THEIVANAI AMMAL COLLEGE FOR WOMEN (AUTONOMOUS)

VILLUPURAM

(Re-Accredited by NAAC with 'A' Grade & ISO 9001:2008 Certified)

(AUNIT OF E.S.S.K. EDUCATIONAL CHARITIES)

.

ACADEMIC COUNCIL BOOKLET – VII

IQAC, Arts & Science (Master Copy)

6th June 2015

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Internal Quality Assurance Cell

UG COURSE PROFILE – Allotment of Hours

(With effect from 2015-2018 batch onwards)

PREAMBLE

Course profiles for UG, PG & M.Phil, Scale of punishment for malpractice Syllabi for Preparatory Course for NET/SET, Value education & Soft skill are presented in this booklet.

Components	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem
Part I						
Tamil/Hindi/French (2 Levels)	4	4	4	4	-	-
Part II						
English (2 Levels)	**5**	**5**	**5**	**5**	-	-
Part III						
Major core & Allied	**19**	**15**	**15**	**19**	**23**	23
Major elective	-	-	-	-	-	5
Allied optional	-	-	-	-	5	-
Part IV						
Non major elective	-	4	4	-	-	-
Value education	2	-	2	-	2	-
Soft skill	-	2	-	2	-	2
Part V Extension activity/ Physical education (outside class hours)	60 Hours (Compulsory)		60 Hours (Optional)		60 Hours (Optional)	
Total Hours	**30**	**30**	**30**	**30**	**30**	**30**
Not more than six courses per semester for Arts and seven courses per semester for Science.						

UG – COURSE PROFILE – Credit Allotment

(With effect from 2015-2018 batch onwards)

Components	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total Credit
Part I Tamil / Hindi / French (2 Levels)	2/3	2/3	2/3	2/3	-	-	8/12
Part II English (2 levels)	**3/4**	**3/4**	**3/4**	**3/4**	**-**	**-**	**12/16**
Part III	10-20	10-20	10-20	15-25	**15-25**	15-25	**100/110****
Major core & Allied	-	-	-	-	-	4	4
Major elective	-	-	-	-	4	-	4
Allied optional	-	-	-	-	-	1	1
Comprehensive viva	-	1	-	1	-	-	2(EXTRA)
Summer Internship (extra)							
Part IV							
Non Major Elective	-	2	2	-	**-**	-	**4**
Value Education	1	-	1	-	1	-	3
Soft Skill	-	1	-	1	-	1	3
Part V Extension activity / Physical education (outside class hours)	1/2		Extra 1/2		Extra 1/2		1/6
						Total	**140/155**

***Not more than six courses per semester for Arts and seven courses per semester for Science**

**** Only for courses offering language for one year (BBA, B.Com, B.Com with CA & BCA)**

PG COURSE PROFILE – Allotment of Hours
(With effect from 2015-2017 batch onwards)

Components	I Sem	II Sem	III Sem	IV Sem
Major core Major elective	25	25	26	24
Project	-	-	2	4
Non major elective	5	5*	-	-
Value education (Women's studies)	-	-	2	2
Service learning (outside class hours)	40 hrs		-	-
Total Hours	**30**	**30**	**30**	**30**
*** Preparatory Course for NET/ SET / Competitive Exam**				

PG COURSE PROFILE – Allotment of Credits
(With effect from 2015-2017 batch onwards)

Components	I Sem	II Sem	III Sem	IV Sem	Total
Major core Major elective	15-20	15-20	15-25	15-25	73
Project	-	-	-	6	6
Non major elective	4	4	-	-	8
Value education - Women's studies	-	-	1	1	2
Service learning (outside class hours)	1		-	-	1
				Total Credit	**90**

*Library hours to be allotted from major for every semester to PG

M.Phil COURSE PROFILE – Allotment of Hours
(With effect from 2015-2016 batch onwards)

I Semester	II Semester
Paper I (6 hours)	-
Paper II (6 hours)	-
Paper III (Special area study paper)	-
-	Dissertation & Viva voce

- **Paper Presentation (minimum one) and / or Publication of articles in Journals (minimum one) is mandatory for submission of Dissertation.**

