langford, (2002). *Textiles*, (9<sup>th</sup> ed.), New Jersey: Prentice hall. Print.

Smith J. L., (2003). *Textile Processing*, Chandigarh: Abhishek Publications. Print.

Peter R. H., (1970). *Textile Chemistry*, (Vol I & II), Manchester: Textile Institute. Print.

**FDS5502CM TECHNICAL TEXTILES****(THEORY)****LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will able to

- classify technical textiles
- differentiate fibre, yarns and fabric types used in technical textiles
- evaluate the role of textile material in textiles products

**COURSE CONTENT:****UNIT I: INTRODUCTION TO TECHNICAL TEXTILES**

14 hrs.

Technical textiles – definition and scope of technical textiles – global scenario – applications of technical textiles – fibres and fabrics used.

**UNIT II: FIBRES USED IN TECHNICAL TEXTILES**

16 hrs.

Technical fibers – conventional fibers – high strength and high modulus organic fibers – high chemical and combustion – resistant organic fibers – high performance inorganic fibers – ultra fine and novelty fibers.

**UNIT III: FINISHING FOR TECHNICAL TEXTILES**

16 hrs.

Mechanical finishes – calendaring – raising – cropping – shearing – compressive shrinkage – heat setting – chemical process – durable flame retardant treatments – water repellent – anti static

finishes – anti microbial and antifungal finishes – coatings – chemicals used and method of application.

**UNIT IV: SURVIVAL TEXTILES**

15 hrs.

Introduction of survival textiles – short term survival – ballistic protection – protection from fire – long term survival – extreme weather condition – heat and flame protection – thermal behavior of fibres – fibres suitable for protective textiles – waterproof breathable fabrics – densely woven fabrics – membranes and coatings.

**UNIT V: SMART AND INTELLIGENT TEXTILES**

14 hrs.

Classification of smart textiles – active smart – passive smart – ultra-smart textiles – intelligent textiles – phase change material (PCM) – shape memory polymer (SMP) – chromic and conductive materials.

**TEXT BOOK(S):**

Horrocks, A.R. and Anand S.C., (2000). *Handbook of Technical Textiles*, U.K: Wood head Publishing Ltd. Print.

**REFERENCE BOOK(S):**

Adanur and S.Wellington, (1995). *Sears Handbook of Industrial Textiles*, Pennsylvania: Technomic Publishing Co. Inc. Print.

Richard Horrocks, Subhash C. and Anand,(2016). *Handbook of Technical Textiles Applications*, Wood head Publishing Ltd. Print.

**FDS6503CM ORGANISATION OF GARMENT UNIT**

**(THEORY)**

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify the requirements of a garment unit
- evaluate the costing strategy
- to be a successful entrepreneur

**COURSE CONTENT:**

**UNIT I: ENTREPRENEURSHIP**

15 hrs.

Entrepreneurship – meaning – definition and types – need for entrepreneurs – qualities and types of entrepreneurship difference between entrepreneur and manager – management – definition – management as a process – planning – organizing – directing controlling – co- ordination.

**UNIT II: GARMENT UNIT**

15 hrs.

Organizational structure of a garment unit – design department – finance department – purchasing department – production department – organizing different section – hierarchy – personnel involved in all the departments – nature of the job.

**UNIT III: FACTORY DESIGN**

15 hrs.

Factory design and layout – important of factory design – factors affecting factory design – types of building – (single and multi-storey) – advantages and limitations – factory layout – process – product and combined layout – design requirement – requirements relating to health – safety and welfare.

**UNIT IV: COSTING**

15 hrs.

Principles of costing – requirements of good costing system – cost estimation of yarn and woven fabric – cost estimation of cutting – stitching – checking – packing – forwarding – shipping – insurance.

**UNIT V: SETTING UP A UNIT**

15 hrs.

Performance of Indian garment export – SWOT analysis – setting up of garment unit for export market – export document – export finance – payment method – export shipping – cost estimation of cutting – stitching – checking packing – forwarding – shipping and insurance – Institutions supporting entrepreneurs – DIC – NSIC – SISI – SIPCOT – TII – VIC – CODISSIA – commercial banks – SBI.

**TEXT BOOK(S):**

Gupta C.B. Srinivasan N.P and Sultan (1997). *Entrepreneurship Development in India*, Delhi: Chand & sons, Print.

**REFERENCE BOOK(S):**

Dinakar Pagare and Sultan, (2015). *Principles of management*, Delhi: Chand & Sons. Print.

Chester A.J., (1998). *Introduction to clothing production management*, (2<sup>nd</sup> ed.), Wrenbury Associates Ltd. Print.

Harold Carr and Barbara Latham (1994). *The technology of clothing manufacture*, Blackwell Science. Print.

Krishnakumar M., *Apparel Costing*, A functional Approach Abishek Publications. Chandigragh, Print.

**FDS6303CP COMPUTER AIDED DESIGNING – II**

(LAB)

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- interpret the techniques of designing using software
- create various patterns and layouts
- develop new designs for portfolio preparation

**COURSE CONTENT:****LIST OF EXPERIMENTS:**

- |   |         |
|---|---------|
| 1. Illustration of Stick Figure – four poses  | 4 hrs.  |
| 2. Illustration of Flesh Figure – four poses  | 4 hrs.  |
| 3. Motif Creation – Dobby, Jacquard.  | 10 hrs. |
| 4. Textile Designing – Dobby Saree Designs setting,<br>Jacquard Saree Designs setting | 10 hrs. |
| 5. Designing school Uniforms – Girls, Boys  | 5 hrs.  |
| 6. Designing different seasonal wear – Summer, Winter, Autumn                         | 5 hrs.  |
| 7. Designing Men's and Women's Sportswear.  | 5 hrs.  |
| 8. Flat Sketches: Party wear  | 14 hrs. |
| a. Children's Garments  |         |
| b. Women's Garments   |         |

- c. Men's Garments
9. Preparing pattern for the following 12 hrs.
- a. Shirts
  - b. T- Shirts
  - c. Trousers
  - d. Pajama

10. Layout for Shirt and Trousers 6 hrs.

## FDS6504CM APPAREL QUALITY CONTROL

(THEORY)

LEARNING OUTCOME 5 hrs./wk.

On successful completion of the course, the student will be able to

- recognize the importance of quality of the fabric
- identify the quality standard fsof fabrics
- relate inspection method with quality standards

COURSE CONTENT:

**UNIT I: QUALITY AND QUALITY CONTROL** 15 hrs.

Quality – definition – objectives–importance of quality – quality terminologies – no Inspection–100% inspection – spot checking – arbitrary sampling – statistical sampling – specifications sheet – quality control– definition – importance – advantage.

**UNIT II: QUALITY STANDARDS AND ASSURANCE** 15 hrs.

Standards – introduction – benefits of standards – levels of standards – sources of standards – ASTM – AATCC – ANSI – BSI – ISO – OEKO – quality assurance – definition – importance – types – advantages.

**UNIT III: INSPECTION** 15 hrs.

Inspection– raw material inspection – fabric inspection – 4 point system – 10 point system – sewing thread – zippers – buttons – buckles and snap fasteners – interlining – in process inspection– spreading – cutting – sewing – control of fusing operation – control of screen printing operation – control of embroidery operation – pressing – final inspection.

**UNIT IV: MANAGING QUALITY** 15 hrs.

Managing quality through inspection – managing quality through testing – seven tools of quality – cause and effect diagram – check sheet – control chart – flow chart – histogram – pareto chart – scatter diagram.

**UNIT V: FABRIC AND SEWING DEFECTS** 15 hrs.

Fabric defects – definition – self descriptive defects – types of defects – baggy – bar – balk – bowed filling – chafe – fly – hitch – back – jerked in filling – pick out mark – shaded – smash – temple marks – tentering marks – sewing defects – skipped stitch – thread drawn off – seam puckering – wrong stitch density – uneven stitch – staggered stitch – defected stitch – oil spot or stain.

TEXT BOOK(S):

Pradeep V Mehta and Satish K. Bhardwaj, (1998). *Managing Quality in Apparel Industries*, New Age International publishers. Print.

## REFERENCE BOOK(S):

J.E. Booth and Butterworths, (1986). *Principles of Textile Testing*, (3<sup>rd</sup> ed.), Butterworths Publishers. Print.

Elliot B. Grover and Hamby D.S., (1988). *Hand book of textile Testing & Quality Control*, New york: Textile Book Publishers. Print.

Saville B.P., (1999). *Physical testing of Textiles*, Wood head Publishing. Print.

(For the following course, content remains the same but the contact hours have been changed and the content is presented in this Academic Council booklet)

## FDS1402AT FUNDAMENTALS OF CLOTHING CONSTRUCTION

(LAB CUM THEORY)

### LEARNING OUT COME

2T+3L hrs./wk.

On successful completion of the course, the student will able to

- differentiate the types of sewing machine
- construct various parts of garment
- design parts of garment

### COURSE OUTLINE:

#### UNIT I: INTRODUCTION TO SEWING MACHINE

6T + 9L hrs.

Introduction to sewing machine – classification – single thread and multi thread – parts and functions – single needle machine – essential tools – cutting tools, measuring tools, marking tools, general tools, pressing tools – stitch formation – different types.

#### UNIT II: SEAMS AND SEAM FINISHES

6T + 9L hrs.

Seams and seam finishes – types – working of seams and seam finishes – hems – types – stitches used – fullness – definition – types – darts, tucks, pleats, flares and godets, gathers and shirrs, frills or ruffles, flounces.

#### UNIT III: PLACKETS AND FASTENERS

6T + 9L hrs.

Plackets – definition – characteristics of a good placket – types – inconspicuous placket and conspicuous plackets – fasteners – conspicuous (button and button – holes, button loops, button with holes, shank buttons, eyelets and cords) – inconspicuous (press buttons, hooks and eyes, zips).

#### UNIT IV: SLEEVES AND YOKES

6T + 9L hrs.

Sleeves – definition – types – set-in – sleeves – plain sleeves, puff sleeve, bishop sleeve, bell sleeve – modified armhole – cap sleeve and magyar sleeve – sleeve and bodice combined – Raglan, kimono and dolman – yokes – types – method of construction – simple yoke, yoke with fullness within the yoke, yoke supporting / relating fullness.

#### UNIT V: COLLARS AND POCKETS

6T + 9L hrs.

Neck line facing and binding – collars – definitions – types – peter pan, scalloped, square, full shirt collar, open collar, chinese, shawl collar – pockets – types – patch pocket, bound pocket, pocket in a seam, front hip pocket.

## EXPERIMENTS / LAB:

### List of practical:

#### Preparation of sample for:

1. Seam and seam finishes.
2. Hems
3. Fullness
4. Plackets and fasteners
5. Set in sleeves and sleeves with modified arm.
6. Yoke with or without fullness.
7. Flat collars and rolled collars
8. Patch pocket, seam pocket, bound pocket
9. Facing and Binding

### TEXT BOOK(S)

Mary Mathews, (1986). *Practical Clothing Construction* part I and part-II, Chennai: Cosmic Press.Print.

### REFERENCE BOOK(S)

Zarapker K. R,(2008). *Zarapker system of cutting*, Ahmadabad: Navneet publications Ltd. Print.

## FDS2301CM PATTERN DRAFTING AND CONSTRUCTION – KIDS WEAR

### (THEORY)

#### LEARNING OUTCOME

3 hrs./wk.

On successful completion of the course, the student will able to

- illustrate any garment with bodice variation
- apply different laying and cutting techniques
- design pattern for kids wear

#### COURSE CONTENT:

##### UNIT I: MEASUREMENTS

9 hrs.

Body measurement – importance, measurement preparation for children, women and men – standardizing body measurements – importance, techniques used – relative length and girth measures in ladies / gentlemen – preparation of fabric for cutting – importance of grain in cutting and construction – bias in cutting and construction – steps in preparing the fabric for cutting.

##### UNIT II: PATTERN MAKING AND GRADING

9 hrs.

Definition of various garment parts – methods of making pattern – drafting method – draping method – flat pattern – pattern layout – definition – purpose – rules in layout – types of layouts – stripes check, prints, and fabric with bold design, asymmetric designs and one - way designs – grading – definition – techniques – importance.

##### UNIT III: GARMENTS FOR INFANT (0–1 year)

9 hrs.

Drafting and pattern making – Bib with variation in outline shape – Panty with plain or plastic lined – Knickers with elastic waist – side pockets

UNIT IV: KIDS WEAR (1–6 years) 9 hrs.

Drafting and pattern making – Zabla – without sleeve, front open – Magyar sleeve, back opens – Baba suit – Knicker with chest piece attached – Romper – Petticoat – ‘A’ line petticoat – Pleated or gathered skirt

UNIT -V: GARMENTS FOR SCHOOL CHILDREN (6–12 years) 9 hrs.

Drafting and pattern making – Frock – Yoke at chest line, with open, with open, with sleeve, gathered skirt / circular skirt at waist line – Princess line frock – School uniform for boys – Shorts and Shirts

TEXT BOOK(S):

Mary Mathews, (1986). *Practical Clothing Construction* part I and part-II, Chennai: Cosmic Press. Print.

Zarapker K. R, (2008). *Zarapker system of cutting*, Ahmadabad: Navneet publications Ltd. Print.

REFERENCE BOOK(S):

Amstrong, (2007). *Draping for Apparel Design*, United states: Pearson Education Publications. Print.

Gerry Cooklin, (1990). *Pattern Grading for Women's clothing*, London: Blackwell Science Ltd. Print.

Helan Joeph and Amstrong, (2008). *Pattern Making for Fashion Designers*, (4<sup>th</sup> ed.) United states: Pearson Education Publications, Print.

Price Zamkoff, (2004). *Grading techniques for Fashion Designers*, New York: Fairchild Publications, Print.

## FDS2301CP KIDS WEAR

(LAB)

LEARNING OUTCOME 5 hrs./wk.

On successful completion of the course, the student will able to

- design kids garments
- construct infant and kids wear
- acquire practical experience in garment making for children

COURSE CONTENT:

EXPERIMENTS / LAB: 75 hrs.

LIST OF PRACTICALS:

1. Bib – Variation in outline shape
2. Panty – plain or plastic lined panty
3. Knicker – elastic waist, side pockets
4. Zabla – without sleeve, front open (or) Magyar sleeve, back opens
5. Baba suit – knickers with chest piece attached (or) Romper
6. Petticoat – A line petticoat (or) petticoat with pleated or gathered waist
7. Frock – yoke at chest line, with open, with sleeve, gathered skirt / circular skirt at waist line (or) Princess Line frock
8. School uniform for girls – A line or pleated waist with blouse
9. School uniform for boys – Shorts and a – Shirt

## REFERENCE BOOK(S):

- Chris Jefferys, 1986, *The complete Books of Sewing*, London, Dorling Kindersley Limited, print.
- Mary Mathews, 1986 *Practical Clothing Construction–Part I and II*, Chennai, Cosmic Press, print.
- Sewing and Knitting, 1993 *A Readers Digest, step-by guide*, Australia, Readers Digest Pvt. Ltd, print.
- Zarapker. K. R, 2008 *Zarapker system of cutting*, Ahmadabad, Navneet publications Ltd, print.

## FDS5402CT DRAPING TECHNIQUES IN FASHION

### (LAB CUM THEORY)

#### LEARNING OUTCOME

3T + 2L hrs./wk.

On successful completion of the course, the student will be able to

- know about the advanced draping techniques
- estimate the truing method
- apply the advanced techniques in draping

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION TO DRAPING

8T + 5L hrs.

Introduction to draping – tools and equipment – preparation of muslin for draping – Draping of basic bodice front – back – sleeve – basic skirt – Draping stages – draping – making – trueing.

##### Lab experiments:

Draping of basic bodice back and front.

Draping of basic sleeve.

Draping of Basic skirt.

##### UNIT II: DRAPING OF BLOCKS

9T + 6L hrs.

Draping of bodice blocks variation – bustier – asymmetric bodice – off shoulder design – halter– Waist line variation – empire – lowered – pointed and princess bodice – Draping of skirts – one-piece basic skirt – gored skirt – flared skirt – plated skirt.

##### LAB EXPERIMENTS:

Draping of bodice blocks variation – bustier – Asymmetric bodice – off shoulder design – halter– Waist line variation – empire – lowered – pointed and princess bodice – Draping of skirts– one-piece basic skirt – gored skirt – flared skirt – pleated skirt.

##### UNIT III: DRAPING OF BASIC COMPONENTS

9T + 6L hrs.

Draping of yokes – midriff yoke – shirt yoke – hip yoke – Draping of dolman sleeve – raglan sleeve – kimono sleeve – Collar – convertible – peter pan – stand collar.

##### LAB EXPERIMENTS:

Draping of yoke variation

Draping of dolman sleeve – Raglan sleeve, Kimono sleeve.

Draping of collar – Convertible, Peter pan and Stand collar.

##### UNIT IV: DRAPING OF APPLICATIONS

9T + 6L hrs.

Draping of flounces – ruffles – peplums – halter twist butterfly – two piece neck yoke – Cowl variation – neck cowl – underarm cowl.

**UNIT V: DRAPED GARMENT**

10T +7L hrs.

Draping method of Tops – leggings – Party wear for men and women.

**LAB EXPERIMENTS:**

Draping of Tops and Leggings

Draping of Party wear for men and women

**TEXT BOOK(S):**

Kiisel and Karolyn, (2013). Draping: The Complete Course. U.S.A.: Laurence King Publishing. Print.

**REFERENCE BOOK(S):**

Crawford and Connie Amaden, (2005). The Art of Fashion Draping, (3<sup>rd</sup> ed.) U.S.A: Laurence King Publishing. Print.

Emeritus and Hilde Jaffe, (2011). Draping for Fashion Design, (5<sup>th</sup> ed.) U.S.A: Prentice Hall. Print.

(For the following course, content remains the same but the course has been shifted to a different semester and the content is presented in this Academic Council booklet)

**FDS3201CP SURFACE EMBELLISHMENT**

(LAB)

**LEARNING OUTCOME**

3 hrs./wk.

On successful completion of the course, the student will be able to

- know about the basic embroidery stitches
- practice the Indian traditional embroidery works
- apply the advanced techniques in traditional embroidery patterns

**COURSE CONTENT:**

**LIST OF EXPERIMENTS:**

15 hrs.

- I. Basic embroidery stitches:
  1. Running and its variation
  2. Back stitch
  3. Stem stitch
  4. Chain stitch and its variations
  5. Lazy daisy stitch
  6. Button hole and its variations
  7. Herring bone and its variations
  8. Knots and its variations
  9. Straight stitch
  10. Feather stitch
  11. Machine embroidery
  12. Computerized embroidery
- II. Surface ornamentation techniques:
  1. Couching
  2. Applique work

10 hrs.

3. Cut work
  4. Patch work
  5. Beads/ sequins/ ribbon works/ Aari/ Zardhosi
  6. Smocking
- III. Traditional embroidery: 20 hrs.
1. Kantha of Bengal
  2. Kashida of Bihar and Kashmir
  3. Embroidery of Gujarath
  4. Phulkhari of Punjab
  5. Embroidery of Rajasthan
  6. Chikankari of Uttarpradesh
  7. Kasuthi of Karnataka
- IV. Application of the surface Embellishment in the following:
1. Home furnishing
  2. Accessories
  3. Garment

**TEXT BOOK(S):**

Shailaja, D. Naik, (1996). Traditional Embroideries of India. New Delhi: South Asia Books. Print.

**REFERENCE BOOK(S):**

Haxell, Kate, (2012). The Stitch Bible: A Comprehensive Guide to 225 Embroidery Stitches and Techniques. U.K: David & Charles. Print.

Kooler, (2000). Donna Encyclopedia of Needlework, U.S.A: Leisure Art Inc. Print.

**FDS6301EC HOME FURNISHING**  
(Theory)

**LEARNING OUTCOME**

**3 hrs./wk.**

On successful completion of the course, the student will be able to

- identify fabric for home furnishing
- understand the functions of draperies
- care and maintenance of home furnishing

**COURSE OUTLINE:**

**UNIT I: INTRODUCTION TO HOME FURNISHING**

**7 hrs.**

Introduction to home furnishing – different types of furnishing material – selection of furnishing material.

**UNIT II: DRAPERIES AND CURTAINS**

**10 hrs.**

Doors and windows – different types and functions– styles in draperies, curtains and valances – care and maintenance.

**UNIT III: FLOOR COVERINGS**

**10 hrs.**

Floor coverings– carpets and rugs – hard floor covering, soft floor coverings – care and maintenance.

**UNIT IV: LINENS** **10 hrs.**  
Bed linen – pillow – pillow covers – bed covers – Kitchen linen – apron – table linen – hand towel – bathroom linen.

**UNIT V: MARKET VIEWS** **8 hrs.**  
Overview of home furnishing industries – market view – Recent trends – sourcing of materials.

**TEXT BOOK(S):**

Baker W, (2000). Curtain and Fabric Sector, London: Collins and Brown Publications Pvt. Ltd. Print.

**REFERENCE BOOK(S):**

Murphy.R J, (1997). House Beautiful – A Seasonal Guide to Decorating with Fabric, New York: Quadrille Publishing Ltd. Print.

Octopus H, (2001). Cushions and Pillows–professional skills made easy, new York, Octopus Publishing Group. Print.

(For the following course, content remains the same but the course code has been changed due to a change in credit and the content is presented in this Academic Council booklet)

## **FDS2201FS FASHION COMMUNICATION**

**(THEORY)**

**LEARNING OUTCOME** **2 hrs./wk.**

On successful completion of the course, the student will be able to

- review the role of digital, broadcast and print media in the creation, communication and consumption of fashion products and brands
- interpret text and speeches on fashion promotions
- discuss how a fashion publication works

**COURSE CONTENT:**

**UNIT I: ADVANCED WRITTEN COMMUNICATION:** **10 hrs.**  
Precision writing, Creative Writing, Social Media Publishing, Social Media Review & research

**UNIT II: STRATEGIC FASHION COMMUNICATION:** **10 hrs.**  
Fashion publication review, Speech preparation, Public Speaking, Promotional Material Study, Promotional Campaigns, Types of Fashion advertising, IN STORE Visual Merchandising, Negotiation Skills, Branding & Endorsements.

**UNIT III: MAGAZINE PRODUCTION, PORTFOLIO CREATION AND PROMOTION:** **10 hrs.**  
Working of a fashion publication, media promotion & presentation, Portfolio development, Fashion shows & runways.

**MAGAZINE(S):**

VOGUE, FEMINA, WOMEN'S ERA, COSMOPOLITAN, INSTYLE, ELLE, SAVVY, BAZAAR.

## DIPLOMA IN APPAREL DESIGNING

### PREAMBLE:

This course enables the students to appreciate the concepts of design. It creates new avenues in higher studies as well as in future career options.

**Eligibility:** Female candidates have completed standard XII

**Duration of the course:** Two semesters

### COURSE PROFILE

From 2019 batch onwards

Sem.	Course code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	DAD1201	LIFE SKILLS I	TH	2		2			SUFDS
	DAD1202	ENGLISH FOR COMMUNICATION I	TH	2		2			SUFDS
	DAD1203	ACCESSORIES MAKING I	LA		4	2			SUFDS
	DAD1101	BASIC COMPUTER SKILLS I	LA		2	1			SUFDS
	DAD1401	FASHION DESIGNING	LT	2	4	4			SUFDS
	DAD1402	FASHION SURFACE ORNAMENTATION	LT	2	4	4			SUFDS
	DAD1403	BASIC IN SEWING PROCESS	LT	2	4	4			SUFDS
		LIBRARY			2				
		Total			30		19		
II	DAD2201	LIFE SKILLS II	TH	2		2			SUFDS
	DAD2202	ENGLISH FOR COMMUNICATION SKILLS II	TH	2		2			SUFDS
	DAD2101	BASIC COMPUTER SKILLS II	LA		2	1			SUFDS
	DAD2203	ACCESSORIES MAKING II	LA		4	2			SUFDS
	DAD2401	GARMENT CONSTRUCTION	LT	2	4	4			SUFDS
	DAD2602	FABRIC KNOWLEDGE FOR DESIGNERS	TH	6		6			SUFDS
	DAD2501	PORTFOLIO PRESENTATION	LA		6	5			SUFDS
	DAD2601	INTERNSHIP				6			SUFDS
		LIBRARY			2				
		Total			30		28		

## EVALUATION PATTERN

Sem.	Course Code	Course title	Hours	Place	Period
II	DAD2601	INTERNSHIP	180	Company Validated by the Department	May 1 <sup>st</sup> Week to May 4 <sup>th</sup> Week

### DAD1201 LIFE SKILLS I

(THEORY)

#### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course the student will be able to

- recognize the need for a positive attitude towards life
- learn and apply different techniques to solve the problems
- acquire skills on critical and creative thinking

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION

10 hrs.

Definition – who's life skills – types – social – thinking – emotional skills – positive thinking – meaning – positive attitude – positive reinforcement – self-esteem – introduction to self-concept – factors – importance – steps

##### UNIT II: PROBLEM SOLVING AND DECISION MAKING

10 hrs.

Problem solving – meaning – principles – tips  
Decision making – meaning – process – C's of decision making

##### UNIT III: CRITICAL AND CREATIVE THINKING

10 hrs.

Definition – essential skills for critical and creative thinking skills – logical reasoning – predicting and transforming knowledge

#### REFERENCE BOOK(S):

- Alponse Xavier S.J., (2004). *We Shall Overcome, A Text Book on Life Coping Skills*, Chennai: MCRDCE Publications. Print.
- Shiv Khera, (1998). *You Can Win*, New Delhi: Published by Macmillan India Ltd. Print.

### DAD1202 ENGLISH FOR COMMUNICATION SKILLS I

(THEORY)

#### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course the student will be able to

- express and interpret in english
- acquire fundamental knowledge of grammatical structures and functions
- develop fluency in English

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION AND GRAMMAR

10 hrs.

Importance of english – amazing facts of english – synonyms – antonyms – parts of speech – sentence and its types & framing of sentences

**UNIT II: LISTENING SKILLS**

10 hrs.

Difference between listening and hearing – Active listening & barriers to listening – note-taking – listening to conversations & announcements – listening to news programmes – learning spelling & pronunciation

**UNIT III: SPEAKING SKILLS**

10 hrs.

Interactive nature of communication – importance of context – pronunciation – formal interaction and informal interaction – conversational manners – dialogue practice

**REFERENCE BOOK(S):**

Joseph, K.V., (2006). *A Text Book of English Grammar*, Chennai: Vijay Nicole Imprints Private Limited. Print.