I. Scale of punishment for Malpractice in CIA and ESE

<table>
<tr><th rowspan="2">Category</th><th colspan="2">Corresponding punishment</th></tr>
<tr><th>CIA Test</th><th>ESE</th></tr>
<tr><td colspan="3">A. Within the Examination Hall</td></tr>
<tr><td>Using identification marks:
Using colour thread / Making in colour pencil / Candidates name / Reg. No. in other pages / College Name / any other special marking</td><td>Warning</td><td>Warning / Cancellation of examination of that particular paper.</td></tr>
<tr><td>Letter of appeal with promise for consideration of any form.</td><td rowspan="8">Cancel the test and put zero marks in that particular subject.</td><td>Cancel the examination in that particular subject.</td></tr>
<tr><td>Possession of any materials (related/not related to the Exam Paper) inside the examination Hall / Writing on the desk / Any part of the body / Writings on scale, Calculator, handkerchief, Hall ticket etc.,</td><td>Cancel the written examinations of particular paper.</td></tr>
<tr><td>Helping others for copying or getting help from others in the examination Hall in any form for all the students involved in this.</td><td>Cancel all the written examination of that session.</td></tr>
<tr><td>Willfully changing register number.</td><td>Cancel the particular examination taken in that semester.</td></tr>
<tr><td>Exchange of question paper with answer</td><td>Cancel that examination for involved students.</td></tr>
<tr><td>Insertion of answer sheets brought from outside.</td><td rowspan="3">Cancel all the examinations taken in that semester.</td></tr>
<tr><td>Threatening the Hall Superintendent.</td></tr>
<tr><td>Any violent behavior</td></tr>
<tr><td colspan="3">B. Outside the Examination Hall</td></tr>
<tr><td>Put staff / HOD Signature in the Practical Record Book by herself / any other persons.</td><td>Redo the record and submit with next batch.</td><td>Not eligible to appear for the particular examinations.</td></tr>
<tr><td>Marks Changed in her CIA test answer scripts by herself.</td><td>Put zero mark in that CIA test.</td><td>---</td></tr>
<tr><td>Appeal for favour with / without any promise of consideration.</td><td>Warning</td><td>Warning</td></tr>
<tr><td>Change of mark for any CIA component marks in the answer sheet / mark register / mark statement.</td><td>Put zero mark in that CIA test</td><td>----</td></tr>
<tr><td colspan="3">C. Repetition of Malpractice</td></tr>
<tr><td>If the same person continues to do malpractice (more than one time).</td><td>Cancel the test and put zero marks in all papers</td><td>Cancel all examinations taken for that session.</td></tr>
</table>

II. Revaluation for UG Courses (2015-2016 onwards)

Revaluation will be done by internal teachers for all UG courses.

PALE201/301 PREPARATORY COURSE FOR NET / SET

(With effect from 2012-2014 Batch)

Semester : III **Credits : 4**

Category : NME **Hours/week : 5**

Total Hours : 65

General Objectives:

To enable the students

- Familiarize about reasoning ability and research aptitude
- Take up competitive exam skills
- Acquire Language Skill
- Eligible for lectureship upon Indian nationals & belonging state

UNIT I: TEACHING APTITUDE & RESEARCH APTITUDE 15 Hrs

Teaching: Nature, objectives, characteristics and basic requirements; learners characteristics; factors affecting teaching; methods of teaching; teaching aids; evaluation systems. Research: Meaning, characteristics and types; Steps of research; Methods of research; Research Ethics; Paper, article, workshop, seminar, conference and symposium; Thesis writing: its characteristics and format.

UNIT II: READING COMPREHENSION & COMMUNICATION 10 Hrs

Reading Comprehension: A passage to be set with questions to be answered. Communication: Nature, characteristics, types, barriers and effective classroom communication.

UNIT III: MATHEMATICAL & LOGICAL REASONING 15 Hrs

Mathematical Reasoning: Number series; letter series; codes; Relationships; classification.

Logical reasoning: Understanding the structure of arguments; Evaluating and distinguishing deductive and inductive reasoning; verbal analogies: Word analogy- Applied analogy; Verbal classification; Reasoning Logical Diagrams: Simple diagrammatic relationship, multi diagrammatic relationship; Venn diagram; Analytical Reasoning.

UNIT IV: DATA INTERPRETATION & INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) 12 Hrs

Data Interpretation: Sources, acquisition and interpretation of data; Quantitative and qualitative data; Graphical representation and mapping of data. ICT:Meaning, advantages, disadvantages and uses; General abbreviations and terminology; Basics of internet and e-mailing.