Lester, Mark and Larry Beason, (2005). *The McGraw-Hill Handbook of English Grammar and Usage*, New York: McGraw-Hill. Print.

Susan Boyer, (2003). *Understanding Spoken English a Focus on Everyday Language in Context*, Boyer Educational Resources. Print.

Murphy Raymond, (1998). *Essential English Grammar*, Chennai: Cambridge University Press. Print.

Pillai G. Radhakrishnan, Rajendran K., (1987). *Spoken English for You, Level*, Emerald Publisher. Print.

Xavier A.G, (1988). *Practical English Grammar*, Mumbai: St. Paul's Press. Print.

**DAD1203 ACCESSORIES MAKING I**

(LAB)

**LEARNING OUTCOME**

4 hrs./wk.

On successful completion of the course, the student will be able to

- design accessories for garment
- prepare jewelries with different material
- create an artificial bridal set

**LIST OF EXPERIMENTS:****1. CLAY JEWELLERY**

20 hrs.

- a) Short chain
- b) Bangles
- c) Ear rings
- d) Bracelets
- e) Hair clips
- f) Key chains

**2. ARTIFICIAL JEWELLERY**

20 hrs.

- a) Necklace
- b) Long chain
- c) Bangles
- d) Hip chains
- e) Anklets
- f) Pearl chain

### 3. SILK THREAD JEWELLERY

20 hrs.

- a) Bangles
- b) Chain
- c) Ear ring

## DAD1101 BASIC COMPUTER SKILLS I

(LAB)

### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course, the student will be able to

- employ office based applications
- demonstrate the skills in making an effective presentation with audio and video effects
- analyze data to create presentation

### COURSE CONTENT:

#### UNIT I: WORD PROCESSOR

12 hrs.

Tool bars – standard tool bar – drawing tools – formatting text and documents – alignment tools – adding bullets & numbers – header and foot notes – adding tabs – inserting files and hyperlinks – adding clip arts – document protection – autocorrect options – table – insertion – sorting – splitting & merging cells – text direction & alignment in tables

#### UNIT II: SPREADSHEET

12 hrs.

Introduction – spread sheet basic – customizing excel – working with workbooks – inserting cells – rows & columns – formatting sheets – adding sheets – inserting graphs – charts & pictures – working with functions – conditional formatting – goal seek – data analysis and formula auditing

#### UNIT III: PRESENTATION

6 hrs.

Creating presentations – inserting slides – creating organization charts – designing slides – applying animation schemes – rehearse timings – presenting the slides

### REFERENCE BOOK(S):

*Getting Started with Libreoffice*, (2016). Import by Libreoffice Documentation Team. Print.

### WEBSITE(S):

<https://computers.tutsplus.com/tutorials/getting-started-with-libreoffice-writer--cms-21700>

[http://www.ahuka.com/?page\\_id=270](http://www.ahuka.com/?page_id=270)

<https://ptgmedia.pearsoncmg.com/images/9780735699236/samplepages/9780735699236.pdf>

<https://abiid.files.wordpress.com/2011/01/microsoft-office-professional-2010-step-by-step.pdf>

## DAD1401 FASHION DESIGNING

(LAB CUM THEORY)

### LEARNING OUTCOME

2T + 4L hrs./wk.

On successful completion of the course, the student will be able to

- acquire knowledge on the importance of color in the fashion world
- apply principles of design in a garment
- recognize the purpose of marketing strategies and merchandising procedure

## **COURSE CONTENT:**

### **UNIT I: PRINCIPLES AND ELEMENTS OF DESIGN** 6T + 12L hrs.

Introduction to elements of design – types of lines – shapes – textures – forms & space – introduction to principles of design – balance – proportion – rhythm – radiation – gradation – emphasis of the design & harmony of the design – unity & variety

### **UNIT II: COLOR ASPECTS** 6T + 12L hrs.

Color theory – primary – secondary – tertiary colors – color scheme – color dimensions – warm and cool colors – tints – shades – psychology of color on dress – application of color on dress – illusion created by color – color combinations – color harmony – harmony of analogy of hue – harmony of analogy of tone

### **UNIT III: FASHION CONCEPTS** 6T + 12L hrs.

Fashion season – fashion cycle – adaptation of fashion – trickle up – trickle across – bottom up – fashion diffusion – fashion forecast

### **UNIT IV: APPAREL MARKETING INTRODUCTION** 6T + 12L hrs.

Meaning and classification of marketing – fashion marketing – fashion market – size – structure – marketing environment – micro and macro environment – ansoff's marketing strategy – marketing mix (4 p's theory)

### **UNIT V: FASHION MERCHANDISING** 6T + 12L hrs.

Fashion merchandising – design collection – materials for product development – cost and price of garments

## **LIST OF EXPERIMENTS:**

#### **1. Application of Colors**

- Prang color chart
- Monochromatic Theme
- Achromatic Theme
- Color Analogous
- Color Complimentary

#### **2. Steps to draw a figure**

- Stick figure
- Block figure
- Flesh figure

#### **3. Application of Elements of Design in a garment**

- Line
- Color
- Texture
- Shape or form
- Size

#### **4. Application of Principles of Design in a garment**

- Balance in dress
- Harmony in dress
- Emphasis in dress

- Proportion in dress
  - Rhythm in dress
5. Designing a garment with theme
6. Illustration of a perfect figure with Costume

**REFERENCE BOOK(S):**

- Bryta Cars, (2005). *How You Look and Dress*, Singapore: McGraw Hill Book Co. Print.
- Frank Alvah, (1920). *The Psychology of Dress*, Double Day page & Co. Print.
- Goldsten Houghton, (1934). *Art in Every Day Life*, London: Mifflin. Print.
- Grace Margaret, (1943). *The Arts of Costume & Personal Appearance*, London: John Wiley & Sons. Print.
- Ruthtone and Tarplay Houghton, (1931). *Fabrics and Dress*, Mifflin. Print.

**DAD1402 FASHION SURFACE ORNAMENTATION**

**(LAB CUM THEORY)**

**LEARNING OUTCOME** 2T + 4L hrs./wk.

On successful completion of the course, the student will be able to

- practice different hand embroidery stitches
- apply various dyeing and printing techniques
- design a garment

**COURSE CONTENT:**

**UNIT I: DESIGN DEVELOPMENT** 6T + 12L hrs.

Introducing repeats on fabrics & garments – design development – through pictures – visuals – natural things – still life – textures – applications of the above in fabrics

**UNIT II: HAND EMBROIDERY** 6T + 12L hrs.

Hand embroidery stitches – running stitch with variations – back stitch – stem stitch – chain with variation – lazy daisy stitch – button hole stitch with variations – herring bone with variation – french knot – bullion knot – pistil stitch (long tailed-french knot) – satin stitch and its variations – long and short – couching – cross stitch – appliqué – monogram

**UNIT III: OTHER DECORATIVE TECHNIQUES** 6T + 12L Hrs.

Smocking – patch work – cut work – mirror – bead – sequins work – single – hanging – continuous – overlap – chain with sequins – stone work

**UNIT IV: TRADITIONAL DESIGN TECHNIQUES** 6T + 12L Hrs.

Batik and its variations – block batik – marbling batik – tie and dye techniques – sun burst – random – marbling – diagonal

**UNIT V: MACHINES USED FOR FABRIC ORNAMENTATION** 6T + 12L Hrs.

Latest machine used for all techniques in surface ornamentation – embroidery machine – stone fixing machine – printing machine – screen printing – block printing – dyeing machines

**LIST OF EXPERIMENTS:**

1. Hand embroidery – 20 stitches – 10 samples
2. Appliqué (machine / hand) – 3 types
3. Smocking – 2 types

4. Bead Work – 1 sample
5. Sequins work – 1 sample
6. Zardosi work – 1 sample
7. Mirror work – 1 sample
8. Stone work – 1 sample
9. Printing
  - a) Block print
  - b) Stencil print
  - c) Screen print
  - d) Tie and dye
  - e) Batik print

## DAD1403 BASICS IN SEWING PROCESS (LAB CUM THEORY)

### LEARNING OUTCOME

2T + 4L hrs./wk.

On successful completion of the course, the student will be able to

- use different measurements and draft a specific pattern
- construct various seams, sleeves, collars, yokes, plackets and pockets
- create a garment

### COURSE CONTENT:

#### UNIT I: SEWING TECHNOLOGY

6T + 12L hrs.

- (a) Introduction to sewing machine technology – safety rules care and maintenance
- (b) Quality for sewing – selection of needles – sewing defects and methods to rectify – defects due to machine – bobbin – needle or fabric – bobbin winding and changing – bobbin tension adjustment.

#### UNIT II: MEASUREMENTS AND PARTS OF GARMENT

6T + 12L hrs.

- (a) Measurement – importance – method of taking – definition of various garment parts – Methods of making pattern – drafting method & draping method – basic bodice pattern – child – women.
- (b) Seams – definition – types of seams – plain seams – top seam – flat fell seam – french seam – lapped seam – slot seam – mantua maker seam – seam finishes – their suitability and application in various seams – pinked seam – hand overcast – over locked – bias bound – edge finish stitch – Hem finishes – Hand hemming – visible and invisible hemming.

#### UNIT III: SLEEVE AND COLLAR

6T + 12L hrs.

Construction of sleeve block – sleeve variation – plain – cap – puff sleeve – petal sleeve – collar variations – one piece and two-piece peter pan collar – stand collar – convertible collar – neckline variations.

#### UNIT IV: YOKES AND FULLNESS

6T + 12L hrs.

Yokes – definition – different styles of yoke – simple – yokes with or without fullness – midriff yokes – fullness – definition – types – darts – single – double – pointed darts – tucks – pin tucks – cross tucks – pleats – knife pleats – box pleats – inverted box pleats – flare – godet – gathers – shirring – frill – single or double frills – ruffles – hemming techniques.

## UNIT V: PLACKETS AND POCKETS

6T + 12L hrs.

Plackets: two piece placket continuous bound placket – kurta plackets.

Pockets: Patch pocket – flap – front hip – set-inseam – slash pocket with flap.

### LIST OF EXPERIMENTS:

Preparation of samples

1. for seam and seam finishes
2. for hems
3. for fullness
4. for facing and binding
5. for plackets and fasteners
6. for set in sleeves and sleeves with modified arm
7. yoke with fullness within the yoke, yoke supporting fullness
8. for flat collars and rolled collars
9. for patch pocket, seam pocket, bound pocket

### REFERENCE BOOK(S):

David and Charles, (1993). *Reader's Digest Step-By-Step Guide to Sewing and Knitting World of Book*. Print.

Gerry Cooklin, (1992). *Master Patterns & Grading for Men's Outsize*, Blackwell Scientific Publications, Print.

Gerry Cooklin, (1995). *Master Patterns & Grading for Women's Outsize*, UK: Blackwell Scientific Publications. Print.

Gillian Holman, (1997). *Pattern Cutting Made Easy*, UK: Blackwell Scientific Publications. Print.

Natalie Bray, (1986). *More Dress Pattern Designing*, UK: Blackwell Scientific Publications. Print.

## DAD2201 LIFE SKILLS II

(THEORY)

### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course the student will be able to

- discover the importance of goals in life and to set SMART goals
- acquire skills on stress and time management
- develop workplace etiquettes

### COURSE CONTENT:

#### UNIT I: MOTIVATION AND GOAL SETTING

12 hrs.

Goal setting – definition of goal – focus – SMART goals – obstacles – process – types motivation – meaning – self-actualization – internal and external motivation.

#### UNIT II: STRESS MANAGEMENT AND TIME MANAGEMENT

10 hrs.

Stress management – meaning, kinds, causes, and effects – identify the sources of stress – managing stress.

time management – meaning – importance – steps – lateness problem – obstacles – tips.

### UNIT III: WORK ENVIRONMENT AND WORK PLACE ETIQUETTES

8 hrs.

Work environment – life skills required – steps – tips – work place etiquettes – greetings and self-presentation – making positive impressions – do's and don'ts – office etiquette.

#### REFERENCE BOOK(S):

Alponse Xavier S.J., (2004). *We Shall Overcome, A Text Book on Life Coping Skills*, Chennai: MCRDCE Publications. Print.

Ray Josephs, (1994). *Hot to gain an extra hour everyday Harper Collins*, Noida: Printed in India by Gopsons papers Ltd. Print.

Jim Cairo, (1999), *Motivation and Goal Setting - How to set and achieve goals and inspire others*, Published by Master Mind Books. Print.

## DAD2202 ENGLISH FOR COMMUNICATION SKILLS II

(THEORY)

### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course the student will be able to

- identify the structure of English sentences
- acquire language skills and improve vocabulary
- develop an interest in reading

### COURSE CONTENT:

#### UNIT I: WRITING SKILLS

10 hrs.

Vocabulary and grammar – one-word substitutes – dictionary & its usage – learning new words through newspaper – tenses – punctuation – narrating an event.

#### UNIT II: READING SKILLS

10 hrs.

Reading for information – application of scanning and skimming – silent and loud reading – reading practice – introducing students to different text types – fairy tales – story books.

#### UNIT III: SPEAKING SKILLS

10 hrs.

Greeting / introducing oneself – introducing a friend to another friend – breaking off a conversation politely – leave-taking – making and responding to inquiries / request – expressing an opinion / agreement / disagreement – expressing emotions – pleasure – sorrow – regret – surprise – admiration etc – narrating or reporting an event.

#### REFERENCE BOOK(S):

Joseph, K.V, (2006). *A Text Book of English Grammar*, Chennai: Vijay Nicole Imprints Private Limited. Print.

Lester, Mark, and Larry Beason, (2005). *The McGraw - Hill Handbook of English Grammar and Usage*, New York: McGraw-Hill. Print.

#### WEBSITE(S):

<https://www.englishgrammar.org/tenses-exercise-4/>

[http://www.myenglishpages.com/site\\_php\\_files/grammar-exercise-tenses.php](http://www.myenglishpages.com/site_php_files/grammar-exercise-tenses.php)

<https://www.englisch-hilfen.de/en/exercises/tenses/mix2.htm>

<https://www.ego4u.com/en/cram-up/tests/language-course>

<Http://www.culturalindia.net/indian-folktales/jataka-tales/>

<https://www.speakconfidentenglish.com/disagree-in-english/>

<http://www.vocabulary.cl/lists/opinions.htm>

## DAD2101 BASIC COMPUTER SKILLS II

(LAB)

### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course, the student will be able to

- demonstrate skills in creating professional logos and visiting cards
- create dynamic graphics using drawing and editing tools, styles and templates
- design various types of motifs and printing designs

### COURSE CONTENT:

#### UNIT I: BASICS OF CORELDRAW X3

8 hrs.

Introduction – getting started – creating a new file – title bar – menu bar – work area – printable page – property bar – page counter bar – color palette – toolbox – status bar – drawing figures – lines – ellipse – circles – rectangle – square – polygon – page layout – changing the page size – changing the layout – changing the background

#### UNIT II: DRAWING AND COLORING

10 hrs.

Introduction – selecting an object – resizing an object – moving an object – changing the shape – combining two objects – skewing – welding the objects – blending – curve lines – straight lines – continuing a line – view mode – arranging objects – ordering objects – rotating an object – grouping – applying color fills and outlines

#### UNIT III: MASTERING WITH TEXT AND IMAGE

12 hrs.

Introduction – text tool – artistic and paragraph text – formatting text – changing the font size – changing the font – bullets – decorating the text – webdings – changing the alignment – type style – spell checking – grammar – searching synonyms – find – replace – editing – formatting characters – image – importing images – adding special effects – resizing – rotating – skewing – moving – cropping – bitmap conversion

### REFERENCE BOOK(S):

DT Editorial Services, (2017). *CorelDraw X7 in Simple Steps*, Delhi: Dreamtech press. Print.

Sharma M.C, (2008). *CorelDraw Graphics Suite X3 Training Guide*, BPB Publications. Print.

### WEBSITE(S):

<https://www.youtube.com/watch?v=iKfFNntfpMU>

<http://product.corel.com/help/CorelDRAW/540229932/Main/EN/User-Guide/CorelDRAW-X7.pdf>

[http://gtu.ge/Arch/Faculty/Multimedia/Resources/2\\_Corel/Languages/EN/Help/CorelDRAW%20Graphics%20Suite%20X3.pdf](http://gtu.ge/Arch/Faculty/Multimedia/Resources/2_Corel/Languages/EN/Help/CorelDRAW%20Graphics%20Suite%20X3.pdf)

## DAD2203 ACCESSORIES MAKING II

(LAB)

### LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- acquire knowledge on the raw materials in jewellery designing
- design jute, natural and terracotta jewellery as accessories for the garment
- estimate the accessories

**COURSE CONTENT:**

**UNIT I: FABRIC JEWELLERY** 12 hrs.

Types of fabric – lace – satin – velvet – jute – printed fabric

Products – chain – earrings – pendant

**UNIT II: NATURAL JEWELLERY** 30 hrs.

Raw materials – rice – wheat – natural seeds – fresh & dried flowers

Products – earrings – long chain – pendant

**UNIT III: TERACOTTA JEWELLERY** 18 hrs.

Raw materials – natural clay

Products – necklace – long chain – bracelet – earrings

**WEBSITE(S):**

[https://www.youtube.com/watch?v=ZX\\_32HFSd8](https://www.youtube.com/watch?v=ZX_32HFSd8)

<https://www.youtube.com/watch?v=WPsXoc9j14>

<https://www.youtube.com/watch?v=jm3Oyg-23wY>

**DAD2401 GARMENT CONSTRUCTION**

**(LAB CUM THEORY)**

**LEARNING OUTCOME** 2T+4L hrs./wk.

On successful completion of the course, the student will be able to

- develop any garment with various bodice variation
- construct kids wear and women's wear
- acquire different display techniques

**COURSE CONTENT:**

**UNIT I: INTRODUCTION TO BASIC DRAFTING** 6T + 12L hrs.

Drafting – components of garment – bodice variation – empire bodice – natural bodice – lowered bodice and princess bodice – skirt variations

**UNIT II: KIDS WEAR** 6T + 12L hrs.

Designing and drafting kids wear – zabra – knicker – frock variation – midi and tops

**UNIT III: WOMEN'S WEAR I** 6T + 12L hrs.

Designing and drafting women's night wear – saree petticoat – salwar kameez

**UNIT IV: WOMEN'S WEAR II**

Designing and drafting gagra choli – cut blouse – princess cut blouse

**UNIT V: DISPLAY TECHNIQUES AND COSTING** 6T + 12L hrs.

Display of garment – display techniques – garment quality standards and specification – costing for garment making

**LIST OF EXPERIMENTS:**

I. Designing and Pattern making for Children wear:

- a) Zabra and Knicker
- b) Frock
- c) Midi and Tops

## II. Designing and Pattern making for Women's wear:

- a) Saree petticoat
- b) Night dress
- c) Salwar and Kameez
- d) Cut Blouse
- e) Princess cut blouse
- f) Gagra Choli

### REFERENCE BOOK(S):

David and Charles, *Reader's Digest step by step Guide to sewing and knitting*, World of Book, Australia. Print.

Gerry Cooklin, (2006). *Introduction to clothing Manufacture*, UK: Blackwell Publishing. Print.

Mary Mathew, (2000). *Practical Clothing Construction*, Chennai: Cosmic Press. Print.

Nurie Relis / Gail Strauss, (1968). *Sewing for Fashion Design*, UK: Blackwell Publishing. Print.

## DAD2602 FABRIC KNOWLEDGE FOR DESIGNERS

### (THEORY)

#### LEARNING OUTCOME

6 hrs./wk.

On successful completion of the course, the student will be able to

- describe the process of making fiber to yarn
- differentiate between natural and manmade fiber
- recognize the types of yarn and its quality parameters

#### COURSE CONTENT:

##### UNIT I: FABRIC KNOWLEDGE FOR DESIGNERS

13 hrs.

Fiber – definition – classification of textile fibers – natural fiber – cotton – silk – wool – man-made fiber – polyester – rayon

##### UNIT II: YARN

17 hrs.

Yarn – definition – types of yarn – single – ply – core – classification of yarn – simple yarn – fancy yarn – yarn twist – S twist – Z twist – properties and application of yarns

##### UNIT III: FABRIC

20 hrs.

Fabric – definition – various fabrics forming techniques – weaving – basic loom and its operation – knitting – warp knitting and weft knitting – nonwoven – bonded – lace – braid – net

##### UNIT IV: SOURCING OF TEXTILES

20 hrs.

Quality parameters while sourcing fabrics – woven fabric – dimensional characteristics – weight of fabric – fabric strength and extensibility – threads per inch of fabric – yarn count – crimp – handle – crease resistance and crease recovery – air permeability – abrasion resistance – water resistance – shrinkages – different fastness properties – fastness to light – wash – perspiration – rubbing – Knitted fabrics – strength and extensibility – course density – Wale's density – lop length – elasticity – deformation – gram per square meter – yarn count – design – Nonwoven – strength and extensibility of fabric – weight – thickness – air permeability – crease resistance – stability of washing – stability of dry cleaning – dimensional stability – elasticity

**UNIT V: TECHNICAL TEXTILES**

20 hrs.

Brief study on technical textiles – Medi tech – Geo tech – Mobi tech – Agro tech – Space tech – Home tech – Build tech etc.,

**REFERENCE BOOK(S):**

Allen. C. Cohen Ingrid Johnson, (2010). *Fabric Science*, New York: Fairchild Books. Print.

Bernard Pcorban, (1983) *Fiber to Fabric*, (6<sup>th</sup> ed.), Singapore: McGraw-Hill Publication. Print.

Terry Brackenbury, (1992). *Knitted clothing technology*, UK: Blackwell Publishing. Print

**DAD2501 PORTFOLIO PRESENTATION**

(LAB)

**LEARNING OUTCOME**

6 hrs./wk.

On successful completion of the course, the student will be able to

- design garments predicting the trend
- identify different display techniques
- create a portfolio

**List of Experiments:**

90 hrs.

- a. Selection of a Theme
- b. Preparation of customer profile
- c. Preparation of theme board and mood board
- d. Preparation of color board and fabric board
- e. Preparation of flat sketches
- f. Preparation of story board
- g. Preparation of accessory board
- h. Preparation of photographic board
- i. Preparation of pattern according to the selected garment
- j. Constructing the garment to the customer requirement
- k. Costing of the final garment

## EVALUATION PATTERN

### I Semester

Sem.	Course Code	Course Title	Course Type	Total Hrs. / Wk.		Credit	FORMATIVE														SUMMATIVE						
							TH						LA						GM		RM		Exam Hrs.				
							Test		Seminar		Chart Preparation / Role Play*		Assn.		Test		Assn.		Record								
							RM	No	RM	No	RM	No	RM	No	RM	No	RM	No	RM	No	RM	No	TH	LA	TH	LA	TH
<b>DIPLOMA IN APPAREL DESIGNING</b>																											
1	DAD1201	Life Skills I*	TH	2		2	20	1	20	1	20	1	-	-	-	-	-	-	-	-	-	50	-	40	-	2	-
1	DAD1202	English For Communication I	TH	2		2	30	1	15	1	-	-	15	1	-	-	-	-	-	-	50	-	40	-	2	-	
1	DAD1203	Accessories Making I	LA		4	2	-	-	-	-	-	-	-	-	25	1	25	1	25	1	-	100	-	25	-	3	
1	DAD1101	Basic Computer Skills I	LA		2	1	-	-	-	-	-	-	-	-	25	1	25	1	25	1	-	50	-	25	-	2	
1	DAD1401	Fashion Designing	LT	2	4	4	10	1	10	1	-	-	-	-	10	1	15	1	15	1	60	100	10	30	2	3	
1	DAD1402	Fashion Surface Ornamentation	LT	2	4	4	10	1	10	1	-	-	-	-	10	1	15	1	15	1	60	100	10	30	2	3	
1	DAD1403	Basic in Sewing process	LT	2	4	4	10	1	10	1	-	-	-	-	10	1	15	1	15	1	60	100	10	30	2	3	

\* Role Play is one of the evaluation component for DAD2201 Life Skills I.

## II Semester

Sem.	Course Code	Course Title	Course Type	Total Hrs. / Wk.		Credit	FORMATIVE														SUMMATIVE						
							TH							LA							GM		RM		Exam Hrs.		
							Test		Seminar		Chart Preparation / Role Play*		Assn.		Test		Assn.		Record								
							RM	No	RM	No	RM	No	RM	No	RM	No	RM	No	RM	No	TH	LA	TH	LA	TH	LA	
<b>DIPLOMA IN APPAREL DESIGNING</b>																											
II	DAD2201	Life skills II*	TH	2		2	20	1	20	1	20	1	-	-	-	-	-	-	-	-	-	50	-	40		2	-
II	DAD2202	English For Communication Skills II	TH	2		2	30	1	15	1	-	-	15	1	-	-	-	-	-	-	50	-	40		2	-	
II	DAD2101	Basic Computer Skills II	LA		2	1	-	-	-	-	-	-	-	-	25	1	25	1	25	1	-	50	-	25	-	2	
II	DAD2203	Accessories Making II	LA		4	2	-	-	-	-	-	-	-	-	25	1	25	1	25	1	-	100	-	25	-	3	
II	DAD2401	Garment Construction	LT	2	4	4	10	1	10	1	-	-	-	-	10	1	15	1	15	1	60	100	10	30	2	3	
II	DAD2402	Fabric knowledge for designers	TH	6		4	20	1	20	1	20	1	-	-	-	-	-	-	-	-	60	-	40	-	2	-	
II	DAD2403	Portfolio Presentation	LA		6	4	-	-	-	-	-	-	-	-	25	1	25	1	25	1	-	100	-	25	-	3	
II	DAD2601	Internship **				6																					

\*\* During the internship period the assessment of the trainee will be done by the external assessor of the Industrial partner.

\* Role Play is one of the evaluation component for DAD2201 Life Skills II.



## CERTIFICATE COURSES

### PREAMBLE:

This course is for a duration of 3 months in odd semester and in the even semester annually. These courses enable the students to appreciate the concepts of design. It creates new avenues in higher studies as well as in future career options.

**Eligibility:** Open for all UG and PG students and female candidates who have completed standard X

**Duration of the Course:** Three Months

### COURSE PROFILE

From 2019 batch onwards

Sem.	Course code	Course Title	Course Type	Hrs./Wk.		Credit	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I / II / III / IV / V / VI	CDM0601	BASICS IN DRESS MAKING	LA	-	9	6		ALLM	FDS
	CAE0602	INTRODUCTION TO AARI EMBROIDERY	LA	-	9	6		ALLM	FDS
	CME0603	INTRODUCTION TO MACHINE EMBROIDERY	LA	-	9	6		ALLM	FDS
	CEM0604	INTRODUCTION TO HAND EMBROIDERY	LA	-	9	6		ALLM	FDS
	CJH0605	INTRODUCTION TO JUTE HANDICRAFT	LA	-	9	6		ALLM	FDS
	CFP0606	BASIC COURSE IN FABRIC PAINTING	LA	-	9	6		ALLM	FDS
	CFP0801	ADVANCED COURSE IN FABRIC PAINTING	LA	-	9	8		ALLM	FDS

2017-18 Batch

Sem.	Course code	Course Title	Course Type	Hrs./Wk.		Credit	Passed in Academic Council	Offered to	Offered by
				TH	LA				
I	CDM1051CC	BASICS IN DRESS MAKING	LA	-	9	6		ALLM	FDS
	CAE1052CC	INTRODUCTION TO AARI EMBROIDERY	LA	-	9	6		ALLM	FDS

## CDM0601 BASICS IN DRESS MAKING

(LAB)

### LEARNING OUTCOME

9 hrs./wk.

On successful completion of the course, the student will be able to

- use sewing machine
- construct garments for kids and women
- develop skills that are necessary for employment and entrepreneurship

### COURSE CONTENT:

#### UNIT I: INTRODUCTION OF SEWING TECHNOLOGY

20 hrs.

Parts of a sewing machine – care and maintenance of sewing machine – introduction to pedaling and stitching.

#### UNIT II: DRESS FOR KIDS

28 hrs.

Slip – petticoat – baby frock – midi & top – measurement – formulae – pattern drafting – cutting – construction.

#### UNIT III: DRESS FOR WOMEN

45 hrs.

Saree petticoat – nighty for adult – salwar & kameez – cut blouse – measurement – formulae – pattern drafting – cutting – construction.

#### UNIT IV: ESTABLISHING A TAILORING SHOP

15 hrs.

Determining business viability – business plan business model canvas – finance planning – online viability – developing the business – scope of the apparel industry – pricing – standardization and trends – guarantee for products and services – latest trends in sewing methods and garment designing – marketing viability.

### REFERENCE BOOK(S):

Zarapkar K. R. and Zarapkar K. A., (2014). *Zarapkar, System of Cutting*, Bangalore: Vasani Publications. Print.

Mary Mathew, (2000). *Practical clothing construction*, Chennai: Cosmic Press. Print.

## CAE0602 INTRODUCTION TO AARI EMBROIDERY

(LAB)

### LEARNING OUTCOME

9 hrs. /wk.

On successful completion of the course, the student will be able to

- develop design for embroidery
- design garments using aari work
- prepare a business model

### COURSE CONTENT:

#### UNIT I: INTRODUCTION TO AARI WORK

18 hrs.

Origin and growth – importance of aari work and scope – pricing the garment – labor and material.

#### UNIT II: INTRODUCTION TO BASIC STITCHES

30 hrs.

Running stitch – loose running stitch – water filling stitch – zig-zag stitch – wheat stitch – chain stitch – knot on running stitch – magic stitch – button-hole stitch – leaf stitch 1 – leaf stitch 2 – Plain

load stitch – french knot – step chamki stitch – chamki with french knot stitch – bead stitch – running bead stitch – running chamki stitch.

**UNIT III: ADVANCED STITCHES** 30 hrs.

Katta stitch – patch work – kalamkari work – cut work – mirror work – feather work – emboss stitch on thread – zardosi stitch – threaded cut work – stone with thread stitch – emboss stitch on zardozi.

**UNIT IV: DESIGNING GARMENTS** 30 hrs.

Procedure for tracing designs – applying basic stitches – applying stitches to border design – neck line – sleeves – tips for finishing – bridal work initiatives – color combination awareness.

**WEBSITE(S):**

<http://letslearnembroidery.blogspot.in/2012/01/aari-embroidery.html>

<http://needlework.craftgossip.com/learn-aari-embroidery/2012/01/16/>

<http://www.aiacaonline.org/craftmark-certified-processes-aari-embroidery.asp>

YouTube videos on

- aari work - basics for beginners
- aari work for blouse

**CME0603 INTRODUCTORY COURSE IN MACHINE EMBROIDERY**

(LAB)

**LEARNING OUTCOME** 9 hrs. / wk.

On successful completion of the course, the student will be able to

- design motifs using embroidery machine
- estimate costs and carryout projects
- create a catalogue

**COURSE OUTLINE:**

**UNIT I: INTRODUCTION TO SEWING TECHNOLOGY** 12 hrs.

Parts of an embroidery sewing machine – care and maintenance – introduction to pedaling and stitching.

**UNIT II: INTRODUCTION TO BASIC STITCHES** 26 hrs.

Stitches – straight stitch – round stitch – diamond stitch – egg stitch – leaf stitch – flower stitch – alignment of stitches.

**UNIT III: INTRODUCTION TO DESIGNS** 38 hrs.

Designing motifs – flower variation – butterfly variation – peacock variation – mango variation – polka dot variation – color awareness.

**UNIT IV: INTRODUCTION TO DESIGN DEVELOPMENT** 32 hrs.

Tracing – application of designs – front and back of blouse – front and back lines of designs of kameez – sleeve line design – saree border – polka dot on sarees – blouse application – saree application – kameez application – shirt application – cut work – patch work – kalam kari work – tissue work – creating a catalogue.

## CEM0604 INTRODUCTORY COURSE IN HAND EMBROIDERY

(LAB)

### LEARNING OUTCOME

9 hrs./wk.

On successful completion of the course, the student will be able to

- create embroidery designs
- design garments using hand embroidery
- develop entrepreneurial skills

### COURSE CONTENT:

#### UNIT I: INTRODUCTION TO THREAD WORKS

30 hrs.

Back stitch – threaded back stitch – running stitch – stem stitch – whipped stem stitch – long and short stitch – satin stitch straight and slanting – chain stitch – fish bone stitch – leaf stitch – star stitch – lazy daisy stitch – herring bone stitch – spider web stitch – rope stitch – fly stitch – feather stitch – button hole stitch – bullion knot – french knot – interlaced cable chain stitch – twisted ribbon rose – leaf ribbon rose – mat stitch – balloon work – jacobean couching – fern stitch – closed button hole stitch.

#### UNIT II: INTRODUCTION TO SEQUENCE WORKS

28 hrs.

Chain chamki stitch – back chamki – kumil chamki – bead work – tube work – pearl work – mirror work – cut-tube work – kundan work – milk bead work – design with chamki – design with bead – design with tube – design with kundan stone – contemporary work.

#### UNIT III: INTRODUCTION TO ZARDOSI WORKS

20 hrs.

Straight stitch – round stitch – lazy daisy stitch – zardosi stem stitch – zardosi with chamki – zardosi with bead – zardosi with small tube – zardosi with medium tube – zardosi with load stitch.

#### UNIT IV: EMBELLISHING THE GARMENTS

30 hrs.

Falls – tassels – liquid embroidery – pillow cover – kutchu work – designing and adding value to a garment using hand embroidery – color combination.

### REFERENCE BOOKS:

Vetri Selvi. R., (2007). *சித்திரத் தையல்*, Chennai: Parinilayam, Prints.

Jayanthi. R., (2008). *சித்திரப்பூ தையல்*, Chennai: Sri Shenbaga Pathippagam. Prints.

Nagarajan, Mirudhula., (2008). *எம்ப்ராய்டரி*, Chennai: Vigadan Press. Prints.

Surekha, (2006). *121 Stitches: with pictorial guide*, Hyderabad: Aashapura Publications. Prints.

## CJH0605 INTRODUCTION TO JUTE HANDICRAFT

(LAB)

### LEARNING OUTCOME

9 hrs. /wk.

On successful completion of the course, the students will be able to

- acquire knowledge on availability of raw materials and its related accessories
- estimate the product
- produce utilitarian eco-friendly jute products

### COURSE CONTENT:

#### UNIT I: MODES OF PROCUREMENT OF RAW MATERIALS

14 hrs.

Origin and growth – importance of jute products – scope in day to day life – material availability.

<b>UNIT II: BASIC LEVEL OF MAKING JUTE PRODUCTS</b>	<b>35 hrs.</b>
Jute pouch – letter holder – pen stand – wall hanger – jute jewellery.	
<b>UNIT III: ADVANCED LEVEL OF MAKING JUTE PRODUCTS</b>	<b>45 hrs.</b>
Folder – draw string bag – tote bag – lunch bag – sling bag – bottle holder.	
<b>UNIT IV: SOURCING, PRICING &amp; MARKETING</b>	<b>14 hrs.</b>
Modes of procurement of raw materials – brick and motor shop – pricing and marketing the products – e-marketing – whole sale price – retail price – government entrepreneurial schemes.	

**WEBSITE(S):**

- <https://www.youtube.com/watch?v=LYYcvtDbO8w>
- <https://www.youtube.com/watch?v=LWgug0Vpk3Q>
- <https://www.youtube.com/watch?v=x71xdWv-0mA>
- [https://www.youtube.com/watch?v=ZX\\_32\\_HFSd8](https://www.youtube.com/watch?v=ZX_32_HFSd8)
- [https://www.worldjute.com/about\\_jute/abj\\_intro.html](https://www.worldjute.com/about_jute/abj_intro.html)

**CFP0606 BASIC COURSE IN FABRIC PAINTING**

(LAB)

<b>LEARNING OUTCOME</b>	<b>9 hrs./wk.</b>
On successful completion of the course, the students will be able to	
<ul style="list-style-type: none"> <li>• develop skills in various painting techniques</li> <li>• create unique designs on fabric</li> <li>• estimate the product</li> </ul>	

**COURSE CONTENT:**

<b>UNIT I: INTRODUCTION OF FABRIC PAINTING</b>	<b>10 hrs.</b>
Origin and growth – importance – scope – tracing techniques – processing method.	
<b>UNIT II: BRUSH PAINTING AND PRINTING TECHNIQUES</b>	<b>30 hrs.</b>
Filling – strokes – single – line – dry – double – vegetable block – single – double – multi colours – shading.	
<b>UNIT III: PAINTING TECHNIQUES</b>	<b>30 hrs.</b>
Tie and dye using fabric colours – dot painting – liquid embroidery – stencil work.	
<b>UNIT IV: TRADITIONAL PAINTING TECHNIQUES</b>	<b>38 hrs.</b>
Warli – phad painting.	

**WEBSITE(S):**

- [https://www.youtube.com/watch?v=X5\\_6faQ7ffc](https://www.youtube.com/watch?v=X5_6faQ7ffc)
- [https://www.youtube.com/watch?v=N\\_pXFynTU81](https://www.youtube.com/watch?v=N_pXFynTU81)

**REFERENCE BOOK(S):**

- Susan Stein, (2017). *Step by Step basic for painting and Printing on fabric*, Quarto Publishing international. Print.
- Bascomb Galloway Eades, (2013). *Fabric Painting: A Hand Book on Technique*, Literary Licensing. Print.

## CFP0801 ADVANCED COURSE IN FABRIC PAINTING

(LAB)

<b>LEARNING OUTCOME</b>	<b>9 hrs./wk.</b>
On successful completion of the course, the students will be able to	
<ul style="list-style-type: none"><li>• develop various painting technique skills</li><li>• create unique designs on fabric</li><li>• estimate the product</li></ul>	
<b>UNIT I: TRADITIONAL FABRIC PAINTING TECHNIQUES IN INDIA</b>	<b>20 hrs.</b>
Madhubani – kalamkari – rajasthani miniature – kerala mural – warli.	
<b>UNIT II: PRINTING TECHNIQUES</b>	<b>16 hrs.</b>
Screen printing – wooden block printing – printing from nature.	
<b>UNIT III: CREATIVE PRINTING</b>	<b>30 hrs.</b>
Shibori – doodle – silhouette – marbling – gond – mural.	
<b>UNIT IV: SURFACE EMBELLISHMENTS &amp; APPLICATION ON GARMENTS</b>	<b>30 hrs.</b>
Advance appliqué work on blouse – stone work on saree – cutwork on kurti.	

<b>UNIT V: SOURCING, PRICING &amp; MARKETING</b>	<b>12 hrs.</b>
Modes of procurement of raw materials – brick and motor shop – e-marketing – whole sale price – retail price – government entrepreneurial schemes.	

### REFERENCE BOOKS:

Susan Stein, (2017). *Step-by-Step Basic for Painting and Printing on fabric, USA*: Quarto Publishing International. Print.

Bascomb Galloway Eade, (2013). *Fabric Painting: A Hand Book on Technique*, Literary Licensing. Print.

Cheryl Rezendes, (2013). *Fabric surface design*, Story Publishing. Print.

### WEBSITE(S):

<https://www.youtube.com/watch?v=qdadyGj7xt0>

<https://www.youtube.com/watch?v=lz1TYBGEbtA>

<https://www.youtube.com/watch?v=EcZ7loC-jme>

<https://www.youtube.com/watch?v=yqRT2urNOqE>

<https://www.youtube.com/watch?v=kWWKOqHaze0s>

## CDM1051CC BASICS IN DRESS MAKING

(LAB)

<b>LEARNING OUTCOME</b>	<b>9 hrs./wk.</b>
On successful completion of the course, the student will be able to	
<ul style="list-style-type: none"><li>• use sewing machine</li><li>• construct garments for kids and women</li><li>• develop skills that are necessary for employment and entrepreneurship</li></ul>	

**COURSE CONTENT:**

**UNIT I: INTRODUCTION OF SEWING TECHNOLOGY** 20 hrs.

Parts of a sewing machine – care and maintenance of sewing machine – introduction to pedaling and stitching.

**UNIT II: DRESS FOR KIDS** 28 hrs.

Slip – petticoat – baby frock – midi & top – measurement – formulae – pattern drafting – cutting – construction.

**UNIT III: DRESS FOR WOMEN** 45 hrs.

Saree petticoat – nighty for adult – salwar & kameez – cut blouse – measurement – formulae – pattern drafting – cutting – construction.

**UNIT IV: ESTABLISHING A TAILORING SHOP** 15 hrs.

Determining business viability – business plan business model canvas – finance planning – online viability – developing the business – scope of the apparel industry – pricing – standardization and trends – guarantee for products and services – latest trends in sewing methods and garment designing – marketing viability.

**REFERENCE BOOK(S):**

Zarapkar K. R. and Zarapkar K. A., (2014). *Zarapkar, System of Cutting*, Bangalore: Vasani Publications. Print.

Mary Mathew, (2000). *Practical clothing construction*, Chennai: Cosmic Press. Print.

**CAE1502CC INTRODUCTION TO AARI EMBROIDERY**

(LAB)

**LEARNING OUTCOME** 9 hrs. /wk.

On successful completion of the course, the student will be able to

- develop design for embroidery
- design garments using aari work
- prepare a business model

**COURSE CONTENT:**

**UNIT I: INTRODUCTION TO AARI WORK** 18 hrs.

Origin and growth – importance of aari work and scope – pricing the garment – labor and material.

**UNIT II: INTRODUCTION TO BASIC STITCHES** 30 hrs.

Running stitch – loose running stitch – water filling stitch – zig-zag stitch – wheat stitch – chain stitch – knot on running stitch – magic stitch – button-hole stitch – leaf stitch 1 – leaf stitch 2 – Plain load stitch – french knot – step chamki stitch – chamki with french knot stitch – bead stitch – running bead stitch – running chamki stitch.

**UNIT III: ADVANCED STITCHES** 30 hrs.

Katta stitch – patch work – kalamkari work – cut work – mirror work – feather work – emboss stitch on thread – zardosi stitch – threaded cut work – stone with thread stitch – emboss stitch on zardozi.

**UNIT IV: DESIGNING GARMENTS**

30 hrs.

Procedure for tracing designs – applying basic stitches – applying stitches to border design – neck line – sleeves – tips for finishing – bridal work initiatives – color combination awareness.

**WEBSITE(S):**

<http://letslearnembroidery.blogspot.in/2012/01/aari-embroidery.html>

<http://needlework.craftgossip.com/learn-aari-embroidery/2012/01/16/>

<http://www.aiacaonline.org/craftmark-certified-processes-aari-embroidery.asp>

YouTube videos on

- aari work - basics for beginners
- aari work for blouse

**CERTIFICATE COURSE EVALUATION PATTERN**

Course Code	Course Title	Formative							Summative		
		Assign.	Req. Max	Test	Req. Max	Record	Req. Max.	Form. Total	Exam Duration (Hrs.)	Given Max	Req. Max
CDM0601	BASICS IN DRESS MAKING	1	25	1	25	1	25	75	3	100	25
CAE0602	INTRODUCTION TO AARI EMBROIDERY	1	25	1	25	1	25	75	3	100	25
CME0603	INTRODUCTION TO MACHINE EMBROIDERY	1	25	1	25	1	25	75	3	100	25
CEM0604	INTRODUCTION TO HAND EMBROIDERY	1	25	1	25	1	25	75	3	100	25
CJH0605	INTRODUCTION TO JUTE HANDICRAFT	1	25	1	25	1	25	75	3	100	25
CFP0606	BASIC COURSE IN FABRIC PAINTING	1	25	1	25	1	25	75	3	100	25
CFP0801	ADVANCED COURSE IN FABRIC PAINTING	1	25	1	25	1	25	75	3	100	25

## DEPARTMENT OF SOCIAL SCIENCES

### PREAMBLE

The present curriculum of M.Sc. Psychology was reviewed and based on which it is found necessary to introduce a few changes in the following courses

#### Specialization I – Industrial Psychology,

- PPY3405M Human Resource Management is changed to PPY3407M Human Resource Management
- PPY4407M Organizational Development and Intervention is changed to PPY4409M Organizational Development and Intervention
- PPY4501O Consumer Behaviour is changed to PPY4503O Consumer Behaviour

#### Specialization II – Counselling and Psychotherapy,

- PPY3406M Counseling and Psychotherapy – I is changed to PPY3408M Counseling and Psychotherapy – I
- PPY4402M Counseling in various settings is changed to PPY4408M Counseling in various settings
- PPY4502O Health Psychology is changed to PPY4504O Health Psychology

In both the specializations, the course PPY3501O Positive Psychology is changed to PPY3502O Positive Psychology.

Besides this, the department introduces the following course

- PPY3402E Microskills in Counseling

### COURSE PROFILE

#### M.Sc. PSYCHOLOGY

From 2018 batch onwards

#### Specialization I – Industrial Psychology

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
	*PPY3202M	FUNDAMENTALS OF RESEARCH	TH	3		2	BA2018	SPPSY	SOC
	PPY3401M	PRINCIPLES OF MANAGEMENT	TH	5		4	BA2018	SPPSY	SOC
	PPY3403M	ORGANIZATIONAL BEHAVIOR I	TH	5		4	BA2018	SPPSY	SOC
	PPY3407M	HUMAN RESOURCE MANAGEMENT	TH	4		4		SPPSY	SOC
	PPY3203P	PSYCHOLOGICAL ASSESSMENTS IN INDUSTRIAL SETTINGS	LA		3	2	BA2018	SPPSY	SOC
	*PPY3502O	POSITIVE PSYCHOLOGY	TH	5		5		SPPSY	SOC

	PPY3401E	STRESS AND STRESS MANAGEMENT	TH	4		4	BA2018	ALLS (except SPPSY)	SOC
	*PPY3402E	MICROSKILLS IN COUNSELING	TH	4		4		ALLS	SOC
	PPY3301F	INTERNSHIP / TRAINING				3	BA2018	SPPSY	SOC
	PGV3101PV / PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH/ SPCH	
	TOTAL			27	3	29			
IV	*PPY4401M	BEHAVIOUR MODIFICATION	TH	5		4	BA2018	SPPSY	SOC
	PPY4403M	ORGANIZATIONAL BEHAVIOR – II	TH	5		4	BA2018	SPPSY	SOC
	PPY4405M	TRAINING AND DEVELOPMENT	TH	5		4	BA2018	SPPSY	SOC
	PPY4409M	ORGANIZATIONAL DEVELOPMENT AND INTERVENTION	TH	4		4		SPPSY	SOC
	PPY4601M	PROJECT	PR		4	6	AZ2017	SPPSY	SOC
	PPY4503O	CONSUMER BEHAVIOUR	TH	5		5		SPPSY	SOC
	PPY4201F	INTERNSHIP				2	AZ2017	SPPSY	SOC
	PGV4103PV	IN TUNE WITH NATURE						ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER	TH	2		1		APCH/ SPCH	
		TOTAL			26	4	30		

#### Specialization II - Counselling and Psychotherapy

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in A.C.	Offered to	Offered by
				TH	LA				
III	*PPY3202M	FUNDAMENTALS OF RESEARCH	TH	3		2	BA2018	SPPSY	SOC
	PPY3402M	INTRODUCTION TO CLINICAL PSYCHOLOGY	TH	5		4	BA2018	SPPSY	SOC
	PPY3404M	NEURO PSYCHOLOGY	TH	5		4	BA2018	SPPSY	SOC
	PPY3408M	COUNSELING AND PSYCHOTHERAPY – I	TH	4		4		SPPSY	SOC

III	PPY3204P	PSYCHOLOGICAL ASSESSMENTS IN THERAPEUTIC SETTINGS	LA		3	2	BA2018	SPPSY	SOC
	*PPY3502O	POSITIVE PSYCHOLOGY	TH	5		5		SPPSY	SOC
	PPY3401E	STRESS AND STRESS MANAGEMENT	TH	4		4	BA2018	ALLS (except SPPSY)	SOC
	*PPY3402E	MICROSKILLS IN COUNSELING	TH	4		4		ALLS	SOC
	PPY3302F	INTERNSHIP / TRAINING				3	BA2018	SPPSY	SOC
	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1		1		ALLM	Centre for VE
	PIV3101PI	BIBLICAL ETHICS						APCH/ SPCH	
	TOTAL				27	3	30		
IV	*PPY4401M	BEHAVIOUR MODIFICATION	TH	5		4	BA2018	SPPSY	SOC
	PPY4404M	REHABILITATION PSYCHOLOGY	TH	5		4	BA2018	SPPSY	SOC
	PPY4406M	COUNSELING AND PSYCHOTHERAPY II	TH	5		4	BA2018	SPPSY	SOC
	PPY4408M	COUNSELING IN VARIOUS SETTINGS	TH	4		4		SPPSY	SOC
	PPY4601M	PROJECT			4	6	AZ 2017	SPPSY	SOC
	PPY4504O	HEALTH PSYCHOLOGY	TH	5		5		SPPSY	SOC
	PPY4202F	INTERNSHIP				2	AZ2017	SPPSY	SOC
	PGV4103PV	IN TUNE WITH NATURE						ALLM	Centre for VE
	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER	TH	2		1		APCH/ SPCH	
	TOTAL				30		30		

\*Common courses for both the specializations

## EXTRA CREDIT COURSES

Course Title	Course Code			Course Type	Credits	Offered to	Offered by
	Sem. II	Sem. III	Sem. IV				
Term Paper	PPY2301MT	PPY3301MT	PPY4301MT	TH	3	SPPSY	SOC
Mini Project	PPY2301MP	PPY3301MP	PPY4301MP	TH	3	SPPSY	SOC
Comprehensive Viva	PPY2301MV	PPY3301MV	PPY4301MV	TH	3	SPPSY	SOC
Comprehensive – e-Assessment	-	-	PPY4201CE	TH	2	SPPSY	SOC

## COURSES OFFERED TO STUDENTS OF OTHER DEPARTMENTS

### ELECTIVES

Sem.	Course Code	Course Title	Course Type	Hrs./Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	LA				
II	PPY2401E	INTERPERSONAL DYNAMICS	TH	4		4	AY2016	SPALLM (Except PSY)	SOC
III	PPY3301E	STRESS AND STRESS MANAGEMENT	TH	4		4	AZ2017	SPALLS (Except PSY)	SOC
III	PPY3402E	MICROSKILLS IN COUNSELING	TH	4		4		SPALLS	SOC

### SELF-LEARNING COURSES

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
III	PPY0401D	PERSONAL GROWTH: AN EXPERIENTIAL ENQUIRY	TH	4	AY2016	ALLM	SOC
II / IV	PPY0402D	INDUSTRIAL RELATIONS AND LABOUR WELFARE	TH	4	AY2016	ALLM	SOC

## SPECIALIZATION I – INDUSTRIAL PSYCHOLOGY

### PPY3407M HUMAN RESOURCES MANAGEMENT

#### (THEORY)

#### LEARNING OUTCOME

4 hrs./wk.

On successful completion of the course, the student will be able to

- describe the functions and processes of human resource management
- analyse the role and functions of human resource departments
- develop professional skills required for human resources management

#### COURSE CONTENT:

#### UNIT I: INTRODUCTION

10 hrs.

Human Resource Management: Concept – scope – history – function – role of HR Executives – HRM in India: changing role of HRM in India.

**UNIT II: MANPOWER PLANNING**

14 hrs.

Job analysis: Uses of job analysis – process of job analysis – methods of collecting job analysis – job description – job specification.

Role analysis: Job design and quality of work life: techniques for designing jobs.

Recruiting human resources: Sources of recruitment – methods of recruitment.

Indian experiences in recruitment – employee testing and selection: types of tests.

**UNIT III: EMPLOYEE CAREER PLANNING AND GROWTH**

12 hrs.

Concept of employee growth – managing career planning – elements of a career planning programme – succession planning – appraising and managing performance: performance management process – methods of performance management – 360-degree feedback system – problems with performance appraisal – training and developing employees: need for training – systematic approach to training – types of training – training methods – evaluation of training.

**UNIT IV: REWARDING HUMAN RESOURCES**

12 hrs.

Employee compensation: Objectives of compensation planning – compensation of pay structure – victim compensation – factors influencing compensation levels.

Financial incentives and employees benefits and services: statutory and non-statutory benefits – incentive plans – individual incentives – group and team-based incentive plans – fringe benefits.

**UNIT V: EMERGING TRENDS IN HRM**

12 hrs.

Competency mapping – HR accounting – right sizing of workforce – flexi time – talent management – employee management – organizational branding.

**TEXT BOOK(S):**

Dessler, G., (2005). *Human Resources management*, New Delhi: Pearson-Prentice Hall. Print.

Gomez-Mejia, L. R., Balkin, D. B., and Cardy, R. L. (2012). *Managing Human Resource*, New Delhi: Pearson Education India. Print.

**REFERENCE BOOK(S):**

Bernadin, (2012). *Human Resource Management*, New Delhi: Tata Mcgraw Hill. Print.