UNIT V: PEOPLE AND ENVIRONMENT & HIGHER EDUCATION SYSTEM 13Hrs

People and Environment: People and environment interaction; Sources of pollution; Pollutants and their impact on human life, exploitation of natural and energy resources; Natural hazards and mitigation. Higher Education System: Structure of the institutions for higher learning and research in India; formal and distance education; professional / technical and general education; value education; governance, polity and administration; concept, institutions and their interactions.

Reference Books:

- R.Gupta,*"UGC NET junior Research Fellowship and Eligibility for Lectureship Exam"*,Ramesh Publishing House, New Delhi-2012.
- Dr.M.I.Kamlesh,"*UGC Net Digset teaching and research Aptitude",* KhelSahitya Kendra Publisher, 2005.

- "*UGC University Grants Commision NET/SET for Lectureship Exam Paper I (Compulsory)"*- GKP Publisher: G K Publications Pvt.Limited,2010.
- Lal Jain, K.C. Vashistha,"*UGC NET/JR/SLET Teaching & Research Aptitude (General Paper-I)"*, Upkar Publications. 2009.

PART IV-VALUE EDUCATION

PREAMBLE:

The course profile and the Syllabi of courses offered in Semesters I, III, V (With effect from 2015-2018 batch onwards) are presented in this booklet.

Semester	Part	Category	Course code	Course Title	Contact Hrs	Credit
I	IV	Value Education	UGEV101	Values In Life	2	1
			UGEV104	Globalization and Values In Family Life	2	1
			UGEV105	Family Life Education	2	1
III	IV `	Value Education	UESV301	Pollution and Its Management	2	1
			UESV304	Biodiversity	2	1
			UESV305	Environmental Issues And Human Health	2	1
			UESV306	Natural Resources and Conservation	2	1
			USEV307	Consumer Protection	2	1
			USEV308	Awareness On Anticorruption	2	1
			USEV309	Human Rights	2	1
V	IV	Value Education	UWSV501	Women and Education	2	1
			UWSV502	Women's Rights	2	1
			UWSV503	Domestic Violence Against Women	2	1
			UWSV504	Women and Health	2	1

UGEV101 VALUES IN LIFE

Semester: I **Credit : 1**
Category: Value Education **Hours/Week : 2**
Class& Major: I UG **Total Hours : 26**

Objectives:

To enable the students

- Understand the need and importance of value education and education for human values.
- Understand the intervention strategies for moral education and conversion of moral learning into moral education.
- Understand the nature of values, moral values, and moral education and differentiate such values from religious education, moral training or moral in doctrination.

UNIT - I INTRODUCTION **5 Hrs**

Value Education – Definition – Relevance to present day – Concept of human values – Self introspection – Self esteem.

UNIT - II SOCIAL VALUES **5 Hrs**

Social values - Faith, Service and Secularism – Social sense and commitment - Students and Politics –Social Awareness.

UNIT - III CULTURAL VALUES **5Hrs**

Cultural Values –Respect for elders – Hospitality – Charity – Gentleness – Kindness – Peace –Love – Non violence – Appreciation of other culture.

UNIT – IV ETHICAL VALUES **5Hrs**

Ethical Values – Mass Media – Advertising ethics – Professional Ethics – Influence of ethics on Family life – Psychology of youth – Leadership Qualities – Personality development.

UNIT - V FAMILY VALUES **6 Hrs**

Family Values – Components, Structures and responsibility of family – Status of women in family and society – the analysis of mind – Instinct and habit – general ideas and thoughts – Truths and falsehood.

Reference Books

- Anchukandam. T and Kuttianimathathil. J, Ed. '*Grow Free Live Free'*, Kristtu Jyoti Publications, Bangalore, 1995.
- Daniel and Selvamony – '*Value Education Today'*, (Madras Charistian College, Tambaram and ALACHE, New Delhi, 1990).
- Mani Jacob. Ed. '*Resource Book for Value Education'***,** Institute for Value Education, New Delhi, 2002.
- Scarf Peter. Ed., "*Readings in Moral Education"*, Minnipolis Press Inc. 2001.
- Wilson, J., Williams, N. and Sugarman, B, '*Introduction to Moral Education'*, Penguin Books, 1967.

UGEV104 GLOBALIZATION AND VALUES IN FAMILY LIFE

Semester: I **Credit : 1**
Category: Value Education **Hours/Week : 2**
Class& Major: I UG **Total Hours : 26**

Objectives:
To enable the students

- Inculcate a sound system of values with correct priorities.
- Acquire the skill necessary to transform into complete human.
- Develop a good personality in the growing Adolescent.
- Provide good moral, spiritual code & stable relationship.