Cascio, W., (2007). *Managing Human Resource*, New Delhi: McGraw Hill. Print.

Ivancevich, (2012). *Human Resource Management*, New Delhi: McGraw Hill. Print.

Lynton, L. R., and Pareek, U., (2009). *Training for development*, New Delhi: Vistaar publications. Print.

Rao, S. V., (2007). *Human Resources Management: Text and Cases*, New Delhi: Excel Books. Print.

Robbins, S. P., and DeCenzp, D. A., (2004). *Personnel and/Human Resource Management*, New Delhi: Wiley. Print.

Stone, R. J., (2005). *Human Resources Management*, New York: John Wiley & Sons. Print.

**PPY4409M ORGANISATIONAL DEVELOPMENT AND INTERVENTION****(THEORY)****LEARNING OUTCOME**

4 hrs./Wk.

On successful completion of the course, the student will be able to

- explain the process of change management
- analyse various interventional strategies
- acquire strategies to become organizational change facilitators

## COURSE CONTENT:

- UNIT I: INTRODUCTION** 10 hrs.  
Meaning and definition – history of Organisational Development (OD) – relevance of organizational development for managers.  
Characteristics of OD: Values – assumptions – beliefs in OD.
- UNIT II: THEORY AND MANAGEMENT** 12hrs.  
Foundations of organizational development: Models and theories of planned change – systems theory – participation and empowerment – teams and teamwork.  
Managing the OD process: Diagnosis – action component.  
OD interventions.
- UNIT III: INTERVENTIONS** 12hrs.  
Overview of OD Interventions – classifying OD interventions.  
Team interventions: Teams and work groups – broad team – building interventions.
- UNIT IV: STRUCTURAL INTERVENTION:** 14 hrs.  
Work redesign – work modules – Quality of Work Life (QWL) – Management by Objectives (MBO) – Quality Circles (QC).  
Behavioural interventions: Sensitivity training – career advancement.  
Inter-growth interventions: Team building – Survey feedback – Rensis Likert's system 4 management – Grid OD.  
Executive coaching: Process consultation – succession planning – mentoring.  
Mergers and acquisitions – conflict resolution.
- UNIT V: OD-HRD INTERFACE:** 12 hrs.  
OD-HRD interface – participation of top management in OD/HRDE – OD research and practice in perspective – future of OD.

## TEXT BOOK(S):

- French, L. W., Bell, H. C., and Vohra, V., (2006). *Organization Development*, New Delhi: Pearson Education. Print.
- Schien, (2005). *Organizational Psychology*, New Delhi: Tata McGraw Hill. Print.

## REFERENCE BOOK(S):

- Blanchard, H. B., and Hersey, P., (1989). *Management of Organisational Behaviour: Utilising Human Resources*, New Delhi: Prentice Hall. Print.
- Hackman, R. J., and Suttle, L. J., (1977). *Improving Life at Work: Behavioural Science, Approach to Organisational Change*, California: Goodyear. Print.
- Harvey, F. D., Brown, R. D., and Cliffs, J. N., (1990). *An Experimental Approach to Organization Development*, New Delhi: Prentice-Hall. Print.
- Huse, E. F., and Cummings, C. T., (1985). *Organisation Development and Change*, New York: Cengage learning. Print.
- Pareek, U., Rao, V. T., and Pestonjee, M. D., (1981). *Behavioural Processes in Organisations*, New Delhi: Oxford and IBH. Print.

## PPY45030 CONSUMER BEHAVIOUR

### (THEORY)

#### LEARNING OUTCOME

5 hrs./wk.

On successful completion of the course, the student will be able to

- describe concepts in the field of Consumer Behaviour
- examine the social and cultural influences on consumers
- apply behavioural concepts to marketing strategies and decision making in marketing sectors

#### COURSE CONTENT:

##### UNIT I: NATURE OF CONSUMER BEHAVIOUR

15 hrs.

Introduction – understanding consumer and market segments – demographic characteristics and market segmentation – demographic – behavioural – psychographic – geographic segmentation – limitations of demographics in predicting consumer behaviour – Lifestyle and Psychographic segmentation – benefit segmentation

##### UNIT II: INDIVIDUAL DETERMINANTS OF CONSUMER BEHAVIOUR

15 hrs.

Personality and self-concept – psychographics – consistency of the self-motivation and involvement – nature and role of motives – classifying motives – motive arousal – motive structuring – involvement – Information processing – information acquisition – perceptual encoding – marketing implications – learning and memory – characterizing learning – classifying learning – attitudes – characteristics of attitudes – functions of attitudes – sources of attitude development – strategies for changing attitudes and intentions – communication process – factors: source – message – receiver.

##### UNIT III: ENVIRONMENTAL INFLUENCES ON CONSUMER BEHAVIOUR

15 hrs.

Culture – cultural values – cultural change and countercultures – cross-cultural understanding of consumer behaviour – subcultures.

Social class – nature of social class – social class measurement and categorization – social class lifestyles – role of social class in segmenting markets – social class and consumer behaviour.

Social groups – classification of groups – group properties – reference groups.

Family – family life cycle – family purchasing decision – opinion leadership in marketing – adoption and diffusion of innovations – social media and its influence.

##### UNIT IV: CONSUMER DECISION PROCESSES

15 hrs.

Problem recognition – types of consumer decision – types of problem recognition – situations leading to problem recognition – measuring problem recognition – Search and evaluation – Information search process – information evaluation process – purchasing processes – recognition of needs and wants – information search – evaluation of choices – purchase – and post purchase evaluation.

Post purchase behaviour – social media influence – organizational buyer behaviour – influences on organizational buyer behaviour – organizational buying decisions – product positioning – Brand positioning – Relationship marketing – Experiential marketing – differences between online and offline shopping.

##### UNIT V: MODELING AND RESEARCHING CONSUMER BEHAVIOUR

15 hrs.

Modeling behaviour – models of consumer behaviour – consumer research strategies – methods of gathering consumer information.

Consumerism – consumer safety – consumer information – environmental redress – environmental concerns – consumer’s responsibilities.

**TEXT BOOK(S):**

David, L. L., and Albert, D. J., (2002). *Consumer Behaviour*. New Delhi: Prentice Hall of India. Print.

Kurder, K., (2002). *Consumer Behaviour*. New Delhi: Pearson. Print.

Schiffman, G. L., and Kanuk, L. L., (2007). *Consumer Behaviour*. New Delhi: Prentice-Hall of India. Print.

**REFERENCE BOOK(S):**

Belk, R. W., Fischer, E. and Kozinets R. V., (2013). *Qualitative Consumer and Marketing Research*, Los Angeles: SAGE Publications Ltd. Print.

Belk, R. W., (Ed.) (2006). *Handbook of Qualitative Research Methods in Marketing*, USA: Edward Elgar. Print.

Daniela, M. A., (2011). *Fundamental Theories on Consumer Behaviour: An Overview of the Influences Impacting Consumer Behaviour*, “Ovidius” University Annals, Economic Sciences Series. Print. 11 (2), 837- 841.

Haugtvedt, C. P. and Herr, P.M. Kardes, F. R., (2008). (Eds). *Handbook of Consumer Psychology*, New York: Taylor and Francis Group. Print.

Howard, D. J., Kirmani, A., and Rajagopal, P., (Eds.) (2013). *Social Influence and Consumer Behaviour*, New York: The Psychology Press. Print.

Kirmani, A., (2009). *The self and the brand*. Journal of Consumer Psychology, Print. 19, 271–275.

Kopetz, C. E., Kruglanski, A. W., Arens, Z. G., Etkin, J., and Johnson, H. M., (2012). *The dynamics of consumer behavior: A goal systemic perspective*, Journal of Consumer Psychology. Print. 22 (2), 208 – 223.

Priest, J., Carter, S., and Statt, D. A., (2013). *Consumer Behaviour*, UK: Edinburgh Business School. Print.

**SPECIALIZATION II - COUNSELLING AND PSYCHOTHERAPY**

**PPY3408M COUNSELING AND PSYCHOTHERAPY – I**

**(THEORY)**

**LEARNING OUTCOME**

4 hrs./wk.

On successful completion of the course, the student will be able to

- recognize the major approaches and therapies involved in counseling
- infer the relation between the various approaches and the therapies
- evaluate the differences between the various approaches and its influence on counseling

**COURSE CONTENT:**

**UNIT 1: INTRODUCTION TO COUNSELING & PSYCHOTHERAPY**

11 hrs.

Counselor as a therapeutic person – Personal therapy for the counselor – counselor values and therapeutic process – multicultural counselor – issues faced by the beginning counselor – ethical issues in counseling practice – Psychotherapy – definition – therapeutic alliance – empirically supported treatments – therapeutic formulations – brief introduction to various approaches:

overview of background focused treatment systems – emotion focused treatment systems – thought focused treatment systems – action focused treatment systems.

**UNIT II: TREATMENT SYSTEM EMPHASIZING BACKGROUND** 11 hrs.

Psychoanalytic therapy – goals of Psychoanalysis – therapeutic process – application: therapeutic techniques and procedures: hypnosis – transference and counter transference – free association – abreaction – interpretation and analysis – contemporary trends – Psychoanalytic theory from a multicultural perspective – contributions of Psychoanalytic and modern Psychoanalytic approach – applications – evaluations.

**UNIT III: ANALYTICAL THERAPY** 12 hrs.

Analytical Psychology: therapeutic techniques: dialectical method – active imagination – dream analysis – use of creative techniques – amplification – transference and counter transference – interpretation – therapeutic process – efficiency of Analytical Psychology – Object Relations Theory – Self-Psychology – Relational Psychoanalysis.

**UNIT IV: INDIVIDUAL PSYCHOLOGY** 12 hrs.

Individual psychology: therapeutic techniques for adults and children – therapeutic process – application – evaluation – Brief Psychodynamic therapy: development – theoretical concepts – treatment – specific models of BPT – application – evaluation.

Indian approaches to psychotherapy: role of meditation – yoga – sadhana.

**UNIT V: HUMANISTIC, EXISTENTIAL AND GESTALT THERAPIES** 14 hrs.

Person centered therapy: Carl Rogers – non-directive counseling – necessary and sufficient conditions – therapeutic techniques: congruence or genuineness – unconditional positive regard – empathy. therapeutic process – application – current use – evaluation – existential therapy: therapeutic techniques: dialectic method – educating the client about existential therapy – developing an authentic relationship – phenomenological perspective – acceptance – confrontation – encouragement – paradoxical intention – de-reflection – therapeutic process – application – evaluation – Gestalt therapy: Fritz Perls – therapeutic techniques: commonly used and specialized – therapeutic process – efficacy of gestalt therapy – Transactional Analysis – treatment using ta – application – evaluation. reality therapy: William Glasser – view on human nature – key concepts – therapeutic techniques: environmental elements – therapeutic process – application – evaluation.

**TEXT BOOK(S):**

Corey, G. (2013). *Theory & Practice of Counseling and Psychotherapy*. New Delhi: CENAGE Learning. Print.

Neukrug, E. (2012). *Counseling Theory & Practice*. New Delhi: CENAGE Learning. Print.

Seligman, L. W., and Reichenberg, L. W. (2011). *Theories of counseling and psychotherapy*. New Delhi: Pearson Education Incorporation. Print.

**REFERENCE BOOK(S):**

Antony D.J., (2003). *Psychotherapies in counseling*. Dindhugal Anugraha publications. Print.

Kakar S. (Ed.) (2005). *Freud Along the Ganges-Psychoanalytic Reflections on the People and Culture of India*. New York: Other Press. Print.

Carson, R. C., and Butcher, J. N. (2009). *Abnormal Psychology* (13<sup>th</sup> ed.). New Delhi: Pearson Education Incorporation. Print.

Gelso, C. J., and Fretz, B. R., (1995). *Counseling Psychology*. Bangalore: Prism Books. Print.

Soundararajan, R. (2012). *Counseling Theory, Skills and Practice*. New Delhi: Tata-McGraw Hill. Print.

Alexander. F and French. T M. (1980). *Psychoanalytic Therapy -Principles and Application*. London: Institute of Psychoanalysis and Hogarth Press. Print.

Kakar. S., (1996) *Culture and Psyche: Selected Essays*. Delhi: Oxford University Press. Print.

## PPY4408M COUNSELING IN VARIOUS SETTINGS

### (THEORY)

#### LEARNING OUTCOME

4 hrs. /wk.

On successful completion of the course the student will be able to

- recognize the various settings where counseling can be used
- analyze the differences in techniques required for counseling in various settings
- demonstrate the ability to apply appropriate counseling technique

#### COURSE CONTENT:

##### UNIT I: INTRODUCTION TO GUIDANCE AND COUNSELING

11 hrs.

Guidance and counseling – factors contributing to the emergence of counseling – moral and philosophical issues – goals – important periods in the development of counseling – evolution of counseling and guidance movement in India – counseling movement in modern times and after independence – guidance services in India: organization – popularization and co-ordination. individuals group counseling: similarities and differences – group counseling – group psychotherapy: psychodrama – T-groups – encounter groups – group marathons – self-help / support groups – types of groups: psycho-educational groups – counseling groups – psychotherapy groups – task / work groups.

##### UNIT II: EDUCATIONAL AND VOCATIONAL GUIDANCE

13 hrs.

Guidance need related to education – counseling need to elementary, middle and secondary school level – role of teacher in counseling – educational counseling in the Indian context: evaluation of programs of educational counseling – educational guidance in India: guidance at N.C.E.R.T – all India educational and vocational guidance association – education commission – vocational guidance: definition – distinction between vocational counseling and vocational guidance – need – principles – process – steps – aims and objectives – exploration and contract setting – state of critical decision – responsibility of the school.

##### UNIT III: GUIDANCE OF CHILDREN AND ADOLESCENTS

12 hrs.

Children – problem children – causes – defects and abnormalities – cure –backward children: problems – causes – identification – solution – counseling the slow learner – gifted children: problems – behaviour patterns – adjustment issues – approaches to meeting the needs – special treatment – education – Indian context – exploring adolescent problems: characteristics – resilience – common difficulties and disorders: sexual problems – drug use – juvenile delinquency – depression and suicide – interrelations of adolescent problems – prevention and intervention.

##### UNIT IV: INDUSTRIAL COUNSELING, FAMILY AND MARRIAGE COUNSELING

11 hrs.

Industrial counseling: absenteeism – burn out – depression – substance abuse. counseling for recruitment – induction – training job – retention and retirement – positive way of structuring time – job satisfaction – factors – family and marriage counseling: changing forms of family life – beginning

of marriage – family life and family life cycle – premarital counseling – marriage counseling – couple and family counseling – family group consultation – legal aspects: Indian legal provisions – family courts – domestic violence – pre-examination counseling.

**UNIT V: SPECIAL AREAS IN COUNSELING**

13 hrs.

Counseling weaker sections and minorities – counseling for women empowerment – counseling of victims of abuse and violence – crisis intervention counseling – counseling in clinical setting: mental health counseling – counseling the sick: terminally ill: inpatient, outpatient, palliative care – counseling for caretakers of persons having mental illness and terminal illness – counseling for addicts: alcohol and substance abuse – digital addiction – social media – gadget addiction – counseling the physically challenged – geriatric counseling.

**TEXT BOOK(S):**

Sahajpal, P., and Rao, N. S. (2013). *Counseling and Guidance*. (3<sup>rd</sup> ed.). New Delhi: Tata McGraw hill Education Pvt. Limited. Print.

Sharma, R., and Sharma, R. (2013). *Guidance and counseling in India*. New Delhi: Atlantic Publishers & Distributors Pvt. Limited. Print.

**REFERENCE BOOK(S):**

Gladding, T. S. (2009). *Counseling*. New York: Dorling Kindersley Pvt. Ltd. Print.

Gibson, R. L., and Mitchell, M. H. (2015). *Introduction to Counseling and Guidance*. (7<sup>th</sup> ed.). New Delhi: Pearson India Education Services Pvt. Ltd. Print.

Kinra, A. K. (2013). *Guidance and Counseling*. India: Darling Kindersley Pvt. Ltd. Print.

Santrock J. (2006). *Adolescence* (11<sup>th</sup> ed.). New Delhi: Tata McGraw Hill Publications. Print.

Soundararajan, R. (2012). *Counseling Theory, Skills and Practice*. New Delhi: Tata-McGraw Hill. Print.

Vishala, S. (2012.). *Guidance and Counseling (for Teachers, Parents and Students)* (2<sup>nd</sup> ed.). New Delhi: S. Chand & Company Limited. Print.

**PPY45040 HEALTH PSYCHOLOGY  
(THEORY)**

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- recognize the basic issues related to human health
- analyze health issues from the biological, psychological and social perspectives
- evaluate the importance of research findings in health Psychology in contemporary social living

**COURSE CONTENT:**

**UNIT I: FOUNDATIONS OF HEALTH PSYCHOLOGY**

15 hrs.

Definition – mind-body relationship – Bio-psychosocial model – need for health psychology – application – systems of the body: nervous system – endocrine system – cardio vascular system – respiratory system – digestive system – reproductive system – immune system.

**UNIT II: HEALTH BEHAVIOUR & PRIMARY PREVENTION**

15 hrs.

Health behaviour – changing health habits – health behaviour change – cognitive behavioural approach – Trans-theoretical model – social engineering – venues for health habit modification – specific health related behaviour: exercise – accident prevention – cancer related health behaviour

– developing a healthy diet – weight control and obesity – stigma of obesity – eating disorder and sleep – health compromising behaviour: substance dependency – alcohol dependency – preventive approaches to alcohol abuse. smoking – social engineering and smoking.

**UNIT III: STRESS AND COPING** 14 hrs.

Definition of stress – theoretical contribution – assessing stress – dimensions of stressful events – studying stress – sources of chronic stress – moderators of stress experience – coping with stress – source of resilience – coping outcomes – social support – coping interventions: mindfulness training – expressive writing – relaxation training.

**UNIT IV: THE PATIENT IN THE TREATMENT SETTING** 16 hrs.

Using health services – recognition and interpretation of symptoms – people who use health services – misusing health services – patient provider relationships – health care provider: nature – consequence of poor communication – ways for improvement – hospital setting: structure and functioning of hospital – burnout among health care professions – impact of hospitalization of the patient – management of pain and discomfort: significance – nature – clinical issues – pain control techniques – management of chronic pain – placebo effect.

**UNIT V: MANAGEMENT OF CHRONIC AND TERMINAL ILLNESS** 15 hrs.

Management of chronic illness – quality of life – chronic illness – emotional response – personal issue – coping strategies – co-management – psychological intervention – psychological issues in advancing and terminal illness – death across the life span – psychological issues in advancing illness – theory on stages of dying – terminal illness – psychological management – alternative to hospital care – problems of survivor – heart diseases – hypertension – stroke and diabetes – Psycho-neuro-immunology – AIDS – cancer and arthritis – health promotion – trends in health Psychology.

**TEXT BOOK(S):**

Taylor, S. E. (2012). *Health Psychology*. New Delhi: Tata McGraw Hill. Print.

**REFERENCE BOOK(S):**

Ghosh, M. (2014). *Health Psychology: Concepts in Health and Well-being*. New Delhi: Pearson. Print.

Marks, D. F. and Murray, M. (2011). *Health Psychology-Theory, Research & Practice*. New Delhi: SAGE publications. Print.

Ogden, J. (2009). *Health Psychology*. New Delhi: Tata McGraw Hill. Print.

Sarafino, E. P. and Smith, T. W. (2011). *Health Psychology: Bio psychosocial Interactions*. New Delhi: Wiley Pvt. Ltd. Print.

**COMMON COURSES FOR BOTH THE SPECIALIZATION**

**PPY35020 POSITIVE PSYCHOLOGY  
(THEORY)**

**LEARNING OUTCOME**

5 hrs./wk.

On successful completion of the course, the student will be able to

- identify the role of positive emotions and optimism in mental well being
- apply the elements of positive psychology in the day to day living
- appreciate the positive perspective in the application of Psychological insights

## COURSE CONTENT:

### UNIT I: INTRODUCTION 15 hrs.

Positive Psychology: western perspectives: hope – eastern perspectives: Confucianism – Taoism – Buddhism – Hinduism – goals – assumptions – definitions – classification and measures of human strength and positive outcomes – Positive Psychology in context: developing strengths and living well in a cultural context – living well at every stage of life – difference between positive psychology and other fields.

### UNIT II: POSITIVE EMOTIONAL STATES AND PROCESSES 15 hrs.

Positive emotions: positive emotions and health resources – positive emotions and well-being – cultivating positive emotions – principles of pleasure: understanding positive affect – happiness and well-being – two traditions – subjective well-being: the hedonic basis of happiness – self-realization, the Eudaimonic basis of happiness – comparing hedonic and Eudaimonic views of happiness – happiness across the life span – gender and happiness – marriage and happiness – making the most of emotional experiences: emotion-focused coping – emotional intelligence – socio-emotional selectivity – emotional storytelling.

### UNIT III: POSITIVE COGNITIVE STATES AND PROCESSES 14 hrs.

Seeing our future through self-efficacy: childhood antecedents – optimism and hope – wisdom and courage: two universal virtues – mindfulness, flow and spirituality: in search of optimal experiences – positive beliefs – interconnections of the “Good” and the “Bad” – contours of a positive life – meaning and means.

### UNIT IV: UNDERSTANDING AND CHANGING HUMAN BEHAVIOUR 16 hrs.

Self-regulation and self-control: value of self-control – personal goals and self-regulation – goals that create self-regulation problems – everyday explanations for self-control failure – goal disengagement  
Resilience: resilience – sources of resilience – growth through trauma  
Prosocial behaviour: empathy and egotism: portals to altruism – gratitude and forgiveness – attachment – love and flourishing relationships – balanced conceptualizations of mental health and behaviour – interceding to prevent bad and enhance the good.

### UNIT V: POSITIVE ENVIRONMENTS 15 hrs.

Positive schooling – good work: the psychology of gainful employment – Me/We balance: individualism “Psychology of Me” – collectivism “Psychology of We” – “Psychology of Us” – building better communities – a positive look at the future of psychology: tackling the fundamental dilemma: the good versus bad – spirituality and positive psychology – building a universal positive psychology.

### TEXT BOOK(S):

Baumgardner, S. R. and Crothers, M. K. (2009). *Positive psychology*, New Jersey: Prentice Hall/Pearson Education. Print.

Snyder, R. S., (2007). *Positive Psychology: The Scientific & Practical exploration of human strengths*, New Delhi: Sage Publications. Print.

### REFERENCE BOOK(S):

Csikszentmihalyi, M., (1990). *Flow: The Psychology of Optimal Experience*, New York: Harper & Row. Print.

Seligman M., (2002). *Authentic Happiness: Using the New Positive Psychology to Realise your Potential for Lasting Fulfilment*, New York: Atria. Print.

Duckworth, A., *Grit: The Power of Passion and Perseverance*, Print.

## PPY3402E MICRO SKILLS IN COUNSELING

(THEORY)

LEARNING OUTCOME

4 hrs. /wk.

On successful completion of the course the students will be able to

- describe the micro-skill model of counseling
- analyze the importance of the skills in the field of counseling
- apply the required skills of a counselor

COURSE CONTENT:

### UNIT I: PRE-HELPING PHASE I

10 hrs.

Acquainting stage – counselor’s skill: acquainting – counselee’s task: associating – observing stage – counselor’s skill: observing – counselee’s task: manifesting – skill development activities: exploring: elements of facial expression – eye contact – use of body language.

### UNIT II: PRE-HELPING PHASE II

12 hrs.

Founding stage – counselor’s skill: founding – counselee’s task: involving – diagnosing stage – counselor’s skill: diagnosing – counselee’s task: investigating – skill development activities: identifying problems – clarification of problems.

### UNIT III: HELPING PHASE I

12 hrs.

Pacing stage – counselor’s skill: pacing – counselee’s task: exploring – personalizing stage – counselor’s skill: personalizing – counselee’s task: understanding – skill development activities: responding and paraphrasing – empathy building statements – exploring ethics of empathy.

### UNIT IV: HELPING PHASE II

12 hrs.

Reframing stage – counselor’s skill: reframing – counselee’s task: reorienting – Initiating stage – counselor’s skill: initiating – counselee’s task: acting – skill development activities: in touch with feelings – tracing earliest memory – focusing exercises.

### UNIT V: POST HELPING PHASE

14 hrs.

Evaluating stage – counselor’s skill: evaluating – counselee’s task: reviewing – skill development activities: least and most significant – self-monitoring – pairs evaluation – journal reflections – counseling skills format – Gendlin’s focusing exercise.

- Demonstration of counseling to be done as a class room activity
- Counseling verbatim to be given an assignment

TEXT BOOK(S):

Antony, D. J., (2003). *Skills of counseling*, Dindugul: Anugraha Publications. Print.

Burnard. P., (2002). *Counselling Skills training - A sourcebook of activities for trainers*, New Delhi: Viva books Pvt. Ltd. Print.

REFERENCE BOOK(S):

Burnard, P., (2002). *Counseling skills training, A sourcebook of activities*, New Delhi: Viva Books. Print.

Jones, R. N., (2012). *Basic counseling skills*, New Delhi: SAGE publications. Print.

McLeod, J. (2009). *Counseling skill*, New Delhi: Rawat Publications. Print.

## CENTRE FOR ENTREPRENEURSHIP DEVELOPMENT

### PREAMBLE

To develop vocational skills of the students and instill the seed of entrepreneurship, the college has offered many vocational courses in semester III. Two Semester-Long Programme CED3231VL AARI AND ZARDHOSI and CED3233VL BAKERY AND FOOD PRESERVATION are changed to crash courses with the course codes CED3232VS and CED3233VS respectively. Three new courses are introduced PHY3201VS MAINTENANCE OF HOME APPLIANCES, CED3234VS MINIATURE MODELING and CED3235VS WEB DESIGNING from 2018 batch onwards.

### COURSE PROFILE

#### FROM 2018 BATCH ONWARDS

Course Code	Course Title	Credits	Passed in Academic Council	Offered to	Offered by
CED3232VS*	AARI AND ZARDHOSI WORK	2		ALLM	CED
CED3233VS*	BAKERY AND FOOD PRESERVATION	2		ALLM	CED
CED3234VS	MINIATURE MODELING	2		ALLM	CED
CED3235VS	WEB DESIGNING	2		ALLM	CED
PHY3201VS	MAINTENANCE OF HOME APPLIANCES	2		ALLM	PHY

\* content remains the same, but the course code has been changed

### CED3234VS MINIATURE MODELLING

#### LEARNING OUTCOME

2 hrs./wk.

On successful completion of the course, the student will be able to

- develop the knowledge for miniature designing
- create and design traditional miniature items
- demonstrate skills in miniature modeling

#### COURSE CONTENT:

##### UNIT I: ENTREPRENEURSHIP

6 hrs.

Concept of Entrepreneurship – Qualities of Entrepreneurs – Product Selection – Institutional Support – DIC, MSME DI – Infrastructural support schemes – Sources of Finance – Government Assistance – Skill development – Skill India, NSDC – Start Ups – Angel Investors – Preparation of cash book and statement of cost and profit – Advertising and sales promotion for small business

##### UNIT II:

24 hrs.

Types of traditional miniature items – Wet and dry grinder, artificial plant, fruit basket, pooja plate, salt box.

#### REFERENCE BOOK(S):

Christiane Berridge Making *Miniature* UK: Gulid of Master Craftsman publications, 2003.Print.  
Jane Harrop *Finishing Touches* California: Davis and Charles publications, 2002.Print.

## CED3235VS WEB DESIGNING

### LEARNING OUTCOME

2 hrs. / wk.

On successful completion of the course, the student will be able to

- recognize the elements of HTML
- design a webpage with CSS
- develop a website with necessary functionality

### COURSE CONTENT:

#### UNIT I: ENTREPRENEURSHIP

6 hrs.

Concept of Entrepreneurship – Qualities of Entrepreneurs – Product Selection – Institutional Support – DIC, MSME DI – Infrastructural support schemes – Sources of Finance – Government Assistance – Skill development – Skill India, NSDC – Start Ups – Angel Investors – Preparation of cash book and statement of cost and profit – Advertising and sales promotion for small business

#### UNIT II:

24 hrs.

Hyper Text Markup Language(HTML) Introduction to elements of HTML Working with Text, Hyperlinks and Images – Cascading Style Sheets(CSS) Creating a style sheet CSS properties – CSS styling Java Script – Introduction – Types – Conditional statements Loops Pop up boxes – Working with Templates – Demo on website to App conversion.

### REFERENCE BOOK(S):

Badi, R.V. and N.V. Badi. *Entrepreneurship*. New Delhi: Vrinda Publications Pvt. Ltd., 2005. Print.

### WEBSITE(S):

<https://www.tutorialspoint.com/html/>

<https://www.w3schools.com/Js/>

<https://www.csstutorial.net/>

## PHY3201VS MAINTENANCE OF HOME APPLIANCES

### LEARNING OUTCOME:

2 hrs./wk.

On successful completion of the course, the student will be able to

- identify the working principles of basic kitchen appliances
- identify and trouble shoot the dysfunctional modules
- develop confidence in handling in repair work

### COURSE CONTENT:

#### UNIT I: ENTREPRENEURSHIP

6 hrs.

Concept of Entrepreneurship – Qualities of Entrepreneurs – Product Selection – Institutional Support – DIC, MSME DI – Infrastructural support schemes – Sources of Finance – Government Assistance – Skill development – Skill India, NSDC – Start Ups – Angel Investors – Preparation of cash book and statement of cost and profit – Advertising and sales promotion for small business

#### UNIT I: HOME APPLIANCES: MAINTENANCE & TROUBLE SHOOTING

24 hrs.

Introduction to the working mechanism of mixer, juicer and grinder – Technical knowledge and fault diagnosis skills – Replacing dysfunctional module (demonstration and hands on training) Microwave oven: technical knowledge fault diagnosis skills – Repairing dysfunctional microwave oven (demonstration and hands on training).

#### REFERENCE BOOK(S):

Badi, R.V. and N.V. Badi. *Entrepreneurship*. New Delhi: Vrinda Publications Pvt. Ltd., 2005. Print.  
Grob B, *Basic Electronics*, 10<sup>th</sup> edition, New Delhi: Mc Graw Hill International Publication, 2009. Print.

#### WEBSITE(S):

[http://www.accuratebuilding.com/publications/family\\_circle/home\\_appliance\\_repair\\_guide\\_circle1983.pdf](http://www.accuratebuilding.com/publications/family_circle/home_appliance_repair_guide_circle1983.pdf)

(For the following courses, content remains the same, but the course code has been changed and the content is presented in this academic council booklet)

### CED3232VS AARI AND ZARDHOSI WORK

#### LEARNING OUTCOMES

2 hrs. / wk.

On successful completion of the course the student will be able to

- acquire basic skill of aari and zardhosi work
- make different types of zardhosi in blouses
- start their own venture

#### COURSE OUTLINE

##### UNIT I: ENTREPRENEURSHIP

6 hrs.

Concept of Entrepreneurship – Qualities of Entrepreneurs – Product Selection – Institutional Support – DIC, MSME DI – Infrastructural support schemes – Sources of Finance – Government Assistance – skill development – Skill India, NSDC – Start Ups – Angel Investors – Preparation of cash book and statement of cost and profit – Advertising and sales promotion for small business

##### UNIT II:

24 hrs.

Padagam (Basic Stitch) – Closed V – Katta, V- Katta and Katta – Giju/Ambea – Salli and Load – Jamki and Sugar Beads – Running Zardhosi – Leaf Zardhosi – Murruku Zardhosi – Checked Zardhosi – Tracing and Practical Design

#### REFERENCE BOOK(S)

Gupta, Charu Smita. *Zardhosi: Glittering Gold Embroidery*. USA: Abhinav Publications, 2009. Print.  
Badi, R.V. and N.V. Badi. *Entrepreneurship*. New Delhi: Vrinda Publications Pvt. Ltd., 2005. Print.

### CED3233VS BAKERY AND FOOD PRESERVATION

#### LEARNING OUTCOMES

2 hrs. / wk.

On successful completion of the course, the student will be able to

- understand the basics of baking and sweetmeat making
- bake cakes, cookies and make sweets
- develop techniques for food preservation
- maintain quality control in production, as well as storage

#### COURSE OUTLINE

##### UNIT I: ENTREPRENEURSHIP

6 hrs.

Concept of Entrepreneurship – Qualities of Entrepreneurs – Product Selection – Institutional Support – DIC, MSME DI – Infrastructural support schemes – Sources of Finance – Government Assistance – skill development – Skill India, NSDC – Start Ups – Angel Investors – Preparation of cash book and statement of cost and profit – Advertising and sales promotion for small business

**UNIT II: PREPARATION OF BAKERY PRODUCTS AND FOOD PRESERVATION**

24 hrs.

Tea Cake, Chocolate Cake, Cookies, Sweets and Chocolates, Chocolate Bouquets – Food Preservation – Juices and Syrups – Jam – Pickle and Ready-mix – Safety issues with Do's and Don'ts

**REFERENCE BOOK(S)**

Kumar, Ashok Yogambal. *Textbook of Bakery and Confectionary*. New Delhi: PHI Learning Publications, 2010. Print.

Kapoor, Sanjeev. *Chocolate*. Mumbai: Popular Prakashan Publications, 2011. Print.

Reejhsinghani, Aroona. *Best of Indian Sweets and Desserts*. Mumbai: Jaico Publishing House, 2001. Print.

Chadwick, Janet. *The Beginner's Guide to Preserving Food at Home*. United States: Storey Publications, 2009. Print.

Rahman, Shafiur. *Handbook of Food Preservation*. 2<sup>nd</sup> ed. United States: CRC Press, 2007. Print.

Badi, R.V. and N.V. Badi. *Entrepreneurship*. New Delhi: Vrinda Publications Pvt. Ltd., 2005. Print.

**EVALUATION PATTERN**

Course Type	FORMATIVE				Total
	Skill Assessments		Assignment		
	No	RM	No	RM	
Crash Course /	1	40	1	20	100
Semester Long Programme	1	40			

Total hours for crash courses – 30 hours (2 hrs. per day – 15 days)

Total hours for semester long programme – 30 hours (2 hrs. per week)

## VALUE EDUCATION

### PREAMBLE

The Integrated Value Based Course (IVBC) programme has been instituted for the Undergraduate and Post Graduate Christian students in all semesters as value education from 2018 Batch onwards. The Course Content of UG & PG IVBC for the I & II Semesters has been passed in the Academic Council in 2018.

The following courses have been introduced Value Based Courses (VBC) in Semester VI and for IVBC in Semesters III to VI for the Undergraduate students from 2018 batch onwards.

- VBC6101FV ENHANCING SOCIAL GRACE
- UIV3101FI CIVICS AND THE BIBLE
- UIV4201FI HUMAN RIGHTS IN THE BIBLE
- UIV5201FI BIBLICAL PERSPECTIVES ON WOMEN
- UIV6101FI BIBLICAL PERSPECTIVES ON LEADERSHIP

The following courses have been introduced for the VBC and IVBC in Semesters III & IV for the Postgraduate students.

2018 Batch onwards:

- PGV3101PV BASIC TENETS OF MAJOR RELIGIONS
- PGV3102PV CULTURAL HERITAGE AND VALUES IN INDIA
- PGV4103PV IN TUNE WITH NATURE
- PIV3101PI BIBLICAL ETHICS
- PIV4101PI BIBLICAL PERSPECTIVES ON GENDER

2019 Batch onwards:

- PGV3103PV PROFESSIONAL ETHICS

The present curriculum of IVBC was reviewed and based on which it is found necessary to introduce a few changes in the following courses from 2019 batch onwards.

- PIV1102PI THE BIBLE AND SCIENCE
- PIV2102PI RIGHTS, RESPONSIBILITIES AND THE BIBLE

The course profile along with the syllabi of the modified and new courses are presented. A revised evaluation pattern for Value Education for Under Graduate and Post Graduate students have also been brought forth.

**COURSE PROFILE**  
**UG – VALUE EDUCATION**

**2018 BATCH ONWARDS**

Sem.	Part IV	Course Code	Course Title	Course Type	Hrs./ Wk.	Credits	Passed in Academic Council	Offered to	Offered by
I	VBC	VBC1101FV	Healthy Transition from Adolescence to Adulthood	TH	2	1	BA2018	ALLM	Centre for VE
	IVBC	UIV1101FV* / UIV1101FI	Biblical Essentials for Emerging Adults	TH	2	1	BA2018	AUCH/ SUCH	Centre for VE
II	VBC	VBC0102FV/ VBC0103FV	Civic Education / Family Life Education	TH	1	1	AV2014	ALLM	Centre for VE
	IVBC	UIV2101FV* / UIV2101FI	Biblical Foundations for Family Life	TH	1	1	BA2018	AUCH/ SUCH	Centre for VE
III	VBC	VBC0102FV/ VBC0103FV	Civic Education / Family Life Education	TH	1	1	AV2014	ALLM	Centre for VE
	IVBC	UIV3101FI	CIVICS AND THE BIBLE	TH	1	1		AUCH/ SUCH	Centre for VE
IV	VBC	VBC0202FV/ VBC0203FV	Human Rights and Duties/ Foundation Course on Women's Studies	TH	2	2	AV2014 /AY2016	ALLM	Centre for VE
	IVBC	UIV4201FI	HUMAN RIGHTS IN THE BIBLE	TH	2	2		AUCH/ SUCH	Centre for VE
V	VBC	VBC0202FV/ VBC0203FV	Human Rights and Duties/ Foundation Course on Women's Studies	TH	2	2	AV2014 / AY2016	ALLM	Centre for VE
	IVBC	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN	TH	2	2		AUCH/ SUCH	Centre for VE
VI	VBC	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1	1		ALLM	Centre for VE
	IVBC	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP	TH	1	1		AUCH/ SUCH	Centre for VE

\*2018 Batch

2019 BATCH ONWARDS

Sem.	Part IV	Course Code	Course Title	Course Type	Hrs./ Wk.	Credits	Passed in Academic Council	Offered to	Offered by
I	VBC	VBC1101FV	Healthy Transition from Adolescence to Adulthood	TH	2	1	BA2018	ALLM	Centre for VE
	IVBC	UIV1101FI / UIV1101FI	Biblical Essentials for Emerging Adults	TH	2	1	BA2018	AUCH/ SUCH	Centre for VE
II	VBC	VBC0102FV/ VBC0103FV	Civic Education / Family Life Education	TH	1	1	AV2014	ALLM	Centre for VE
	IVBC	UIV2101FI / UIV2101FI	Biblical Foundations for Family Life	TH	1	1	BA2018	AUCH/ SUCH	Centre for VE
III	VBC	VBC0102FV/ VBC0103FV	Civic Education / Family Life Education	TH	1	1	AV2014	ALLM	Centre for VE
	IVBC	UIV3101FI	CIVICS AND THE BIBLE	TH	1	1		AUCH/ SUCH	Centre for VE
IV	VBC	VBC0202FV/ VBC0203FV	Human Rights and Duties/ Foundation Course on Women's Studies	TH	2	2	AV2014 /AY2016	ALLM	Centre for VE
	IVBC	UIV4201FI	HUMAN RIGHTS IN THE BIBLE	TH	2	2		AUCH/ SUCH	Centre for VE
V	VBC	VBC0202FV/ VBC0203FV	Human Rights and Duties/ Foundation Course on Women's Studies	TH	2	2	AV2014 / AY2016	ALLM	Centre for VE
	IVBC	UIV5201FI	BIBLICAL PERSPECTIVES ON WOMEN	TH	2	2		AUCH/ SUCH	Centre for VE
VI	VBC	VBC6101FV	ENHANCING SOCIAL GRACE	TH	1	1		ALLM	Centre for VE
	IVBC	UIV6101FI	BIBLICAL PERSPECTIVES ON LEADERSHIP	TH	1	1		AUCH/ SUCH	Centre for VE

## VBC6101FV ENHANCING SOCIAL GRACE

(THEORY)

### LEARNING OUTCOME:

1 hr./wk.

On successful completion of the course, the student will be able to

- recognize the importance of politeness in social interactions
- demonstrate etiquette and manners in the Indian context
- develop self-confidence to build healthy and long-lasting relationships

### COURSE CONTENT:

#### UNIT I: PERSONAL ETIQUETTE

5 hrs.

Social grace – Meaning and importance – Basic good manners – Verbal and non-verbal – Greetings – Respecting and acknowledging one another – Introducing oneself and others

#### UNIT II: SOCIAL ETIQUETTE

5 hrs.

Etiquette in work place and public places – Being punctual – Developing social courtesy – Manners relating to hygiene (personal & public) – Dining etiquette – Dressing etiquette – Driving etiquette

#### UNIT III: INTERPERSONAL ETIQUETTE

5 hrs.

Courteous communication – Telephone etiquette (phubbing) – Netiquette – Negotiating skills – Conflict resolution with peers and superiors – Expressing grievance and condolences.

### TEACHING METHODOLOGY:

Videos, Role plays, Demonstration, Dyadic interaction, Case studies, Reading, Writing, Assignments, Survey.

### REFERENCE BOOK(S):

Farley, Thomas. *Modern Manners: The Thinking Person's Guide to Social Graces*. New York, W.W. Norton & Co, 2005.Print.

Martin, Judy. *Miss Manners' Basic Training: The Right Thing to Say*, New York, Random Publication, 1989. Print.

Shepherd, Margaret. *The Art of Civilized Conversation: A Guide to Expressing Yourself with Style and Grace*. California, Three Rivers Press, 2005.Print.

### WEBSITE(S):

[http://www.toi.edu/Training%20Materials/leading%20spiritual%20movements/Student%20Notes/F1 Social%20Graces.pdf](http://www.toi.edu/Training%20Materials/leading%20spiritual%20movements/Student%20Notes/F1%20Social%20Graces.pdf) 28.2.19

<https://www.universalclass.com/i/course/childrenetiquette/syllabus.htm> 28.2.19

<http://urbanetiquetteproject.blogspot.com/> 28.2.19

## UIV3101FI CIVICS AND THE BIBLE

(THEORY)

### LEARNING OUTCOME:

1 hr./wk.

On successful completion of the course, the student will be able to:

- illustrate the civic heritage in the Old and New Testaments
- identify the key elements of citizenship
- develop social responsibilities in daily life

## COURSE CONTENT:

### UNIT I: CIVIC HERITAGE

5 hrs.

Jewish Culture – Customs Rending of garments (II Sam:11-12, Job 11:18-20), Hospitality (Gen:18:4, Jn: 13:12-17) – Festivals – Passover (Mtt:26:17-27), Feast of the unleavened bread (I Cor:5:6-8), Feast of First fruits (Lev: 23:9-14), Laws – Mosaic – divorce (Deut: 24:1-4, Matt 19:1-6), Slavery (Deut: 15:12-18), Genocide (Deut: 9) – Christian Culture – Understanding the purpose of the laws (Mtt:5, Gen 1:26ff, Gen 2:18, 2:24, 3:16) and its effects (Gal 3:28) – Mission Heritage – Establishment of missions – Mission work – William Carey, Bishop Robert Caldwell, Father Beschi, Katie Wilcox

### UNIT II: CIVIC RESPONSIBILITIES

5 hrs.

Social Structures – Tribal (Num:2, Judg:5:14, Judges: 9, 1), Theocracy (I Sam: 10:18), Monarchy (Deut:14) – Governance (Deut:16,17,18, Kings :17), Leaders – Abraham, Moses; Kings – David, Hezekiah; Prophets – Samuel, Isaiah – System of election (I Peter 1:1-2), Anointing (John 2:27, Exodus 29:7), Choosing (John15:16, Rom::8:28-30)  
Elements of Citizenship – Social – Concern for the underprivileged (Deut: 15:15, 6:21, 10:19, 16:12, 24:18, 24:22, Acts 6, Acts 4:34), Integrity (Deut: 25:15), morality (Eph:5:5), Political – Submitting to authority (Rom:13:2-7, Titus:3:1-3), Environmental Sustenance (Gen:2:15, Lev: 25:23-24, Ps: 104: 25-30).

### UNIT III: CHRISTIAN EDUCATION COUNCIL: OLD TESTAMENT (I-IV UNITS)

5 hrs.

Introduction – Concept of God – The Doctrine of Creation – The Concept of Sin

#### ACTIVITY:

Discussions on the socio-cultural issues related to the national /regional context (ex: bonded labour, stratification on the basis of caste, dowry system).

#### REFERENCE BOOK(S):

Blanchar Ken and Phil Hodges, *Lead Like Jesus*, Nashville: Thomas Nelson Publishers, 2006. Print.  
Dyer, Charles and Eugene Merrill, *Nelson's Old Testament Survey*, Nashville: Thomas Nelson Publishers, 2000. Print.  
Gaebelei Frank E. Ed, *The Expositor's Bible Commentary*, Michigan: Zondervan, 1991. Print.  
Hamilton Victor P, *Handbook on the Pentateuch*, Michigan, Baker Books, 1982. Print.  
Silva Moises, *The Essential Companion to Life in Bible Times*, Nashville, Zondervan, 2011. Print.  
Ross, Allen P. *Creation and Blessing: A Guide to the Study and Exposition of Genesis*, Michigan, Baker Books, 1996. Print.  
Zondervan, *NIV Cultural Backgrounds Study Bible: Bringing to Life the Ancient World of Scripture*, Zondervan, Michigan, 2016. Print.

#### WEBSITE(S):

<http://auministry.com/civic-responsibilities/>11.2 2019.

[https://www.openbible.info/topics/civic\\_duty](https://www.openbible.info/topics/civic_duty)11.2.2019.

<https://bible.org/seriespage/lesson-11-christian-citizenship-1-peter-213-17>, 12.2. 2019.

<https://www.ligonier.org/blog/christians-and-government/>12. 2019.

## UIV4201FI HUMAN RIGHTS IN THE BIBLE (THEORY)

### LEARNING OUTCOME:

2 hrs./wk.

On successful completion of the course, the student will be able to

- acquire an awareness of human rights and responsibilities
- examine human rights issues at all levels
- relate Biblical perspective of human rights protection to real life

### COURSE CONTENT:

#### UNIT I: UNDERSTANDING HUMAN RIGHTS

8 hrs.

Root Cause for Injustice – Greed for money wealth and sex (II Samuel 11 &12, 1 Kings 21) – Mosaic Law on Equality – Human as God's image (Gen1:27) – Honouring parents (Ex. 20:12) – No caste, colour, race distinctions (Gal. 3:28) – Parental Responsibilities (Eph. 6:4) – Protecting the marginalized (Prov. 22:22-23, Matt. 25:34-39) and aliens (Jer 7:5-7, Deu 23:7,24:14)

ACTIVITY: Role Play or Skit on Refugee Crisis / Racism / Plight of migrant workers

#### UNIT II: RIGHTS BASED ISSUES IN THE BIBLICAL CONTEXT

8 hrs.

Protection of the environment (Deut. 20:19-20, Deut. 23:12-13) – Sharing of Wealth (Acts 4:32-37). – Being humane and responsibility towards the needy (I Peter 2: 17, Levi 19:13-14, Proverbs 14:31) – Justice to the vulnerable (Psalm 82:3, Isaiah 1:17, I Kings 18:3-4) – Debts & Loans. (Levi 25:13-17).

ACTIVITY: Survey / Chart Preparation on issues of Environment or underprivileged communities

#### UNIT III: GLOBAL AND NATIONAL BODIES FOR HUMAN RIGHTS

9 hrs.

Christian Testimony in Secular / Christian Establishment & Civil Society. Amnesty International, National Human Rights Commission – National Commission for Minorities(NCM) in India - Police Stations /MCA/World Council of Churches (WCC)/ Christian Conference of Asia (CCA)/ National Council of Churches in India (NCCI)/ World Vision/Missionary Societies – Social Movements for Rights – Student Christian Movement/ International Justice Mission

ACTIVITY: Group Discussion on case studies on Christian Principles of Human Rights in National/International Institutions

#### UNIT IV: CHRISTIAN EDUCATION COUNCIL: OLD TESTAMENT (V-X UNITS)

5 hrs.

Character Study – I – Character Study – II – Wisdom Literature – Major Prophets – Minor Prophets – Messianic Hope

### ASSIGNMENT TOPICS:

- Give a Christian response to Human trafficking
- Review on documentary films

Sample videos:

GLS 2016 Grander Vision story – Quality health

<https://www.youtube.com/watch?v=KXWFXeIZY9g> 28.02.2019)

Child Labour: The Dark Side of Chocolate

<https://www.youtube.com/watch?v=0Mzs-kAiaU> 28.02.2019)

## REFERENCE BOOK(S):

- Agarwal H.O., *Implementation of Human Rights Covenants with Special Reference to India*, Allahabad, KitabMahal, 1993.Print.
- ArjunDev, Indiran Arjun Dev and Supta Das, *Human Rights, Delhi, A Source Book*,1996.Print.
- Bani Borgohain, *Human Rights – Social justice and Political challenge*, New Delhi,Kanishka Publishers,1999.Print
- Bhawathi P.N., *Human Rights & Social justice*, Delhi, 1997.Print.
- Baxi Upendra, *Right to be Human*, New Delhi, Laneer International,1987. Print.
- Desai A.R. *Violation of Democratic Rights in India, ed.*, Bombay, Popular Prakashan, 1986.Print.
- Desai A.R, *Repression and Resistance in India*, Bombay,Popular Prakashan, Bombay, 1990. Print.
- Devasia V.V, Leelamma Devasia, *Women social justice Human Rights*, Print.
- Hingorani R.C. *Human Rights in India*, New Delhi,Oxford and IBH Publishing Co.,1985.Print.
- Gokulish Sharma, *Human Rights Social Justice New Delhi*,Deep and Deep Publications,1997.Print.
- Krishna Iyer V.R., *Human Rights Past, Present and Future*,Print.
- Raja Muthuraman, *Human Rights*, Suriya Publishers, Tirchy,1996 Print.
- Institute of India and International Studies, Human Rights in India*, 2000.Print.

## N.G.O REPORT(S):

- Justice Rama, Joyce, Human Rights ICSSR.
- Annual Reports of Amnesty International

## WEBSITE(S):

- <https://www.compellingtruth.org/human-rights.html> 11.2. 2019
- <https://www.focusonthefamily.com/family-q-and-a/faith/what-the-bible-11.2.2019>
- [https://www.openbible.info/topics/human\\_rights](https://www.openbible.info/topics/human_rights) 11.2. 2019
- <https://www.thegospelcoalition.org/blogs/evangelical-history/the-christian-roots-of-human-rights/11.2.2019>
- <https://www.kingjamesbibleonline.org/Bible-Verses-About-Human-Rights/> 11.2. 2019

## UIV5201FI BIBLICAL PERSPECTIVES ON WOMEN

### (THEORY)

#### LEARNING OUTCOME:

2 hrs./wk.

On successful completion of the course, the student will be able to

- identify God's purpose for a righteous and just humankind
- recognize that the roots and structures of inequality that discriminate and subordinate women are human constructs
- interpret the challenges faced by the courageous women in the Bible, who used God's laws to secure justice
- define herself as an agent in implementing God's purposes

#### COURSE CONTENT:

#### UNIT I: ROOTS OF INEQUALITY IN THE WORLD – GOD'S DISSENTING VOICE

8 hrs.

Creation – Men and women image bearers of God; Disobedience – Power struggle; – Injustice and oppression – Distinctions between gender and sex – Gender and socialization – Masculinity and

femininity – God’s absolute statements vs. cultural norms – Abraham, Isaac, Jacob with Sarah, Rebecca Leah and Rachel; Patriarchy – Interconnections of Gender relations in the changing contexts – God’s dissenting voice through history e.g. Genealogy of Jesus – Tamar, Rahab, Ruth, Bathsheba, Mary – Women who dissented in a patriarchal society – Abigail, Vasthi, Esther, Mary of Bethany (Martha’s sister), Hannah Mary Magdalene; Gender Equality and Gender Equity.

Biblical Reference: [Gen:1:26-27,2:18-24,25, Psalms 33:20, 70:5,146:5, Exodus 20:12, Galatians 3:28] -[(Genesis 3:15-19, Romans 5:15-21)]-[(Genesis 12:12-17, Leviticus 22:12-13, Numbers 31:17-18, 32-35, Deuteronomy 21: 10-13)]-[Genesis 17:2-7,19,20 Genesis 24:3-9 Genesis 31:11-14 Genesis 17:15,16 Genesis 37-51, Genesis 29:31-35, 30:17-21,22-24, 31:4-7, 11-16, 25-26)]-[(Genesis 29:31-35, 30:17-21,22-24, 31:4-7, 11-16, 25-26, 48-50,55)]-[(Genesis 2:24, Mathew 19:4,5, Mark 10:6-8, Hebrews 11:31, James 2:25)]-(Mathew 1:3-16)-[(1 Samuel 25:2-33)(Esther 1:5-20, 2:14, 17, 3:13-15,4:15-17, 5:1-8, 7:1-10) (Luke 10:38-42(1Sam2: 1-11) (Luke 8:2-3)]

## UNIT II: WOMEN’S ROLE IN THE FAMILY, CHURCH AND THE COMMUNITY

8 hrs.