UNIT - I INTRODUCTION **5Hrs**

Family Life:-Definition of family and family life - Types of family patterns - Indian family - Social functions of the family - Family as a custodian & transmitter of values - Reunite families with their origin.

UNIT–II RELATIONSHIPS & RESPONSIBILITY IN A FAMILY **5 Hrs**

Relationships & Responsibility in a Family:-Mothering - Fathering – Mother & Daughter relationship - Warmth and love oriented discipline - Adjustability in a Family - Caring for needy elders. Time allotment and sharing ideas - Dutiful parent responsibility.

UNIT – III GLOBALIZATION AND ITS IMPACTS ON FAMILY: **5 Hrs**

Globalization and its impacts on family:-Mobility of family - joint family - nuclear Family – divorce - single parent family - old age home – crèche-fission of family structure - children affected by urbanization and nuclear family.

UNIT – IV IMPACT OF GLOBALIZATION ON CULTURAL ACTIVITIES OF FAMILY **7 Hrs**

Impact of globalization on cultural activities of family:- The process of socialization - cultural diffusion - cross culture in food - festival and dress - life style of adolescent - Infatuation – peer groups – love - Mental Health - mental hygiene - Mental health programme – anxiety – stress – eustress - distress.

UNIT - V RESPONSIBILITIES TO PRESERVE FAMILY VALUES **4 Hrs**

Responsibilities to preserve family values:-Teaching children the values of Responsibility -Mental health and hygiene - Healthy management of stress – Parent - Teacher responsibility - Parent responsibility towards adolescent - Personality Development - Moral education.

Reference Books

- K.R.Lakshminarayanan, and M.Umamageswari, '*Value Education'*, Nalnilam Publication, Chennai.
- M.M.Mascarenhas '*Natural Family Planning'*, Bangalore.
- Marie Mignon Mascarenhas, **"**Family life Education - Value Education, MFCMRCP(Eng) DPH(Lond) FRIPHH(Engg).

UGEV105 FAMILY LIFE EDUCATION

Semester	**: I**	**Credit**	**: 1**
Category	**: Value Education**	**Hours/Week**	**: 2**
Class& Major	**: I UG**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Understand the values of family life.
- Acquire the skills necessary to develop and maintain stable relationship.

UNIT – I THE FAMILY **2 Hrs**

Definition of family and family life – need for family - Importance of family – social functions of family – Types of family – changing trend(Positive and Negative approaches).

UNIT – II MARRIAGE **5 Hrs**

Definition, types of marriage – love, arranged, arranged love marriages. Love and Infatuation marriage – purpose of marriage – need for marital preparation and pre marital counseling. Dating, courtship, choosing the life partner, pre marital intimacy.

UNIT – II CONJUGAL HARMONY **5 Hrs**

Husband and wife relationship: Difference between men and women. Accepting difference, mutual understanding and adjustment. Changing roles of husband and wife – multiple role of women in present day- handling conflicts in marriage life.

UNIT - IV REPRODUCTION **7 Hrs**

Definition – determinants of sexuality, sex education – female reproductive system – male reproductive system – pregnancy and birth – family planning – Child Care.

UNIT - V PROTECTION **7 Hrs**

Family Disorganization – Impact of globalization on family – Separation – Divorce, Deservation – Single parent family – need to protect our self in marriage – pre family counseling centers – family court – All women's police station.

Reference books

- Betty, Carten and Mcg Goldric, *The changing Family Life cycle – A framework for Family Therapy*, II Edition, 2000.
- Marie, Masearentas, *Family Life Education, CREST -Center for research education service Training for Family life promotion*, Bangalore, 1999.

UESV301 POLLUTION AND ITS MANAGEMENT

Semester : III **Credit : 1**
Category : Value Education **Hours/Week : 2**
Class& Major : II UG **Total Hours : 26**

Objectives:

To enable the students

- Become Pollution conscious.
- Know how to control the pollution and make them analyze the methods of management of waste in their day to day life.

UNIT–I INTRODUCTION TO ENVIRONMENTAL STUDIES 6 Hrs

Definition, scope, importance and need for public awareness and methods to propagate environmental awareness.

UNIT – II ENVIRONMENTAL POLLUTION 5 Hrs

Causes, Deleterious effects and control measures of air pollution, water pollution and Noise pollution.

UNIT – III ENVIRONMENTAL POLLUTION 5 Hrs

Causes, Deleterious effects and control measures of soil pollution, plastic pollution thermal and nuclear pollution. Role of an individual in prevention of pollution.