Ancient world – Importance of children in families – Reproductive role for both men and women – surrogacy, – Women’s Role in gender attitudes – Debates on measuring household work – challenges of valuing women’s work – Invisibility and unpaid labour – ‘Proverbs 31 woman’ changing gender roles through the ages – Rebecca, Tamar, Miriam Hannah, Jehosheba, Rizpah, Samaritan woman, Mary Magdalene, Priscilla, etc – Increasing economic participation of women – Aksah’s claim, Lydia, Joanna, Susanna; Challenges in the care economy in Family, the church and State – Rule of kinsmen redeemer, care of widows in the old testament and the early church – Women’s participation in governance and public space – Prophet, – Huldah – Judge - Deborah and Jael – Tabitha, Phoebe, Junia, Priscilla, – Queen-Disciple – Apostle, Professional roles: Managers, Shepherds, Farmers, Businesswomen, Tentmaker.

Biblical Reference: (Genesis 16:1-6, 30:1-6, 9-11, (Proverbs 19:14)) - [(Exodus 2:4-8, 15:20-21, Micah – 6:4), (1 Samuel 2:1-10), (2 Kings 11:1-2) (2 Samuel 21:9-10) John 4:7-27) (Mark 16:1-6), (Acts 18: 1-3, 24-26, Romans 16:3, 1 Cor. 16:19, 2 Tim. 4:19)] - (Judges 1:12-15) (Acts 16:13-15) (Luke 8:1-3) -(Ruth 2:1-23, 3: 1-18, 4:1-17) (2 Kings 4:1-7) -[(2 Kings 22:14-20, 2 Chron. 34:221-32) (Judges: 2:16, 4:4-22, 5:1-31), Acts 9:36-42 (Romans 16 :1-2) (Romans 16:7) (1 Cor. 11:1–16 ) (Acts 18: 1-3, 24-26, Romans 16:3, 1 Cor. 16:19, 2 Tim. 4:19]

## UNIT III: ISSUES AND CHALLENGES

9 hrs.

Child sex ratio – Role of Shiphrah, Puah – The girl child – Decline in Child Sex Ratio – Son preference and sex -selective abortions – Role of Assisted Reproductive technologies and gender – MTP and PCPNDT ACT 1994 [Pre Conception and Pre Natal Diagnostic Technique ACT] – Malnutrition – Vicious cycle of poor health – Women’s mental health – Gender in contraceptive a sterilization techniques – Understand our Bodies – Menstrual hygiene and health. – Biblical laws regarding uncleanness – Jesus response to impurity of women; – Understanding sexuality – Song of songs; Jesus’ teaching on marriage and divorce Women in Media – Gender Stereotyping and Objectification – Women as property not God’s ideal; Delilah and the misuse of sexuality – Women’s body – A Market for beauty products industry Beauty Stereotypes – Vasthi, Esther, Bathsheba Women’s education – Skills – Capacity building – Resources – Assets – Credit – Infrastructures Violence against women – Violence in Public and Private spheres – Personal is political – Body politics – Different forms of violence – Vishaka Guidelines on Sexual Harassment at the Workplace – Sexual

Harassment at the Workplace – Prevention, Prohibition And Redressal Act, 2013 – Protection of Women from Domestic Violence ACT 2005 – Legislations for protecting children from child abuse – Convention on Elimination off All Forms of Discrimination Against Women (CEDAW)

Luke 1:16-55 – Mary’s song – Stories of women who have challenged patriarchal norms – Betty Frieden – Amy Carmichael, Pandita Ramabai, Ida Scudder

Biblical Reference: Exodus 1:15-22, Matthew 9:20-22, Luke 8:43-48, Mark 5:25-34; Luke 7:37-50, [Mathew 19:3-12, Mark 10:2-12, 1Corinthians 7 :1-17, Ephesians 5:28-31, 1Corinthians 6:19 Judges 16:4-19, Esther 1:10-12, 2:1.

UNIT IV: CHRISTIAN EDUCATION COUNCIL: ESSENCE OF CHRISTIAN FAITH (I-VI Units) 5 hrs.

Scripture – Holy Trinity – Angels – Salvation – Faith – Doctrine of the Church

REFERENCE BOOK(S):

Margaret English de Alminana; ‘A Biblical Investigation of Matriarchal Structure in Ancient Semitic Life’, Lakeland, Southeastern University, 2016. Print.

Kak, Shakthi. Pati, Biswamoy., *Exploring Gender Equations in Colonial and Post -Colonial India* (1<sup>st</sup> & II chapters), New Delhi, Nehru Memorial Museum & Library, 2001. Print.

Majumdar, Maya, *Encyclopedia of Gender Equality through Women Empowerment*, Vol I & II, New Delhi, 1<sup>st</sup> edition, SARUP & SONS, 2001. Print.

Ratnakumari, B., *Gender and Globalization – A Comparative Perspective Between Europe and India*, New Delhi, Kanishka Publishers & Distributors, 2010. Print.

WEBSITE(S):

<http://micahredding.com/blog/women-in-the-church>

<http://rachelheldevans.com/blog/mutuality-women-leaders>

<https://www.thoughtco.com/women-of-torah-israel-co-founders-116361>

<https://www.cbeinternational.org/reources/article/priscilla-papers/sarah-submission>

<https://goo.gl/images/vUzUak>

<https://margmowczko.com/weaker-vessel-gender-justice-1-peter-3-7/>

<https://erlc.com/resource-library/articles/what-does-the-bible-say-about-sexual-assault>

<https://www.bibleodyssey.org/en/passages/related-articles/woman-wisdom>

<https://www.restoredrelationships.org/news/2016/07/22/fms-5-violence-against-women>

<http://www.fixinghereyes.org/single-0post/2017/06/20/An-Exegetical-Look-at-1-Corinthians-111-16>

## UIV6101FI BIBLICAL PERSPECTIVES ON LEADERSHIP

(THEORY)

LEARNING OUTCOME:

1hr./wk.

On successful completion of the course, the student will be able to

- recognize the importance of Biblical leadership style for better relationships
- demonstrate steward leadership
- choose to live a purpose driven life

## COURSE CONTENT:

### UNIT I: STEWARDSHIP

5 hrs.

Salutation – Christian greetings (Matthew 10:12) – Expression of appreciation & gratitude in Pauline Epistles (Romans 1:7, Romans 16, I Corinthians 1: 3) – The Art of Negotiation – Shrewdness coupled with love and grace (Matthew 10:16) – Logical and tactical presentation of argument (Acts 21:37-22:29) – Delegation of responsibilities to workers – Abraham & Elieazer (Genesis 24) – Negotiation with counterparts – Paul & the Sanhedrin (Acts 23) – Negotiation with Superiors – Joseph & Pharaoh (Genesis 41) – Esther (5,7) – Faith Driven courage – Responsible & Sacrificial

### UNIT II: PARTICIPATORY/ DEMOCRATIC LEADERSHIP

5 hrs.

Essential attributes of a Godly leader: Prayerful, Participatory, Compassionate, Purpose driven, People-centered, Indomitable (Nehemiah 1- 2:1-10) – Faithful steward (Matthew 25:14-30) – Jesus the Trend Setter & Trend Bender (John 4, John 8:1-11, Matthew 15: 21-28) – Born to serve (John 15:15) – Walked the talk (John 4) – Prepared the disciples for the forthcoming challenges (John 14-17) – Empathetic High Priest (Hebrew 4:15) – Leader of the Least & the Lost – Missionary Biography – Amy Carmichael – Fight for justice with tact

### UNIT III: CHRISTIAN EDUCATION COUNCIL: ESSENCE OF CHRISTIAN FAITH (VII-X UNITS) 5 hrs.

Sacraments – Cults – Christian Ethics – Eschatology

### REFERENCE BOOK(S):

*The Holy Bible: New King James Version: NKJV.* Chicago: Thomas Nelson, 2010. Print

Carmichael, Amy. *If.* London: SPC, 1939. Print

Hybels, Bill. *Courageous Leadership.* Nashville: Zondervan, 2012. Print

Maxwell, John. *The 21 Indispensable Qualities of a Leader.* Nashville: Thomas Nelson, 1999. Print

Peale, Norman Vincent. *Bible Power for Successful Living.* Random House Value Publishing, 1996. Print

Warren, Rick. *The Purpose Driven Life.* Grand Rapids, United States: Zondervan. 2013. Print

### Class Assignment

Group Discussion: Luke 16:1-15 Parable of a Shrewd Manager

### Home Assignment

- To document the biographies of the life and work of the missionaries in Tamil Nadu
- To visit any organization/institution built by missionaries (hospitals, schools, colleges, homes for the orphans & elderly) and write a report

### WEBSITE(S):

<https://bible.org/seriespage/lesson-51-godly-leadership-acts-2017-21>

<https://www.inc.com/lee-colan/4-powerful-leadership-lessons-from-jesus.html>

<https://www.bible.com/reading-plans/2560-lead-strong-leadership-lessons-from-the-bible/day/15>

[https://www.caritas.org.au/docs/default-source/cst/solidarity\\_mp\\_12lessonsible.pdf](https://www.caritas.org.au/docs/default-source/cst/solidarity_mp_12lessonsible.pdf)

<https://unlockingthebible.org/2015/07/four-leadership-lessons-from-a-king-who-finished-poorly/>

## PG COURSE PROFILE

2018 BATCH

Sem.	Part IV VBC/IVBC	Course Code	Course Title	Course Type	Hrs./ Wk.	Credits	Passed in Academic Council	Offered to	Offered by
I*	VBC	PGV0104V	Human Rights and Duties	TH	2	1	AM2005 as PGV0104V	NON LDC ALLM	Centre for VE
		PGV0113V	Foundation Course on Women's Studies	TH	2	1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE
	IVBC	PIV1101V	The Bible and Science	TH	2	1	BA2018	APCH/ SPCH	Centre for VE
I & II**	VBC	PGV0109V	Peace Studies	TH	2	1	AM2005	LDC ALLM	Centre for VE
		PGV0110V	Professional Ethics	TH	2	1	AS2011	LDC ALLM	Centre for VE
		PGV0111V	Universal Values	TH	2	1	AS2011	LDC ALLM	Centre for VE
II	VBC	PGV2101V	Perspectives on Gender	TH	2	1	AV2014	ALLM	Centre for VE
		PGV2102V	Practicing Human Rights	TH	2	1	AM2005 as PGC0107V	ALLM	Centre for VE
		PGV0109V	Peace Studies	TH	2	1	AM2005	LDC ALLM	Centre for VE
		PGV0110V	Professional Ethics	TH	2	1	AS2011	LDC ALLM	Centre for VE
		PGV0111V	Universal Values	TH	2	1	AS2011	LDC ALLM	Centre for VE
	IVBC	PIV2101V	Rights, Responsibilities and the Bible	TH	2	1	BA2018	APCH/ SPCH	Centre for VE
III	VBC	PGV3101PV/ PGV3102PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA	TH	1	1		ALLM	Centre for VE

Sem.	Part IV VBC/IVBC	Course Code	Course Title	Course Type	Hrs./ Wk.	Credits	Passed in Academic Council	Offered to	Offered by
	IVBC	PIV3101PI	BIBLICAL ETHICS	TH	1	1		APCH/ SPCH	Centre for VE
IV	VBC	PGV4103PV	IN TUNE WITH NATURE	TH	2	1		ALLM	Centre for VE
	IVBC	PIV4101PI	BIBLICAL PERSPECTIV ES ON GENDER	TH	2	1		APCH/ SPCH	Centre for VE

### PG COURSE PROFILE

#### 2019 BATCH ONWARDS

Sem.	Part IV VBC/ IVBC	Course Code	Course Title	Course Type	Hrs./ Wk.	Credits	Passed in Academic Council	Offered to	Offered by
I	VBC	PGV1101PV	Foundation Course on Women's Studies	TH	2	1	AV2014 as PGV0113V	NON LDC ALLM	Centre for VE
	VBC	PGV1102PV	Perspectives on Gender	TH	2	1	AV2014 as PGV2101V	LDC ALLM	Centre for VE
	IVBC	PIV1102PI	THE BIBLE AND SCIENCE	TH	2	1		APCH/ SPCH	Centre for VE
II	VBC	PGV2103PV	Human Rights and Duties	TH	2	1	AM2005 as PGV0104V	NON LDC ALLM	Centre for VE
	VBC	PGV2102PV	Practicing Human Rights	TH	2	1	AM2005 as PGV0107V	LDC ALLM	Centre for VE
	IVBC	PIV2102PI	RIGHTS, RESPONSIBILI ES AND THE BIBLE	TH	2	1		APCH/ SPCH	Centre for VE
III	VBC	PGV3101PV / PGV3102PV/ PGV3103PV	BASIC TENETS OF MAJOR RELIGIONS / CULTURAL HERITAGE AND VALUES IN INDIA/	TH	1	1		ALLM	Centre for VE

			PROFESSIONAL ETHICS						
	IVBC	PIV3101PI	BIBLICAL ETHICS	TH	1	1		APCH/ SPCH	Centre for VE
IV	VBC	PGV4101PV / PGV4102PV/ PGV4103PV.	Universal Values / Peace Studies and Peace Makers / IN TUNE WITH NATURE	TH	2	1	AS2011 as PGV0111V/ AM2005 as PGV0110V	ALLM	Centre for VE
	IVBC	PIV4101PI	BIBLICAL PERSPECTIVES ON GENDER	TH	2	1		APCH/ SPCH	Centre for VE

### PGV3101PV BASIC TENETS OF MAJOR RELIGIONS (THEORY)

**LEARNING OUTCOME:**

1hr./wk.

On completion of the course, the student will be able to

- analyze the rise and development of religions
- expand her world views by understanding the world religions
- recognize the impact of modernity on religions

**COURSE CONTENT:**

**UNIT I: INTRODUCTION**

5 hrs.

Definition – Development of religions – Nature worship – Animism – Ancestor worship – Worship of Gods – Modernism and religions – Atheism – Secularism

**UNIT II: FAR EAST, SOUTH ASIAN RELIGIONS**

5 hrs.

Historical background – Essential features – Hinduism, Jainism, Buddhism, Sikhism, Confucianism, Taoism, Shintoism – Religion in modern era

**UNIT III: MIDDLE EASTERN RELIGIONS**

5 hrs.

Origin – Founder – Teachings – Spread – Judaism – Christianity – Islam – Zoroastrianism – Religion today.

**ACTIVITIES:**

Discussion, Debates, Chart presentations

**REFERENCE BOOK(S):**

Adde J.A. Dubois, *Hindu Manners, Customs and Ceremonies*, New Delhi, 2002. Print.

Aleyamma Zachariah, *Modern Religions and Secular Movements in India*, Bangalore, TBT, 2003. Print.

Anderson N.(ed.), *The World Religions*, UK, IVP, 1985.Print.

Christopher Augustus Bixel Turkey, *Major Religions of India*, Delhi, ISPCK,2003. Print.

David A. Brown, *Guide to Religions*, Delhi, ISPCK, 1996.Print.

David C.Scott, & Israel Selvanayagam (ed.s), *Revisioning Religious Traditions*, ISPCK, 1996. Print.

P.S. Daniel David C. Scott and G.R. Singh (ed.s), *Revisioning Traditions of India*, ISPCK, 2002. Print.

John Bowker (ed.), *Cambridge Illustrated History of Religions*, Cambridge, Cambridge University Press, 2002. Print.

T.M.P. Mahadeven, *Outlines of Hinduism*, Chetana Publishers, Bombay, 1999. Print.

Norman Anderson, *Christianity and World Religions: The Challenge of Pluralism*, UK, IVP, 1970. Print.

Robert K.C. Forman (ed.) *Religions of the World*, New York, St. Martin's Press, 1993. Print.

**WEBSITE(S):**

<http://listverse.com/2007/07/31/top-10-organized-religions-and-their-core-beliefs/> 11.2. 2019

<http://www.bbc.co.uk/religion/religions/> 11.2.2019

<https://www.culturalindia.net/indian-religions/> 11.2. 2019

<https://www.flocabulary.com/unit/major-world-religions/> 11.2.2019

## PGV3102PV CULTURAL HERITAGE AND VALUES IN INDIA

### (THEORY)

**LEARNING OUTCOME:**

1hr. /wk.

On completion of the course the students will be able to

- discover the richness of India's cultural heritage
- assess the significance of India's cultural values
- value the importance of preserving cultural heritage and values

**COURSE CONTENT:**

**UNIT I: INTRODUCTION**

5 hrs.

Background of Indian culture: Geographic, Racial, Linguistics and Historic – Values in ancient Indian culture – Unity in diversity – Tolerance – Humaneness – Hospitality – Spirituality – Ahimsa – Dharma – War and peace – Family values – Preservation of traditions – Adaptability and assimilation.

**UNIT II: ARCHTECTURAL HERITAGE**

5 hrs.

Historic Monuments and Value appreciation: Kailasanatha Temple at Ellora, Sun Temple at Konark, Step wells in Gujarat, Monuments in Mamallapuram, Brahadiswara Temple at Thanjavur, Meenakshi Amman Temple, Madurai, St. Xavier,s Church, Goa, St. Thomas Church, Chennai, St. Mary's Church, Madurai, Taj Mahal Agra, Jama Masjid and Moti Masjid, Delhi, Dhargas.

**UNIT III: ART HERITAGE**

5 hrs.

Music: Carnatic, Hindustani – Dance: Bharatanatyam, Kucipudi, Odissi – Painting: Ajantha, Ellora – Language and Literature – Food, Dress – Folk art – Festivals – Aesthetic Values

**ACTIVITIES:**

Discussions, Presentations, Display of traditional food and ethnic clothing, Visiting historical monument sites,

**REFERENCE BOOK(S):**

*Assessing the values of Cultural Heritage*, The Getty conservation Institute, Los Angeles, 2002. Print.

Basham, A.L. *The Wonder that was India*, Rupa& Co., New Delhi, 1997. Print.

Basham, A.L. *Cultural History of India*, OUP, New Delhi, 2003. Print.

Dwivedi, Bindu Viswakarma, *Essays on Indian Art and Culture*, Varanasi, Kala Prakastan, 1992. Print.

Edith Tomory, *A History of Fine Arts in India and the West*, Orient Longman, Chennai, 1999. Print.

Purnima Mehta Bhatt, *Her Space, Her Story: Exploring the Step wells of Gujarat*, Zubaan, New Delhi, 2014. Print.

Radhakrishnan S (ed.) *The Cultural Heritage of India* (Vol. I – VI), Calcutta, The Ramakrishnan Mission, Institute of Culture, 1957. Print.

Saletore, R.N. *Encyclopaedia of Indian Culture* (Vol – I – VI) Calcutta, The Ramakrishnan Mission, 1991. Print.

**WEBSITE(S):**

<http://knowindia.gov.in/culture-and-heritage/lifestyle-values-and-beliefs.php> 28.2.2019

<https://www.livescience.com/28634-indian-culture.html> 28.2.2019

<https://www.holidify.com/pages/indian-culture-and-traditions-1331.html> 28.2.2019

<http://indiadiscovery.com/historyandheritage/index.html> 28.2.2019

## PGV3103PV PROFESSIONAL ETHICS

### (THEORY)

**LEARNING OUTCOME:**

1hr. /wk.

On completion of the course the student will be able to

- gain familiarity with common ethical principles
- differentiate the different types of professional ethics
- develop clarity in decision making based on professional ethics

**COURSE CONTENT:**

**UNIT I: INTRODUCTION AND WORK ETHICS**

5 hrs.

Meaning and need for professional ethics – Integrity – Civic manners – Respect – Peaceful co-existence – Time and Stress Management – Empathy – Loyalty-Professionalism – Ethical issues

**UNIT II: PROFESSIONAL RESPONSIBILITY AND RIGHTS**

5 hrs.

Collective bargaining – Confidentiality – Conflict of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Non – Discrimination.

**UNIT III: GLOBAL ISSUES**

5 hrs.

Environmental Ethics – Computer Ethics – Research Ethics – Business Ethics – Medical Ethics – Media Ethics

**ACTIVITIES:**

Brainstorming, Discussions, Self-Quiz on work ethics, role play

**REFERENCE BOOK(S):**

Joanne Cuilla B. *The Ethics of Leadership*, Words worth Publishing, 2002. Print.

Murthy CSV., *Indian Constitution and Professional Ethics*, Mumbai, Himalayan Publishing House, 2006. Print.

Raghavan M.P., *Professional Ethics and Human Values*, Chennai, Scitech Publication India Pvt. Ltd., 2006. Print.

The Sweet Water Rattlesnake Round – Up: A Case study in Environmental Ethics Jack Weir, Conservation Biology, Vol.6, No.1 (Mar. 1992), pp.116 – 127: Blackwell Publishing for Society for Conservation Biology. Print.

**WEBSITE(S):**

<http://www.uab.edu/graduate/rcr/> (Video case studies of whistle blowers)

<http://www1.american.edu/TED/feta.htm>

<http://davidmaister.com/blog/333/A-> Case - Study - In – professional – Ethics (hospital setting)

<http://www.indianmba.com/Faculty Column/ FC428.html> (accommodation for lady faculty)

<http://greenwhiteorg/2008/05/08/a-> case - study - in – professional – ethics- the it individual

<http://blogs.Warwick.ac.uk/rbotoole/entry/four case studies/> (intellectual property rights)

<http://ori.dhhs.gov/education/products/montana round1 / professional.html> (research ethics)

<http://www.istor.org/stable/2385857?seq=2> (environmental ethics)

<https://www.juniorachievement.org/documents/20009/1187238/Elementary4.pdfaccessed28.2.2019>

## **PGV4103PV IN TUNE WITH NATURE**

### **(THEORY)**

**LEARNING OUTCOME:**

**2 hrs./wk.**

On successful completion of the course, the student will be able to

- recognize the importance of ecological balance and human interaction
- internalize the seven environmental principles that form the basis of all environmental issues
- reflect critically the roles and responsibilities towards conservation of earth's resources

**COURSE CONTENT:**

**UNIT I: ENVIRONMENT**

**7 hrs.**

Network of living and non-living things, Physical components (air, water, land, energy) – Biological components (Plants and Animals) – Socio-economic components (people, communities, institutions and values) – Seven environmental principles.

**UNIT II: ECOSYSTEM AND COMMUNITY**

**8 hrs.**

Interaction between living and non-living components (Everything is connected to everything else) – Biodiversity: Ecosystem, Species and Genetic diversity (All forms of life are important) – Nutrient cycling, disruption in cycling. (Nature knows best) – Waste management and Environment management systems (Everything must go somewhere) – Pollution and its effects

**UNIT III: NEED FOR CONSERVATION**

**8 hrs.**

Sustainable development (Ours is a finite earth) – Natural resource management- Renewable and Non-renewable resources: Forest, Water, Mineral, Food, Energy, Land – Use and exploitation of resources and associated issues (Everything changes) – Desertification – Deforestation – Problems of tribals – Conflicts over water – Effects of modernization – Global warming – Case Studies.

**UNIT IV: DIVINITY IN ALL FORMS OF LIFE**

**7 hrs.**

Religion – Values and environment (Nature is beautiful, and we are stewards of God's creation) – Environmental Ethics – Coexistence with nature – Respect for Animal and Plant Rights – Individual accountability and social responsibility – Sustainable life style – Reducing individual ecological footprint.

## REFERENCE BOOK(S):

Environment and Society (VBC), LDC Booklet Series No. 7, Lady Doak College, Madurai, 2003.print

Environmental Values, An International peer-reviewed journal, United Kingdom, White Horse Press, since 1992. Print.

Gore,Al, *Earth in the Balance, Ecology and the Human Spirit*, New York, Plume Penguin Books, 1992.print.

Gadgil M. and Guha R., *The Use and Abuse of Nature*, 3rd edition, New Delhi, Oxford University Press, 2002.Print.

Gunaseeli, R., Rajendran, P., Rosalind, JM., and Murugesan, A., Editors. *A Learner-Centered Instruction Manual for Environmental Education*, Centre for Environmental Studies, Lady Doak College, 2017.print.

*In Tune with Nature (VBC), LDC Booklet Series No. 6, Madurai, Lady Doak College, 2003.print.*

Miller GT, *Living in the Environment*, 6th edition, California, Wad worth Publishing Company, 1994.Print.

Rao, A., *The Story of Environment*, Indian Publishers & distributors, New Delhi, 2000.Print.

Wagner RH, *Environment and Man*, INC New York, W.W.Norton & Company, 1971.Print.

## WEBSITE(S):

<https://helpsavenature.com/what-is-environmental-ethics> 11.2.2019

[http://environment-ecology.com/what-is-nature/108-what-is-nature.html#Human\\_interrelationship](http://environment-ecology.com/what-is-nature/108-what-is-nature.html#Human_interrelationship)  
11.2.2019

<https://www.conserve-energy-future.com/what-is-an-ecosystem.php>11.2.2109

<https://www.greenlivinganswers.com/archives/175> 11.2.2019

## PIV1102PI THE BIBLE AND SCIENCE

### (THEORY)

#### LEARNING OUTCOME:

2 hrs. /wk.

On successful completion of the course, the student will be able to

- trace the growth of the theories of the origin of the universe
- compare the laws and observations of Physics with Biblical truths
- evaluate the theory of evolution from a Biblical perspective
- discuss contemporary issues from a Biblical perspective

#### COURSE OUTLINE

##### UNIT I: THE PHYSICAL WORLD

3 hrs.

Philosophical perspective: Early philosophers – philosophy – schools of thought – Existence of God – Biblical Perspective – mystery – the symphony of the universe – five elements-its functions – cosmic order. Historical Perspective: Renaissance–Reformation – Industrial revolution – Globalization

Newton's laws and the deterministic world – quantum physics and probability: possibility of miracles. Maxwell and unification – Michelson Morley experiment – the nature of light – Planck and duality – double slit experiment: duality in science and the scriptures. Origin of the universe – The splendour

of God's creation – evidence of the big bang – the expanding universe –the size of the universe – formation of stars – relativity and time dilation: age of the earth. Atoms and subatomic particles – the Higg's boson/God particle – the fine-tuning of the physical constants – multiverse theory.

Biblical References: Psalm 19:1, 104:5, Genesis 1:1-3, Isaiah: 45:7, 55:10, 40:22, Joel: 2:30-31, Luke: 2:25

Genesis1:1-8, 13-19, Job 26:7, Psalm 8: 3, 4 19, 104, 136:5-9, Isaiah 49:22 (Expansion of the universe), I Corinthians 15: 41, Jeremiah 33:22 (nature of the stars), John 3:19, Hebrew 11:3, 2Peter 3:5

#### UNIT II: LIFE- ORIGIN AND SUSTENANCE

6 hrs.

Origin and evolution of life – Theories, fossil records, genetic data, mutations, natural selection. Transition – common ancestry in human evolution, complexity, homologous structures, junk DNA, selfish genes. Creation – Fascinating sequence of Genesis. Meaning, significance and responsibility of human life.

Biblical References: Genesis 1:31-35, Genesis 2:1-5, Genesis5:13, Psalm 8:4-6, Psalm 33:4-11, Isaiah 9:5-9, Isaiah 42:5-9, Isaiah 44:24, Jeremiah 23:9-11

#### UNIT III: ETHICAL ISSUES – BIBLICAL PERSPECTIVE

6hrs.

Biblical perspectives on cloning – abortion – Euthanasia – organ donation and organ transplant, surrogate motherhood, sperm bank – artificial insemination – Stem cell research.

#### UNIT IV: CHRISTIAN EDUCATION COUNCIL: WISDOM LITERATURE (I, II., IV & V Units)

5 hrs.

Introduction to Biblical Wisdom Literature – Characteristics of Wisdom Literature – Job and the New Faith – Ecclesiastes and Philosophy

#### TEACHING METHODOLOGY:

Group Discussions, Debates, Quiz, Puzzles, Research and Reading, Presentations, Games, Video Presentations followed by Discussions

#### REFERENCE BOOK(S):

Collins Francis, *The Language of God*. New York, Free Press, 2006.Print.

David A. Dewitt., *Answering the Tough Ones, Common questions about Christianity*. Chicago: Relational Concepts, Inc. Moody Press, 1980.Print.

Henry M. Morris, *Science and The Bible*. Moody Publishers, 1986.Print.

Jonathan D. Sarfati, *Refuting Evolution, A Response to the National Academy of Sciences, Teaching About Evolution and the Nature of Science*. USA: Master Books, 1999.Print.

McGonigle, Thomas C and James F. Quigly. *A History of the Christian Tradition: From the Reformation to the Present*. London: Panlist Press, 1988.Print.

#### WEBSITE(S):

*Science and Bible* ([www.clarifyingchristianity.com](http://www.clarifyingchristianity.com))

*The Amazing Scientific Accuracy of the Bible* ([www.creationmoments.com](http://www.creationmoments.com))

<http://www.godandscience.org/apologetics/sciencebible.html>

<https://www.jw.org/en/bible-teachings/questions/science-and-the-bible/>

<http://clarifyingchristianity.com/science.shtml>

## PIV2102PI RIGHTS, RESPONSIBILITIES AND THE BIBLE (THEORY)

### LEARNING OUTCOME:

2 hrs./wk.

On successful completion of the course, the student will be able to

- appreciate God's interest in the wellbeing of His people
- comprehend the Biblical perspective of human rights violation and protection
- trace the hand of God in the life and work of human rights protagonists
- identify Biblical responses to human rights challenges

### UNIT I: INTRODUCTION TO HUMAN RIGHTS EDUCATION

7 hrs.

Human Rights & Culture – Historical evolution – God's concern for His people – Mosaic code and its implications – Forces for Social Change – Levels of Human Rights: Right to freedom, to equality and for the good of the society (hygiene and the environment)

### UNIT II: SECTORAL RIGHTS, VIOLATIONS AND PROTECTION

8 hrs.

God on the side of the poor and marginalized: Women – Children – Dalits/ Tribals / Ethnic Diversity. Law of Jubilee, Law of gleaning, Sabbatical Year of the Kinsman Redeemer – Human rights protection – National and International Commissions, Conventions and Protocol

### UNIT III: HUMAN RIGHTS - INSPIRING PERSONALITIES

10 hrs.

Biblical personalities: Moses, Joshua, Nehemiah, Esther, Amos, Obadiah, Jesus Christ, Barnabas  
Others: William Carey, Abraham Lincoln, Isabella Thoburn, Pandita Ramabai, Amy Carmichael, Ida S. Scudder, Katie Wilcox, Mother Teresa

### UNIT IV: CHRISTIAN EDUCATION COUNCIL: WISDOM LITERATURE (III, VI-VIII units)

5 hrs.

Proverbs – A Study – The Classification of the Psalms and the Choice of Themes – Roles and Actions of God – Prayer, Praise and Worship

Activities: Group Discussions, Debate, Quiz, Presentations

### BIBLICAL REFERENCES:

Relevant passages from the books of Genesis, Exodus, Leviticus, Deuteronomy, Joshua, 1 Kings, Nehemiah, Esther, Psalm 104, Proverbs, Job 38-41, Isaiah, Jeremiah, Amos, Obadiah, Micah, Matthew, Luke, Acts, Romans, 1 and 2 Corinthians, Galatians, Ephesians, 1 Timothy, 1 Peter

### REFERENCE BOOK(S):

Gustavo Gutierrez., *A Theology of Liberation: History, Politics, and Salvation*. New York: Orbis Books, 1988.

Leonardo Boff, Paul Burns (Translator), Clodovis Boff., *Introducing Liberation Theology*. New York: Orbis Books, USA, 1987.

Ronald J. Sider, *Rich Christians in an Age of Hunger: A Biblical Study*. Kindle unlimited, 1977.

Sarah Bessey, *Jesus Feminist: An Invitation to Revisit the Bible's View of Women*. USA: Howard Books, 2013.

Vandana Shiva, *Staying Alive: Women, Ecology and Development*. Chicago: Zed Books, 1989.

## PIV3101PI BIBLICAL ETHICS (THEORY)

### LEARNING OUTCOME:

1hr. /wk.

On successful completion of the course, the student will be able to

- identify the Biblical basis of Christian ethics
- employ Christian ethical and moral truths effectively
- relate biblical ethics to contemporary issues

### COURSE CONTENT

#### UNIT I: PURPOSE OF BIBLICAL ETHICS

5 hrs.

Ethics – Exploration of ethical theories – Deontological – Duty base – World view – Ethical principles in the Bible – Ten Commandments – Foundations of Christian ethics – Christian virtues – Sermon on the Mount

Biblical Reference: Ethics – Genesis 4:1; Job 31:15; Isaiah 44:24, 49:1, 5; and Jeremiah 1:5. Law – Leviticus 19:11-18 – Deuteronomy 10: 12-22.-Commandments – Exodus 20: 1-7; Deuteronomy 5:4 – 21; Matthew 22: 34-40 – Sermon on the Mount – Mathew Chapter 5, 6 and 7.

#### UNIT II: ETHICAL ISSUES AND DECISION-MAKING

5 hrs.

A generation in crisis – Integrity – Trade and Commercial bargaining – Paying taxes – Labor and Management – Work and Leisure – Economic Systems – Poverty – Wealth and Theft – Truth and Deception – Decision – making based on Biblical principles – Christian response to crisis

Biblical Reference: Integrity – Genesis 20:5,6; I Kings 9: 4; Job 2:3,9; Job 31: 6; Psalms 7: 8; Psalms 25: 21; Psalms 26:1,11; Psalms 41:12; Psalms 78: 72; Proverbs 11: 3; Proverbs 19: 1; Proverbs 20:7-Trade – Matthew 25: 16. Tax- II Kings 23:35, Luke 2: 1-5; Acts 5: 37; Romans 12:2.- Poverty – Gen 45: 11; Proverb 6:11; Proverb 11:24; Proverb:24:34; Proverb:28:19; Proverb:28:22; Proverb:30:8; Proverb:31:7: .

#### UNIT III: CHRISTIAN EDUCATION COUNCIL: GOSPELS (I -IV Units)

5 hrs.

Introduction – Synoptic Gospels – Parables of Jesus – Signs and miracles of Jesus

#### BIBLICAL REFERENCES:

Parables of Jesus – Matthew 13<sup>th</sup>, 18<sup>th</sup>,21<sup>st</sup>, 24<sup>th</sup>, chapter. Mark 4<sup>th</sup>,12<sup>th</sup>,13<sup>th</sup> Chapter. Luke 8<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup> Chapter- Signs and miracles of Jesus – Matthew 8<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 20<sup>th</sup>,26<sup>th</sup> Chapter. Mark 1<sup>st</sup> to 10<sup>th</sup> Chapter and 14<sup>th</sup> Chapter – Luke 4<sup>th</sup>-9<sup>th</sup> Chapter, 13,14,17,18, & 22<sup>nd</sup> Chapter – John 2<sup>nd</sup>, 4<sup>th</sup>, -6<sup>th</sup>, 9<sup>th</sup> and 11<sup>th</sup> Chapter.

#### TEACHING METHODOLOGY:

Case Studies, Group Discussions, Debates, Quiz, Puzzles, Research and Reading, Presentations, Games, Video Presentations followed by Discussions

#### REFERENCE BOOK(S):

Robertson McQuilkin and Paul Copan. *An Introduction to Biblical Ethics - Walking in the Way of Wisdom*, 3rd edition, 2014.Print.

Feinberg, John S., and Paul D. Feinberg. *Ethics for a Brave New World*, 2nd ed. Wheaton: Crossway, 2010.Print.

Hollinger, Dennis P. *Choosing the Good: Christian Ethics in a Complex World*, Grand Rapids: Baker Academic, 2002 Print.

Carl E. Braaten and Christopher R. Seitz, eds., *I Am the Lord Your God: Reflections on the Ten Commandments*. Grand Rapids: Wm. B. Eerdmans Publishing Co., 2005. Print.

Richard B. Hays, *The Moral Vision of the New Testament: A Contemporary Introduction to New Testament Ethics*. San Francisco: Harper San Francisco, 1996. Print.

Stephen Long D. *Christian Ethics: A Very Short Introduction*. Oxford: Oxford University Press, 2010. Print.

Scott B. Rae. *Moral Choices*, 3rd ed. Grand Rapids, MI: Zondervan, 2009. Print.

**WEBSITE(S):**

<https://www.crossway.org/articles/10-things-you-should-know-about-christian-ethics/>

<https://www.compellingtruth.org/Christian-ethics.html>

<https://www.esv.org/resources/esv-global-study-bible/biblical-ethics-an-introduction/>

<https://www.bibletools.org/index.cfm/fuseaction/Topical.show/RTD/cgg/ID/954/Ethical-Standards.htm>

<https://pages.stolaf.edu/ein/christian-ethics/what-is-christian-ethics/>

## **PIV4101PI BIBLICAL PERSPECTIVES ON GENDER (THEORY)**

**LEARNING OUTCOME:**

2 hrs./wk.

On successful completion of the course, students will be able to

- identify God's gender-just approach
- recognize that both men and women are created equal and are God's image bearers
- differentiate between God's absolute standards and restricted regulations
- examine women's suffering in today's world with the compassion of Jesus and be spurred to action
- relate the role of women in homes, churches and communities within the cultural settings of the early church

**COURSE CONTENT**

**UNIT I: LESSONS FROM THE OLD TESTAMENT**

8 hrs.

God's egalitarian intent in Creation: Equality, Mutuality, Unity and Intimacy – Result of sin: Inequality, Subordination, Disunity, Shame – Bible written in a patriarchal culture – Women viewed as property – God's countercultural approach in using both men and women – Participation in worship – Naming children – Decision making – Managing households – Inheritance – Imparting wisdom – Participating in God's plan for emancipation from slavery – In warfare – Judges and prophets – God's nature is above human comprehension – Male and female imageries used to describe His attributes

Biblical Reference: Gen 1: 26 – 31, Gen 2: 18-25, Gen 3, Ex20:17, 31:32-35 Deut 5:21, Jud 5:30, Num31:32-35 Gen34, Ex 20:12, Deut6:7-9,20-25, Pr1:8, 6:20, 30:17,31:1- Ex35:20-29, 2Chr35:25, Neh7:67, Gen21:3,29:32, 2Kings 4:8-25, 1Sam1:11, 21-28, 1Sam25:2-38, Pr31:10-31, Judges1:14,15, Num27:7,8, Job 42:15, 2Sam 20:15-22, Ex1:15-22,2:1-10, Ex15:20, Esther1-9, Judges 4:1-5:31, 1Kings22:1-23, -Deut6:4, Jn4:24, Hos 11:6, Is 42:14, 66:13, Matt23:37,

**UNIT II: MESSAGES FROM JESUS AND THE EARLY CHURCH**

8 hrs.

Jesus' up-side-down kingdom – Challenging oppression of women – Divorce laws, Adultery, Uncleanness – Compassion to women – Discipleship greater than maternal role – Women used in

parables and as examples – Women as teachable – Women affirmed as individuals – Women's participation in Jesus' ministry – Appointed spread the gospel – Women in New Testament Churches – Royal priesthood – Participation in worship, Prayer and Prophecy – Women leaders in the early church – Influence of women on Paul and Timothy

Biblical Reference: Matt5:1-11, Matt23:8-12, Luke1:36-55 - Matt19: 1-10, Matt5:28, 19:3-9, Matt5:27-32, Jn8:2-11, Luke8:43-48- Luke7:36-50, Mk5:22-43, Luke13:10-17, Jn19:26-27- Jn3:3-8, Mk3:31-35, Luke11:27,28 - Mk12:43-44, Lk13:19-21, 15:8-10, 18:1-14 -Luke 10:38-42, Jn4:4-26, Mk14:6-9 -Luke 8:1-3, Matt27:55-56, Mk15:40-47, Mk16:7,9-11, Jn20:17-18, Luke24:1-11, Matt28:9-10, Acts1:14-15-Acts 1:12-14, 2:17-18, 1Pet2:4-10, Acts9:36, 21:8-9, Phil4:2-3, Rom 16:1-7, 12-13, 15, 1Tim 3:11

**UNIT III: CHRISTIANS WITHIN A CULTURAL SETTING – CHALLENGES TODAY** 9 hrs.

Cultural setting of the early church – Paul's and Peter's instructions in context – Husband-wife relationships: Mutual submission, Respect and love – Greek and Roman influence on the early church – Christian response to Issues facing women today – Domestic violence, Rape, Physical abuse, Divorce rates, Trafficking of women, Portrayal of women in media – Leadership of women in Church today – Case studies

Biblical Reference: 1Cor 7:4-7, 11:3-12, Gal 3:26-29, Eph 5:15-6:20, Col3:18, 20,23, 1Pet2:5 – 3:9, Gen21:12,- Ps82:3,4, Luke4:14-21, 1Tim 5, Judges19, Deut22:25-27, 2Sam13, Gen31,46:15, Esther 1, Matt14:6-8

**UNIT IV: CHRISTIAN EDUCATION COUNCIL: GOSPELS (V – VIII UNITS)** 5 hrs.

Unique features of the Fourth Gospel – Death and Resurrection of Jesus – Discipleship – Christian Leadership

**REFERENCE BOOK(S):**

Deborah M. Gill and Barbara Cavaness, *God's Women Then and Now*, Authentic Books, Secunderabad, 2004. Revised Edition 2009. Print.

Sarah Blessy, *Jesus Feminist*, Howard Books, 2013. Print.

Christina Manohar, *Women's issues and reflections*.

Rachel Held Evans, *A Year of Biblical Womanhood* Thomas Nelson, 2012. Print.

**WEBSITE(S):**

<https://www.allaboutgod.com/bible-and-gender.html>

<https://denverinstitute.org/called-together-biblical-perspective-gender-roles-workplace-part-2/>

[https://www.saferresource.org.au/the\\_bible\\_on\\_domestic\\_family\\_violence](https://www.saferresource.org.au/the_bible_on_domestic_family_violence)

**UNDER GRADUATE  
VALUE EDUCATION**

**EVALUATION PATTERN 2018 BATCH ONWARDS**

SEM	PART IV VBC/IVBC	COURSE CODE	COURSE TITLE	Hrs./Wk.	Credits	FORMATIVE COMPONENTS												Total
						Formative Assessment – I						Formative Assessment – II						
						CEC				Home ASS		Class ASS		Home ASS		OSS		
						Test		ASS										
						No.	Req. Max	No	Req. Max	No	Req. Max	No	Req. Max	No	Req. Max	No	Req. Max	
I	VBC	VBC1101FV	Healthy Transition from Adolescence to Adulthood	2	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	UIV1101V/ UIV1101FI	Biblical Essentials for Emerging Adults	2	1	1	25	-	-	-	-	1	15	1	20	-	-	60
II	VBC	VBC0102FV/ VBC0103FV	Civic Education / Family Life Education	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	UIV2101FV / UIV2101FI	Biblical Foundations for Family Life	1	1	-	-	1	25	-	-	1	15	1	20	-	-	60
III	VBC	VBC0102FV/ VBC0103FV	Civic Education / Family Life Education	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	UIV3101FI	Civics and the Bible	1	1	1	25	-	-	-	-	1	15	1	20	-	-	60

SEM	PART IV VBC/IVBC	COURSE CODE	COURSE TITLE	Hrs./Wk.	Credits	FORMATIVE COMPONENTS												Total
						Formative Assessment – I						Formative Assessment – II						
						CEC				Home ASS		Class ASS		Home ASS		OSS		
						Test		ASS										
						No.	Req. Max	No	Req. Max	No	Req. Max	No	Req. Max	No	Req. Max	No	Req. Max	
IV	VBC	VBC0202FV/ VBC0203FV	Human Rights and Duties/ Foundation Course on Women's Studies	2	2	-	-	-	-	1	20	1-	20	-	-	1	20	60
	IVBC	UIV4201FI	Human Rights in the Bible	2	2	-	-	1	25	-	-	-	-	1	20	1	15	60
V	VBC	VBC0202FV/ VBC0203FV	Human Rights and Duties/ Foundation Course on Women's Studies	2	2	-	-	-	-	1	20	1	20	-	-	1	20	60
	IVBC	UIV5201FI	Biblical Perspectives on Women	2	2	1	25	-	-	-	-	-	-	1	20	1	15	60
VI	VBC	VBC6101FV	Enhancing Social Grace	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	UIV6101FI	Biblical Perspectives on Leadership	1	1	-	-	1	25	-	-	1	15	1	20	-	-	60

**POST GRADUATE  
VALUE EDUCATION**

**EVALUATION PATTERN 2018 BATCH (III & IV SEMESTERS)**

SEM	Part IV VBC/IVBC	COURSE CODE	COURSE TITLE	Hrs./Wk.	Credits	FORMATIVE COMPONENTS												Total
						Formative Assessment – I						Formative Assessment – II						
						CEC				Home ASS		Class ASS		Home ASS		OSS		
						Test		ASS										
						No.	Req. Max.	No	Req. Max.	No.	Req. Max.	No.	Req. Max.	No.	Req. Max.	No.	Req. Max.	
III	VBC	PGV3101PV	Basic Tenets of Major Religions	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	VBC	PGV3102PV	Cultural Heritage and Values in India	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	PIV3101PI	Biblical Ethics	1	1	1	25	-	-	-	-	1	15	1	20	-	-	60
IV	VBC	PGV4103PV	In Tune with Nature	2	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	PIV4101PI	Biblical Perspectives on Gender	2	1	-	-	1	25	-	-	-	-	1	20	1	15	60

EVALUATION PATTERN 2019 BATCH ON WARDS

SEM	Part IV VBC/IVBC	COURSE CODE	COURSE TITLE	Hrs./ Wk.	Credits	FORMATIVE COMPONENTS												Total
						Formative Assessment- I						Formative Assessment- II						
						CEC				Home ASS		Class ASS		Home ASS		OSS		
						Test		ASS										
						No.	Req Max	No	Req Max	No	Req Max	No	Req Max	No	Req Max	No	Req Max	
I	VBC	PGV1101PV	Foundation Course on Women's Studies	2	1	-	-	-	-	1	20	1	20	-	-	1	20	60
	VBC	PGV1102PV	Perspectives on Gender	2	1	-	-	-	-	1	20	1	20	-	-	1	20	60
	IVBC	PIV1102PI	The Bible and Science	2	1	1	25	-	-	-	-	1	15	1	20	-	-	60
II	VBC	PGV2103PV	Human Rights and Duties	2	1	-	-	-	-	1	20	1	20	-	-	1	20	60
	VBC	PGV2102PV	Practicing Human Rights	2	1	-	-	-	-	1	20	1	20	-	-	1	20	60
	IVBC	PIV2102PI	Rights Responsibilities and the Bible	2	1	-	-	1	25	-	-	-	-	1	20	1	15	60
III	VBC	PGV3101PV	Basic Tenets of Major Religions	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	VBC	PGV3102PV	Cultural Heritage and Values in India	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60

SEM	Part IV VBC/IVBC	COURSE CODE	COURSE TITLE	Hrs./ Wk.	Credits	FORMATIVE COMPONENTS												Total
						Formative Assessment- I						Formative Assessment- II						
						CEC				Home ASS		Class ASS		Home ASS		OSS		
						Test		ASS										
						No.	Req Max	No	Req Max	No	Req Max	No	Req Max	No	Req Max	No	Req Max	
	VBC	PGV3103PV	Professional Ethics	1	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	PIV3101PI	Biblical Ethics	1	1	1	25	-	-	-	-	1	15	1	20	-	-	60
IV	VBC	PGV4101PV	Universal Values	2	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	VBC	PGV4102PV	Peace Studies and Peace Makers	2	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	VBC	PGV4103PV	In Tune with Nature	2	1	-	-	-	-	1	20	1	20	1	20	-	-	60
	IVBC	PIV4101PI	Biblical Perspectives on Gender	2	1	-	-	1	25	-	-	-	-	1	20	1	15	60

## CURRICULUM PLANNING AND EVALUATION CELL

- I. Introduction of interdisciplinary courses (both Aided and SF) to be offered to 2017 batch. Changes in course content of interdisciplinary courses and non-major elective course (Aided) to be offered to 2017 and 2018 batches.
- II. Introduction of foundation in major as a lab course (FP) offered from 2019 batch onwards (Refer Sciences booklet page no. 58)
- III. Ratification – Introduction of PG Elective as lab-cum-theory course
- IV. Change of hours in Life Frontier Engagement Course
- V. Board of Studies and Academic Council meetings per year
- VI. Ratification – Change in nomenclature of Diploma and Certificate courses
- VII. Evaluation Pattern for PG Elective – Lab-cum-theory course and UG Foundation in Major – Lab course (FP)
- VIII. Evaluation Pattern for PG Diploma, Diploma and Certificate courses

### COURSE PROFILE

#### I. a. Introduction of interdisciplinary course (Aided)

Sem.	Course code	Course Title	Hrs./wk.	Credits	Passed in Academic council	Offered to	Offered by
VI	MAPH6401DT	DIFFERENTIAL EQUATIONS FOR COMPUTATIONAL PHYSICS	4	4		AUMAT & AUPHY	MAT & PHY

#### I. b. Introduction of interdisciplinary courses (Self-Financed)

Sem.	Course code	Course Title	Hrs./wk.	Credits	Passed in Academic council	Offered to	Offered by
V	CREN5401DM	BUSINESS JOURNALISM	4	4		SUCOS & SUENG	COS & ENG
V	ITMA5401DT	DISCRETE MATHEMATICS WITH PYTHON	4	4		SUITM & SUMAT	ITM & MAT
VI	CAEN6401DM	ENGLISH FOR BUSINESS CORRESPONDENCE	4	4		SUCOE & SUENG	COE & ENG

Content has been revised for the following courses

#### I. c. Interdisciplinary course (Aided)

Sem.	Course code	Course Title	Hrs./wk.	Credits	Passed in Academic council	Offered to	Offered by
V	COEN5402DM / CBEN5402DM	ADVERTISING STRATEGY	4	4		AUCOM & AUENG / SUCOB & SUENG	COM & ENG
V	CHPH5403DM	FUNDAMENTALS OF ENERGY CONVERSION AND STORAGE	4	4		AUCHE & AUPHY	CHE & PHY

I. d. Non-Major Elective (Aided)

Sem.	Course code	Course Title	Hrs./wk.	Credits	Passed in Academic council	Offered to	Offered by
IV	ENZO4202EI	LITERATURE AND ENVIRONMENT	2	2		AUALLM	ENG & ZOO

I. a. Introduction of interdisciplinary course (Aided)

**MAPH6401DT DIFFERENTIAL EQUATIONS FOR COMPUTATIONAL PHYSICS  
(LAB CUM THEORY)**

LEARNING OUTCOME:

3T+1L hrs./wk.

On successful completion of the course, the student will be able to

- relate the theory to acquire the solutions of the ordinary differential equations
- use Laplace transforms to solve differential equations
- apply Laplace transforms to solve dynamical systems
- employ Python to simulate the solutions of dynamical systems

**UNIT I: ORDINARY DIFFERENTIAL EQUATIONS**

11T hrs.

Differential equations – problems associated with differential equations – linear equations of first order – the equation  $y'+ay=0$  – the equation  $y'+ay=b(x)$  – the general linear equation of the first order

**UNIT II: LAPLACE TRANSFORMS**

11T hrs.

Applications to differential equations – derivatives and integrals of Laplace transforms – convolutions – Abel's mechanical problem – the unit step and impulse functions

**UNIT III: APPLICATIONS OF LAPLACE TRANSFORMS**

11T hrs.

Response of an RC circuit to a single rectangular wave – response of an RLC circuit to a sinusoidal input – mass spring system under a square wave – hammer blow response of a mass-spring system

**UNIT IV: SYMBOLIC PYTHON (SymPy): BASICS**

12T hrs.

Introduction to computing with Python – the Python environment – plotting and visualization using Matplotlib – importing modules – calculus using SymPy– Laplace transform of standard functions – symbolic solution to ordinary differential equations – solving ordinary differential equations using Laplace transformations

**Unit V: LAPLACE TRANSFORM SIMULATIONS USING SYMPY**

15L hrs.

SymPy: Laplace and inverse Laplace transform of simple functions – applications to differential equations and graphing the solutions: Newton's law of cooling, analysis of RC and RLC circuits, damped harmonic oscillator

**TEXT BOOK(S):**

Earl. A. Coddington (2003). *An Introduction to ordinary differential equations*, New Delhi: Prentice Hall of India Ltd., Print. Chapter 1

Gajanan Dhanorkar and Deepak Sonawane, (2014) *Simulation of Laplace Transforms with Python*, International Journal of Mathematical Archive-5(8), Print. pg. 30-35

Johansson, R. (2015). *Numerical Python a practical techniques approach for industry*. New York: Apress. Chapters: 1 (pg. 1-10), 4 (89-97), 9 (207-214,217-219)

Krantz, S. G., & Simmons, G. F. (2014). *Differential equations: Theory, technique, and practice*. Boca Raton: Chapman & Hall/CRC. Print. Chapter 7

Kreyszig, E., Kreyszig, H., & Norminton, E. J. (2011). *Advanced engineering mathematics*. Hoboken, NJ: John Wiley & Sons. Print. Chapters: 6.3 (pg. 237-239), 6.4 (pg. 243-244)

**REFERENCE BOOK(S):**

Srivastava, A. N., Mohammad Ahmad, (2012). *Integral Transforms and Fourier Series*, New Delhi: Narosa Publishing House. Print.