UNIT – IV SOLID WASTE MANAGEMENT 5 Hrs

Causes, effects and control measures of urban and vermincomposting.

UNIT – V DISASTER MANAGEMENT 5 Hrs

Floods, earthquake, cyclone and landslides. Watershed Management and rainwater harvesting and energy conservation in urban areas.

REFERENCES BOOKS

- Kaushik & Kaushik, 'Perspectives in Environmental Studies' -New Age International Publishers.
- Kalavathy s, *Environmental studies*, Bishop Heber College, Trichy.
- K.Kumaraswamy, K.Alagappa Moses and M.Vasanthy, '*Environmental Studies',* Bharathidasan University publications.
- Rajamannar, *Environmental Studies*, EVR College Publications.

UESV304 BIODIVERSITY

Semester : III **Credit : 1**
Category : Value Education **Hours/Week : 2**
Class& Major : II UG **Total Hours : 26**

Objectives:

To enable the students

- Know about Environmental impact in the society.
- Create the awareness of environmental effect & remedial measures.

UNIT- I INTRODUCTION **5 Hrs**

Definition- Biodiversity – components of biodiversity – Genetic species and Ecosystem diversity - Evaluation and genesis of biodiversity – Biodiversity crisis & loss – Importance of biodiversity in daily life - Biodiversity and climate change.

UNIT-II BIODIVERSITY IN INDIA **5 Hrs**

Levels of biodiversity – global, national & local levels - Biogeographical classification of India - India as mega diversity nation - "Hot-spots" and Biodiversity in India.

UNIT-III MODERN TOOLS IN THE STUDY OF BIODIVERSITY **5 Hrs**

Endemism, endemic plants and animals - Assessment of mapping of biodiversity-GIS/ Remote sensing – IUCN - germ plasm banks - National parks - Botanical gardens - Wild life sanctuaries.

UNIT-IV THREATS TO BIODIVERSITY **5 Hrs**

Habitat loss and destruction - Poaching of wildlife - Man-wildlife conflicts – Alterations in ecosystem - Introduction of exotic species – Over exploitation – Global climate change - Stages of species in India.

UNIT-V VALUES AND CONSERVATION OF BIODIVERSITY **5 Hrs**

Values – Consumptive-Productive use values - Social value - Ethical and moral values - Aesthetic value – Option values. Conservation –In-situ and Ex-situ conservation - Community participation in conversation - conservation of wetlands - Medicinal plants - Indian and International conservation strategies, Green India Mission.

Reference Books

- D.K. Asthana & Meera Asthana, 'Envirnoment: Problems and Solutions', S.Chand & Company, New Delhi, 2005.
- Benny Joseph, '*Environmental Studies',* Tata McGraw – Hill,New Delhi,2005.
- Sivakumar. M & Saravanan .R, 'Principles *of Environmental Science and Engineering'*, Third Edition , Lakshmi Publications, June, 2006.
- Rajamannar, '*Environmental Studies'*, EVR College Publication, Trichy, 2004.
- Kalavathy . S. (ED.), *Environmental Studies*, Bishop Heber College Publication, Trichy, 2004.
- Ramesh Menon, *Restoring in Endangered Biospecies*, June 2005.

UESV305 ENVIRONMENTAL ISSUES AND HUMAN HEALTH

Semester : III **Credit : 1**
Category : Value Education **Hours/Week : 2**
Class& Major : II UG **Total Hours : 26**

Objectives:

To enable the students

- Environment conscious
- Understand the environmental issues and its impact on human health.

- Provide them with value based environmental education.

UNIT – I INTRODUCTION TO ENVIRONMENTAL STUDIES 6 Hrs

Definition, scope, importance and need for public awareness and methods to propagate environmental awareness.

UNIT – II SOCIAL ISSUES AND ENVIRONMENT 5 Hrs

Resettlement and rehabilitation issues, environmental ethics- issues and possible solutions.

UNIT – III DISASTER AND ENVIRONMENT 5 Hrs

Global Warming, Acid Rain, ozone depletion, Wasteland reclamation, consumerism and waste products. Role of Women and NGO's in environmental protection.

UNIT – IV HUMAN POPULATION AND WELFARE PROGRAMME 5 Hrs

Population explosion, Family Welfare programme, Environment and Human Health, Value based environmental education.

UNIT – V HUMAN HEALTH AND ENVIRONMENT 5 Hrs

Effect of HIV / AIDS on Environment, Women and Child Welfare, Role of information technology in Environment and human health.

Reference Books

- Kaushik & Kaushik, 'Perspectives in Environmental Studies', New Age International Publishers.
- Kalavathy.S, *Environmental studies,* Bishop Heber College, Trichy.
- Kumaraswamy .K, Alagappa Moses.K and Vasanthy .M, *Environmental Studies*, Bharathidasan University publications.
- Rajamannar, '*Environmental Studies'*, EVR College Publications.

UESV306 NATURAL RESOURCES AND CONSERVATION

Semester	**: III**	**Credit**	**: 1**
Category	**: Value Education**	**Hours/Week**	**: 2**
Class& Major	**: II UG**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Know about the types of natural resources.
- Become natural resources conscious.

UNIT-I NATURAL RESOURCES 4 Hrs

Definition- classification- concept of renewable and non-renewable resources- their conservation and importance.

UNIT- II ENERGY RESOURCES 6 Hrs

Non-renewable and conventional energy resources like coal, petroleum, fuel gases, - Renewable and non-conventional energy resources like solar, wind, geothermal, trial and wave energy, bio mass- biogas and bio diesel- Environmental impacts of energy exploitation- Energy conservation

UNIT- III WATER RESOURCES 6 Hrs

Water resources on the earth- consumption and uses of water- Management and conservation of water resources- Rain water harvesting- conflicts over sharing water. Forest resources and Bio diversity- Importance of forests and bio diversity- types of forest

resources- Overexploitation of forests- Deforestation- Forest management and Conservation-conservation of bio-diversity.

UNIT-IV SOIL RESOURCES AND MINERAL RESOURCES 6 Hrs

Importance – Classification of soils – soil formation- Soil profile-soil fertility- Major types of soils in India. Mineral resources- Types and importance of minerals- important minerals of India-Mineral extraction and environmental problems- Conservation of mineral resources- Reclamation of mining areas.

UNIT- V ROLE OF INDIVIDUALS AND NGOS IN RESOURCE CONSERVATION 4 Hrs

Environmental movements such as 'chipko' Western Ghat and Silent valley, Narmada project agitation etc, - Role of individuals and NGO's-Sustainable resource utilization.

Reference Books

- Benny Joseph, '*Environmental Studies',* 'Tata Mc Gram Hill Publishing Company Limited, New Delhi, 2005.
- Cunningham W.P.Cooper, Gorhani.T.H , *Environmental Encyclopedia,* Jaico Publication House Mumbai, 2001.
- Gilbert M. Masters, '*Introduction to Environmental Engineering Science',* Pearson Education Pvt. Ltd., Second Edition, 2004.

USEV307 CONSUMER PROTECTION

Semester	**: III**	**Credit**	**: 1**
Category	**: Value Education**	**Hours/Week**	**: 2**
Class& Major	**: II UG**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Gain awareness on Consumer Protection.
- know about the redressal mechanism.
- know about the right and responsibility of the consumer.

UNIT - I INTRODUCATION 4 Hrs

Consumer – Meaning – Definition - Importance of a Consumer - Consumer Behavior.

UNIT - II CONSUMER PROTECTION COUNCIL 5 Hrs

Meaning of Consumer protection - Definition of the concept - Objectives of the act-Consumer protection council.

UNIT - III ADULTERATION 5 Hrs

Adulteration - how to face the problems with the marketers - how to approach the court.

UNIT - IV SALE OF GOODS ACT 5 Hrs

Sale of goods - formation of Contract - Conditions and Warranties - Rights of an Unpaid Seller.

UNIT - V CONSUMER REDRESSAL MECHANISM 7 Hrs

Redressal Mechanism - Consumer disputes redressal forms - State and National Consumer disputes redressal commission.

Reference Books

- Kapoor,N.D., '*Elements Of Mercantile Law',* Sultan Chand And Sons, New Delhi, 2005.
- Kapoor,N.D.**,***Business Laws*, Sultan Chand And Sons, New Delhi, 2006.

- Matinchan,C.B.,*Consumer Behavior*, Margham Publications, Chennai, 2004.
- Philip Kotler,*Marketing Management*, Himalaya Publications, New Delhi, 2005.
- Rajan Nair- *Marketing Management*, Sultan Chand and Sons, New Delhi, 2006.