B.S Grewal, (2015), *Higher Engineering Mathematics*, New Delhi: Khanna Publishers. Print

M.D. Raisinghana, (1997), *Ordinary and Partial Differential Equations*, S.New Delhi: Chand & Company Ltd., Print.

**WEBSITE(S):**

<http://josephcslater.github.io/solve-ode.html>

<https://www.youtube.com/watch?v=mjGczJTkWic>

<http://www.cfm.brown.edu/people/dobrush/am33/SymPy/index.html>

<https://github.com/sympy>

**I. b. Introduction of Interdisciplinary Courses (Self-Financed)**

**CREN5401DM BUSINESS JOURNALISM**

**(THEORY)**

**LEARNING OUTCOME:**

**4 hrs./wk.**

On successful completion of the course, the student will be able to

- express effectively making presentations on a variety of topics
- describe products, including news stories, press releases, and advertising
- create and design emerging media products, including blogs for social media

**COURSE CONTENT:**

**UNIT I: INTRODUCTION**

**12 hrs.**

Journalism – Definition & Scope, Print Media – Print Journalism – Newspapers/Magazines  
Organizational structure – Jargons – News Stories – Creative Articles – Power leads – Interviews –  
Editorials – Columns – Electronic Media – Press release

**UNIT II: BUSINESS MEDIA ETHICS**

**12 hrs.**

Business Media Ethics – Press Laws, State Control versus Freedom of Media – Prasar Bharti, Press  
Council of India – Debates in responsibility and accountability of journalists and publishers and  
consequences of misreporting, Press Legislature of India, Broadcasting Journalism – Radio and T.V.  
Production.

**UNIT III: CYBER JOURNALISM**

**12 hrs.**

Definition – Changing format of News Presentation, Web Magazine and Web Newspaper – Stylistic  
guidelines, E-advertising and its types, Challenges and opportunities for a journalist, Future of  
Cyber Journalism in India

**UNIT IV: PUBLIC RELATIONS AND CORPORATE COMMUNICATION**

**12 hrs.**

Theory and practice of PR, definition, role and functions – PR in changing social and political  
environment – Art of persuasion, feedback, campaign planning and strategies – Media Tracking –

Definition, scope and functions of Corporate Communication – Corporate Culture – Social Responsibility – Publicity – Case studies

**UNIT V: GLOBAL INFORMATION SCENARIO** 12 hrs.

Emerging World Information Scenario – Communication and Culture – Intercultural Communication – Bridging Cultural Barriers for Corporate Success: managing the multicultural work force, Content writing – Social media, Blogs, Technical writing – Online reviews – product description writing

**REFERENCE BOOK(S):**

Kamath. *Professional Journalism*. 1<sup>st</sup> ed, New Delhi: Vikas Publication House Pvt. Ltd, 2009. Print.

Elfenbein, J., *Business Journalism*, 2<sup>nd</sup> ed. New York: Harper & Brothers, 1960. Print.

Sharma, R.C., Krishna Mohan. *Business Correspondence and Report Writing*. New Delhi: Tata McGraw Hill, 2010. Print.

Ray, Tapas. *Online Journalism: A Basic Text*. Cambridge: Cambridge University Press India Private Limited, 2006. Print.

Ward, Mike. *Journalism Online*. U.K.: Routledge, 2013. Print.

## **ITMA5401DT DISCRETE MATHEMATICS WITH PYTHON**

**(LAB CUM THEORY)**

**LEARNING OUTCOME:** 3T+1L hrs./wk.

On successful completion of the course, the student will be able to

- apply python constructs for mathematical mapping
- interpret the relation on sets and recurrence relations using programs
- derive the solutions of recurrence relations

**COURSE CONTENT:**

**UNIT I: BASICS OF PYTHON** 9T+3L hrs.

Data types – operators – integer division formatting – text and numbers – basic conditional structures – if else – arrays – symbolic computations – alternatives to arrays: list – tuples – looping structures: for loop – while loop – functions

**UNIT II: OBJECTS, FUNCTIONS AND FILES** 9T+3L hrs.

Class – objects – sequence – properties of monoids – stream and endless stream – concatenation of stream class – flat files

**UNIT III: SETS AND MAPPING** 9T+3L hrs.

Mathematical sets – sets in python – case study – flat files – mathematical mapping – python dictionary – case study – multisets

**UNIT IV: RELATIONS** 9T+3L hrs.

Cartesian product of two sets – relations – representation of a relation – operations on relations – equivalence relations.

**UNIT V: RECURRENCE RELATIONS AND GENERATING FUNCTIONS** 9T+3L hrs.

Recurrence relations – solution of finite order homogeneous linear relations – solution of non-homogeneous relations – generating functions.

**EXPERIMENTS / LAB:**

Average of a collection of observations

Finding a name again in functional style  
Average of observations again in functional style  
Combinations using a generator function  
Finding job candidates using set operations  
Job candidates again with different input files  
Finding given words in a document  
A memoized function: the  $n$ th Fibonacci number  
Number of students in each major field  
Distances using symmetry and reflexivity  
The Moving Average class  
The Pushbutton class  
A state machine for finding fields in a string  
Code that uses a Fields State Machine  
A state machine for finding fields

**TEXT BOOK(S):**

Allan M. Staveland, (2014). *Programming and Mathematical Thinking: A gentle introduction to discrete math featuring Python*. ISBN 9781938159008 (pbk.) — 9781938159015 (eBook). OCLC Number: 863653804 The New Mexico Tech Press. (Chapter :2,11)  
Venkataraman M.K., Sridharan N. and Chandrasekaran N., (2001). *Discrete Mathematics* Chennai: The National Publishing Company. Print. (Chapter: 2 (1-5), 5 (3 – 6))

**REFERENCE BOOK(S):**

Sundaresan V., Ganapathy Subramanian K.S. and Ganesan K., (2001). *Discrete Mathematics*, Sirkali: A.R. Publications. Print.

**WEBSITE(S):**

<https://sahandsaba.com/understandingrecurrencerelationsusingpythonautomataandmatricesvisualized.html>

## CAEN6401DM ENGLISH FOR BUSINESS CORRESPONDENCE

### (THEORY)

**LEARNING OUTCOME:**

4 hrs. /wk.

On successful completion of the course, the student will be able to

- identify methods and formats of report preparation which includes graphical presentation and interpretation
- prepare CVs and face interviews confidently
- develop oral and written skills for business correspondence

**COURSE CONTENT:**

**UNIT I: COMMUNICATION AND OVERVIEW**

12 hrs.

Definition – Process – Principles – Barriers – Essentials of Written and Oral, Non-verbal – e – communication – Know a concept through reading and listening – Audio & video talks – Reading passages from Business Line, Business World – Reading of Business News.

**UNIT II: WRITTEN AND ORAL COMMUNICATION** 12 hrs.

Importance of Oral Communication – Oral Presentation, Dialogue delivery – Discussion of case studies – Presentation of daily news – Role play and extempore on topics relating to business – CV Job Application – Preparation of curriculum vitae, job application

**UNIT III: INTERNAL CORRESPONDENCE** 12 hrs.

Office communication, internal memos, office circulars, office orders – office notes; Mail etiquettes in internal correspondence – interview letters – appointment letters.

**UNIT VI: SECRETARIAL CORRESPONDENCE** 12 hrs.

Board meetings, letters to shareholders and debenture holders, to Registrar of Companies – Notice, agenda, minutes of meetings. Technical writing like report writing.

**UNIT V: BUSINESS REPORTS** 12 hrs.

Introduction – importance – functions – features – Types of Business reports – Selecting a suitable type of report – Long report – characteristics of a good report.

**REFERENCE BOOK(S)**

Pal, Rajendra, and Korlahalli, J.S. *Essentials of Business Communication*. New Delhi: Sultan Chand & Sons, 2016. Print.

Kitty, O, Locker, Stephen Kyo Kaczmarek. *Business Communication*. New Delhi: Tata Mc Graw Hill. Co Ltd., Print.

Sharma, R.C., Krishna Mohan, *Business Correspondence and Report Writing*. New Delhi: Tata Mc Graw-Hill, 2015. Print.

Krishnaswamy, N. Manju Dhariwal and Lalitha Krishnaswamy. *Mastering Communication Skills and Soft Skills*. New Delhi: Bloomsbury Publishers, 2015. Print.

Parikh, J.P., Anshu Surve, Swarnabharati, and Asma Bahrainwala, *Business Communication: Basic Concepts and Skills*. New Delhi: Orient Black Swan Private Limited, 2016. Print.

**I. c. Changes in course content of Interdisciplinary course (Aided)**

**COEN5402DM / CBEN5402DM ADVERTISING STRATEGY**

**(THEORY)**

**LEARNING OUTCOME:** 4 hrs./wk.

On successful completion of the course, the student will be able to

- describe the creative process of advertising
- employ critical thinking while planning an advertisement
- develop a campaign on a given theme

**COURSE CONTENT:**

**UNIT I: ADVERTISING AND MEDIA** 10 hrs.

Advertising – Meaning – Definition – Importance – Objectives – History of advertising – Types of advertising – Media Planning – Steps – Advertising Media – Radio – TV – Print – Outdoor advertising – Web advertising – Advertising as a marketing tool – Ethics in advertising.

**UNIT II: ADVERTISEMENT PLANNING**

15 hrs.

Advertisement planning – Process – Advertisement Agency – Functions – Types – Advertisement copy – Copy writing – Design – Layout – Advertising Theme and Appeals – Types – Rational – Emotional – Moral.

**UNIT III: LINGUISTIC FEATURES OF ENGLISH ADVERTISING**

10 hrs.

Introduction – Graphology – Punctuation, capitalisation, paragraphing, typography, layout of the text – Lexis – monosyllabic verbs, weasel words, favourable words, personal pronouns, compounds, neologisms, figures of speech – Syntax – different kinds of sentences.

**UNIT IV: COPYWRITING**

15 hrs.

Create direct mail pieces – taglines – brand communication – jingle lyrics – webpage content – online ads – e-mail – TV and radio commercial scripts – catalogue – billboard – brochures – flap copy – jacket flap copy.

**UNIT V: ADVERTISING CAMPAIGN AND LAWS**

10 hrs.

Developing an advertising campaign using corporate and social brands – Advertising Campaign – Steps in advertising campaign – Evaluating the campaign effectiveness – Application of relevant laws.

**REFERENCE BOOK(S):**

Bly, Robert W. *The Copywriter's Handbook: A Step-by-Step Guide to Writing Copy That Sells*. New York: Holt Paperbacks, 2006. Print

Krishnamurthy, A.G. *Learning of an Advertising Practitioner*. India: McGraw Hill Education Pvt. Ltd., 2010. Print

Sharma, Sangeeta and Raghuvir Singh. *Advertising Planning and Implementation*. New Delhi: Prentice – Hall of India Private Ltd., 2009. Print

Sissors, Jack Z and Roger B. Baron. *Advertising Media Planning*. New Delhi: Tata McGraw – Hill, 2010. Print

**CHPH5403DM FUNDAMENTALS OF ENERGY CONVERSION AND STORAGE****(THEORY)****LEARNING OUTCOME:**

4 hrs./ wk.

On successful completion of the course, the student will be able to

- apply the electrochemical principles to batteries and fuel cells
- analyze the properties of energy storage systems
- acquire knowledge of photovoltaic devices and their performances
- describe the principles of nuclear reactors

**COURSE CONTENT:****UNIT I: FUEL CELLS AND HYDROGEN STORAGE**

12 hrs.

Fuel cells – history – classification – alkaline fuel cells – phosphoric acid fuel cells – solid oxide fuel cells – molten carbonate fuel cells – direct methanol fuel cells – proton exchange membrane fuel cells – microbial fuel cells – description, working and components of alkaline fuel cell and direct methanol fuel cells – applications – stationary power plants – fuel cells in electric vehicles – hydrogen vehicles – portable power systems.

Hydrogen storage– hydrogen production – hydrogen as an engine fuel – methods of hydrogen storage – storage via chemical reactions – hydrogen energy economy – hydrogen storage technologies

**UNIT II: PRIMARY BATTERIES**

12 hrs.

Components of cells and batteries – operation of a cell – theoretical cell voltage, capacity, and energy (concepts only) – electrochemical principles and reactions – types and characteristics of primary batteries – voltage and discharge profile – specific energy and specific power – zinc/air batteries: general characteristics – construction (basic details) – performance characteristics – lithium batteries: general characteristics

**UNIT III: SECONDARY BATTERIES AND ELECTROCHEMICAL CAPACITORS**

12 hrs.

Types and characteristics of secondary batteries: Lead Acid Batteries, Alkaline Secondary batteries: Nickel-cadmium batteries, Lithium-ion batteries – voltage-discharge profile – effect of discharge rate on performance – lead acid batteries: introduction (general characteristics only) – lithium-ion batteries: introduction (general characteristics only) – intercalation processes – capacity fade in C/LiMn<sub>2</sub>O<sub>4</sub> cells – electrochemical capacitors (ECs): introduction – EC operation.

**UNIT IV: PHOTOVOLTAIC SYSTEMS**

12 hrs.

Properties of solar radiation – the solar constant – spectrum of the sun – air mass – band model of semiconductors – charge transport in semiconductors – doping of semiconductors – pn Junctions – structure and characteristics of a photodiode – method of function of the solar cell – photocurrent – characteristic curve and characteristic dimensions – crystalline silicon cells – amorphous silicon cells – thin film cells: cadmium telluride – applications: space PV cells.

**Unit V: NUCLEAR REACTORS AND RADIATION PROTECTION**

12 hrs.

Nuclear fission – the fission chain reaction – nuclear reactor fuels – components of nuclear reactors – power reactors and nuclear steam supply systems: light water reactors and pressurized water reactors – nuclear cycles: LWR once-through fuel cycle – radiation units: exposure, the Roentgen, exposure rate, imparted energy, adsorbed dose, adsorbed dose rate, Kerma, equivalent dose, equivalent dose rate, population dose – quantitative effects of radiation on the human species – calculations of radiation effects – computations of exposure and dose: dose from neutrons – external exposure – nuclear reactor shielding

**TEXT BOOK(S):**

Konrad Martens, (2014). *Photovoltaics: Fundamentals, Technology and Practice*, (1<sup>st</sup> ed.), John Wiley & Sons, Print.

(Unit IV) Relevant sections in Chap 3, 4, 5 (2.1,3.2,3.3,3.4,3.5,4.1.1,4.2,4.3,4.4,5.1,5.2,5.3,5.3.1)

Lamarsh, J. R., Baratta A. J., (2001). *Introduction to Nuclear Engineering* (3<sup>rd</sup> ed.), Prentice-Hall Inc, New Jersey, Print.

(Unit V) Relevant sections in Chap 3 (3.7), 4 (4.1, 4.2, 4.4, 4.5 (up to Pg. 143), 4.6 (up to Pg. 188)), 9,10 (9.2, 9.5, 9.6, 9.9 (Pg. 516 – 520),10.6)

Linden, D., Thomas B Reddy, (2002). *Handbook of Batteries*, (3<sup>rd</sup> ed.), McGraw Hill, Print.

(Unit II) Relevant sections in Chap 1, 2, 7, 13, 14 (1.1, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4, 7.2, 7.3.2, 7.3.3, 13.1, 13.2, 13.3 (up to Pg. 13.4), 13.4.1 - 13.4.5,14.1, 14.2)

(Unit III) Relevant sections in Chap 22, 23, 35 (22.2, 22.3.2, 22.3.3, 23.1 (up to Pg. 23.3), 23.2.1, 35.1 (up to Pg. 35.3), 35.2.1, 35.2.3)

Puri, B.R, Sharma, L.R., Pathania, S., (2015). *Principles of Physical Chemistry*, (47<sup>th</sup> ed.), Vishal Publishing Co., Jalandhar, Print.

(Unit I) Chap 24.

Viswanathan, B., Aulie Scibioh M., (2006). *Fuel Cells Principles and applications*, University Press PVT Ltd, Print.

(Unit I) Relevant sections in Chap 1, 3, 7, 10, 11(1.2, 1.6, 3.1, 3.2, 3.3, 7.4, 7.5, 7.6, 10.1,10.3, 10.4.4, 11.6, 11.7)

Winter, M., Brodd, R. J., Chemical Reviews, (2004). *What Are Batteries, Fuel Cells, and Supercapacitors?*

(Unit III) pages: 4266,4268

#### REFERENCE BOOK(S):

Singal, R. K., (2014). *Nuclear Reactors*, (1<sup>st</sup> ed.), New Age International (P) Ltd, New Delhi, Print

Vaidyanathan, G., (2013). *Nuclear Reactor Engineering, (Principles and Concepts)*, (1<sup>st</sup> ed.), S. Chand and Co. Pvt. Ltd., New Delhi, Print.

#### WEBSITE(S):

[https://www1.eere.energy.gov/hydrogenandfuelcells/education/pdfs/thomas\\_fcev\\_vs\\_battery\\_ev.pdf](https://www1.eere.energy.gov/hydrogenandfuelcells/education/pdfs/thomas_fcev_vs_battery_ev.pdf) (Unit I)

[http://www.fuelcelltoday.com/media/1711108/fuel\\_cell\\_electric\\_vehicles\\_-\\_the\\_road\\_ahead\\_v3.pdf](http://www.fuelcelltoday.com/media/1711108/fuel_cell_electric_vehicles_-_the_road_ahead_v3.pdf) (Unit I)

<http://nptel.ac.in/courses/108103009/download/M9.pdf> (Unit II)

[http://cdn.intechopen.com/pdfs/36830/InTech-Photovoltaic\\_systems\\_and\\_applications.pdf](http://cdn.intechopen.com/pdfs/36830/InTech-Photovoltaic_systems_and_applications.pdf) (Unit III)

### I. d. Change in course content of Non-Major Elective (Aided)

#### ENZO4202EI LITERATURE AND ENVIRONMENT

##### (THEORY)

#### LEARNING OUTCOME:

2 hrs./wk.

On successful completion of the course, the student will be able to

- infer the interdependence in the web of life
- differentiate between nature and environment (issues and concerns)
- assess the importance of intrinsic value as opposed to instrumental value

#### COURSE CONTENT:

##### UNIT I:

8 hrs.

Concepts and Principles of an Ecosystem: The web of life, keystone species

E H A - "The Banian Tree"

Ruskin Bond - "In Search of Sweet-Peas"

##### UNIT II:

7 hrs.

Abiotic Factors: Light, Temperature, Rainfall

C. A. Renny - "Blessing in the Rice Fields"

F.W. Champion - "Drought in the Jungle"

**UNIT III:** 7 hrs.  
 Bioticfactors: Ecological succession – Predation ecology – Population ecology – Community ecology  
 Anonymous - “The Elephant’s Graveyard”  
 Pallava Bagla - “Predator”

**UNIT IV:** 8 hrs.  
 Habitat Ecology: Fresh water and Marine Ecology – Terrestrial Ecology – Biomes  
 Rudyard Kipling - “Lukannon”  
 A.Y. Campbell - “The Dromedary”

**TEXT BOOK(S):**

Bond, Ruskin. *Green Book*. New Delhi: Roli Books, 2003. Print.  
 Bond, Ruskin. *Funny Side Up*. New Delhi: Rupa &Co, 2006. Print.  
 Odum E.P. *Fundamentals of Ecology*. 3<sup>rd</sup> ed. London: W. B. Saunders Company, 1971. Print.

**REFERENCE BOOK(S):**

Sharma, J.Kumar. et al.,eds. *The British Empire and the Natural World: Environmental Encounters in South Asia*, Oxford University Press, 2010. Print.  
 Thapar, R., *Perceiving the Forest: Early India: From the Origins to AD 1300*, California: University of California Press, 2004. Print.  
 Wright, Judith. *The Double Tree: Selected Poems 1942-76*. Oxford: Houghton Mifflin, 1978. Print.

**III. Ratification – Introduction of PG Elective as lab -cum-theory course**

The theory course PGE2431E THE ART OF STORYTELLING has been changed to Lab cum theory course from 2018 batch onwards

**COURSE PROFILE**

**ELECTIVE COURSE**

Sem.	Course Code	Course Title	Course Type	Hrs./ Wk.		Credits	Passed in Academic Council	Offered to	Offered by
				TH	L				
II	PGE2431E	THE ART OF STORYTELLING	LT	2	2	4		APALLM	ENG

**IV. Change of hours in Life Frontier Engagement Course**

The number of contact hours for Life Frontier Engagement course is reduced from 5 to 4 in order to allocate one hour to Integrated Value Based Course (IVBC) in semester VI, offered to 2018 batch onwards.

**V. Board of Studies and Academic Council Meetings per Year**

Based on the UGC norms (January 2019) Board of Studies and Academic Council meetings should be conducted at least twice a year and this will be implemented from 2019-2020 academic year onwards

## VI. Ratification – Change in Nomenclature of Diploma and Certificate Courses

- The Certificate course 'MEDICAL PHYSICS' offered by the Department of Physics will be changed to 'MEDICAL INSTRUMENTATION' from 2018 onwards
- The Diploma course 'FITNESS MANAGEMENT' offered by the Department of Physical Education will be changed to 'FITNESS TRAINING' from 2017 onwards

## VII. Evaluation Pattern for PG Elective – Lab-cum-theory course and UG Foundation in Major – Lab course (FP)

Evaluation Pattern for PG Elective (Lab-cum-theory) offered to 2018 batch and UG (Foundation in Major – Lab (FP) offered from 2019 batch onwards

### PG ELECTIVE - Lab-cum-theory

Course Code	Course Title	Total hrs. / Wk.		No. of Test	Req. Max.	No. of Assig.	Req. Max.	Form. Lab	Req. Max.	Form.	Summative		
		TH	LA								GM	RM	Exam hrs.
PGE2431E	The Art of Story Telling	2	2	1	30	1	10	1	20	60	60	40	2

### FOUNDATION IN MAJOR – LAB

Form. Lab	Form. Total	Sum Lab	Req. Max
1	75	1	25

## VIII. Evaluation Pattern for PG Diploma, Diploma and Certificate courses

The ratio of the components for the formative and summative evaluation pattern is

60: 40 – Theory and Lab-cum theory courses

75: 25 – Lab courses

to be followed from 2019 batch onwards.

**EXTRA CREDIT COURSES**

**Department of Mathematics**

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	MAT2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUMAT	MAT
IV	MAT4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUMAT	MAT
VI	MAT6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUMAT	MAT
V	MAT0501PR	ACADEMIC PROJECT	PR	5	AZ2017	AUMAT & SUMAT	MAT

**Department of Physics**

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	PHY2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUPHY	PHY
IV	PHY4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUPHY	PHY
VI	PHY6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUPHY	PHY
V	PHY0501PR	ACADEMIC PROJECT	PR	5	AZ2017	AUPHY & SUPHY	PHY
III	PHY3201SI	SUMMER INTERNSHIP	TR	2		AUPHY	PHY
V	PHY5201SI	SUMMER INTERNSHIP	TR	2		AUPHY	PHY

**Department of Chemistry**

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	CHE2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUCHE	CHE
IV	CHE4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUCHE	CHE
VI	CHE6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUCHE	CHE
V	CHE0501PR	ACADEMIC PROJECT	PR	5	AZ2017	AUCHE	CHE
III	CHE3201SI	SUMMER INTERNSHIP	TR	2		AUCHE	CHE
V	CHE5201SI	SUMMER INTERNSHIP	TR	2		AUCHE	CHE

**Department of Botany**

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	BOT2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUBOT	BOT
IV	BOT4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUBOT	BOT
VI	BOT6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUBOT	BOT
V	BOT0501PR	ACADEMIC PROJECT	PR	5	AZ2017	AUBOT	BOT
II	BOT2201SI	SUMMER INTERNSHIP	TR	2		AUBOT	BOT
IV	BOT4201SI	SUMMER INTERNSHIP	TR	2		AUBOT	BOT

Department of Zoology

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	ZOO2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUZOO	ZOO
IV	ZOO4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUZOO	ZOO
VI	ZOO6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	AUZOO	ZOO
V	ZOO0501PR	ACADEMIC PROJECT	PR	5	AZ2017	AUZOO	ZOO
IV	ZOO4201SI	SUMMER INTERNSHIP	TR	2		AUZOO	ZOO

Department of Biotechnology

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	BTE2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUBTE	BTE
IV	BTE4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUBTE	BTE
VI	BTE6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUBTE	BTE
V	BTE0501PR	ACADEMIC PROJECT	PR	5	AZ2017	SUBTE	BTE
II	BTE2201SI	SUMMER INTERNSHIP	TR	2		SUBTE	BTE
IV	BTE4201SI	SUMMER INTERNSHIP	TR	2		SUBTE	BTE

Department of Computer Science

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	CSC2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUCSC	CSC
IV	CSC4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUCSC	CSC
VI	CSC6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUCSC	CSC
V	CSC0501PR	ACADEMIC PROJECT	PR	5	AZ2017	SUCSC	CSC

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	IFT2201CE	ANNUAL e-ASSESSMENT	CE	2		SUIFT	CSC
IV	IFT4201CE	ANNUAL e-ASSESSMENT	CE	2		SUIFT	CSC
VI	IFT6202CE	ANNUAL e-ASSESSMENT	CE	2		SUIFT	CSC
V	IFT0501PR	ACADEMIC PROJECT	PR	5		SUIFT	CSC

## EXTRA CREDIT COURSES

### Department of Mathematics

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
IV	MAE4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUMAT	MAT
VI	MAE6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUMAT	MAT

### Department of Physics

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	PHE2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUPHY	PHY
IV	PHE4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUPHY	PHY
VI	PHE6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUPHY	PHY

### Department of Fashion Designing

Sem.	Course Code	Course Title	Course Type	Credits	Passed in Academic Council	Offered to	Offered by
II	FDS2201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUFDS	FDS
IV	FDS4201CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUFDS	FDS
VI	FDS6202CE	ANNUAL e-ASSESSMENT	CE	2	AZ2017	SUFDS	FDS