USEV308 AWARENESS ON ANTICORRUPTION

Semester : III **Credit : 1**
Category : Value Education **Hours/Week : 2**
Class& Major : II UG **Total Hours : 26**

Objectives:
To enable the students

- Understand evils of corruption.
- Appreciate and Adopt anti-corruption strategies.

UNIT - I CORRUPTION **6 Hrs**

Corruption: Definition-Etymology-Types: Governmental and Non-Governmental Services. Corruption in India: Major factors responsible for corruption.

UNIT - II CORRUPTION & SCAMS **5 Hrs**

Corruption effects-Causes-Factors-Major Scams identified in India: 2G spectrum, Commonwealth games, Telgi, Satyam, Bofors, Fodder, Hawala Scandal, IPL Scam, Stock Market Scams and others –Impact on society.

UNIT - III ANTI-CORRUPTION **5 Hrs**

Anticorruption: Definition-Types: Petty and Grand-Organized and Unorganized - Types of anti-corruption programs : Rule of Law - Fiscal/Customs, Civil Society Programs, Financial Management and Other Programs.

UNIT - IV CORRUPTION AND ANTI-CORRUPTION STRATEGIES **5 Hrs**

Corruption and anti-corruption strategies: Introduction-Good government and governance, Corruption and Change, Issues in Dealing with Corruption, Choice of strategy for anti-corruption-Measures to control corruption.

UNIT - V CORRUPTION AND PUNISHMENT **5 Hrs**

Corruption and types of punishment: Introduction – Offences: Personation, Postal vote, Candidate, Bribing, Treating- Non Criminal sanctions-Criminal Punishment.

REFERENCE BOOKS

- Seumas Miller, Peter Robert & Edward Spence, Corruption and Anti-Corruption: An Applied Philosophical Approach, First Edition, Frank Cross Publishers, 1999.
- Goran Klemen, Janez Stusek Specialised Anti-Corruption Institutions: Review of Models, First Edition, University of California Press, 2000.
- Susan Rose-Ackerman, *Corruption and Government – Causes, Consequences and Reform*, First Edition, Published by the University of Cambridge, 1999.
- Kimberly Ann Elliot, *Corruption and Global Economy*, First Edition, Published by Institute for International Economics, 1997.
- Seppo Tiihonen, *The History of Corruption in Central Government*, First Edition, Published by IOS Press, 2003.

- Mark Robinson, *Corruption and Development*, First Edition, Frank Cass Publishers, 1998.
- Robert Klitgaard, *Controlling Corruption*, First edition, University of California Press, 1998.

USEV309 HUMAN RIGHTS

Semester : III **Credit : 1**
Category : Value Education **Hours/Week : 2**
Class& Major : II UG **Total Hours : 26**

Objectives:
To enable the students

- Develop awareness on how human right can be translated into social and political reality.
- Gain knowledge about constitutional law.

UNIT - I INTRODUCTION **4Hrs**

Definition of HR lights – Nature – Scopes - Significance of HR- Historical development of HR.

UNIT - II HR LAWS **6Hrs**

Universal declaration of international covenant of HR-1948-The protection of HR lights Act 1993-political rights 1996- ICESR- International Covenant On Economical Social & Cultural Rights1996- Natural HR Commission

UNIT - III CONTEMPORARY ISSUES **5Hrs**

Contemporary issues on human rights- Children right – Women's right- Bonded labor & Wages.

UNIT – IV CONSTITUTIONAL LAW **6Hrs**

Constitutional law Vs Human Rights- Fundamental Rights- globalization & Human Rights- The Right To Information Act2005 – Human rights perspective of social research.

UNIT – V NATIONAL HUMAN RIGHTS COMMISSION **5Hrs**

Fundamental rights in Indian constitution – Directive Principles Of State Policy- Fundamental Duties – National Human Rights Commission.

Reference Books

- International Bill of Human Rights, Amnesty International Publication, 1988.
- Human Rights, Questions and answer, UNESCO, 1982.
- Mausice Cranston -What are Human Rights.

UWSV501 WOMEN AND EDUCATION

Semester : V **Credit : 1**
Category : Value Education **Hours/Week : 2**
Class& Major : III UG **Total Hours : 26**

Objectives:
To enable the students

- An understanding about the need of women's education.
- Empower themselves through education.

UNIT- I INTRODUCTION **2 Hrs**

Concept of women empowerment – Women's empowerment in today's world - Global gender gaps – Women's rights - women's movements.

UNIT- II STATUS OF WOMEN **5 Hrs**

Ideological and social cultural construction- sex ratio – family planning and welfare education – health and gender bias – work related issues- existing prejudices, gender discrimination- political participation: lack of women's representation.

UNIT- III SEXISM IN EDUCATION **5 Hrs**

Sexism in education – education is an agent to change the sex role stero typing – gender inequality in education.

UNIT- IV EDUCATION OF WOMEN IN DEVELOPMENT **7 Hrs**

Approaches to women's education – reorganizing and using the education system for raising the status of women - Eradication of literacy-education for achieving quality of life equality opportunity and equity creating gender sensitive educational system.

UNIT-V ROLE OF WOMEN IN DEVELOPMENT **7 Hrs**

Women in developing countries with special reference to India - Famous Women Personalities in different sectors - Women in national development- Leadership Qualities - Women in decision making.

References books

- Agarwal S.P., '*Women's Education In India'*, Guwahati, Eastern Book House, 2001.
- Gupta.N.L, *Women Education Through Ages*, Guwahati Eastern Book House,2001.
- Narasimha Sakuntala, *Empowering Women*, New Delhi, Sage Publications, 1999.
- Singh N.K. *Women Education*, New Delhi, Sage Publications,1999.

UWSV502 WOMEN'S RIGHTS

Semester	**: V**	**Credit**	**: 1**
Category	**: Value Education**	**Hours/Week**	**: 2**
Class& Major	**: III UG**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Understand about the violence against women.
- Gain knowledge about the women's rights.

UNIT- I INTRODUCTION **3 Hrs**

Human Rights-Definition and meaning- Introduction to woman rights, Nature and characteristics – importance

UNIT - II NEED FOR WOMEN'S RIGHTS **6 Hrs**

Violence against Women-Various forms of violence- Verbal Violence-Physical Violence Eve teasing-Sexual adherence-child abuse-Mental torture.

UNIT-III FAMILY AND WOMEN'S RIGHTS **7 Hrs**

Rights to Education-Child Marriage Act – domestic violence act- family court act- dowry Prohibition act - Maintenance, Marriage, divorce, adaptation- minority and guardian ship- rights to Property.

UNIT IV CAREER WOMEN AND RIGHT **4 Hrs**

Sanitation at work place - Sexual harassment at workplace-maternity benefit act - equal benefits - reservation policy.

UNIT-V POLICIES AND PROGRAMMES **6 Hrs**

Government policies and programmes - Action for ensuring rights of women - The national commission for women - role of women's Organization – Global level support for women's right-the impact of CEDAW in India.

Reference books

- Das .P.K., *Universal handbook on Protection of women from Domestic violence act and rules*, Universal law publishing Co. Pvt Ltd, 2007.
- Marjorie Agosin ed. *Women gender and Human rights. Global Perspective*, Rawal-Publication New Delhi, 2005.
- Mohini Chatterjee, *Feminism and Women's Human rights-vol.2*, Aavishkar Publication, Jaipur 2004
- *www.pucl.org\topics\gender\2003-pucl Bulletin*, July 2003. Aug 2004.

UWSV503 DOMESTIC VIOLENCE AGAINST WOMEN

Semester	**: V**	**Credit**	**: 1**
Category	**: Value Education**	**Hours/Week**	**: 2**
Class& Major	**: III UG**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Understand the domestic violence against women in family and society.
- Know about violence against women in media.
- Know about Prevention of domestic violence against women.

UNIT – I INTRODUCTION **6 Hrs**

Discrimination at different stages- Fetus & Infancy, Childhood, Adolescence, Adult, marriage, pregnancy, Motherhood and old age, types of harassment, Patriarchy.

UNIT - II TYPES OF VIOLENCE AGAINST WOMEN **5 Hrs**

Physical, Sexual, Emotional, Verbal, Economic. Causes to Effects – Causes of domestic violence. Female Infanticide in India – Domestic Violence against Domestic Help.

UNIT - III ACTS AGAINST DOMESTIC VIOLENCE **5 Hrs**

Advocacy on Behalf of Battered Women - Violence Against Women Act: Domestic Violence Act 2005 - Child marriage - Eve Teasing - sati - Dowry Prohibition Act.

UNIT - IV VIOLENCE IN MEDIA **5 Hrs**

Serials, advertisement, movies, journals, News paper, magazines. Counseling programs.

UNIT - V CONTINUING AND EMERGING ISSUES **5 Hrs**

Violence Against Older Women - Violence Against Women with Disabilities- Human Trafficking- Stalking - Violence Against Women as Human rights: NGO Activity, School Based Education and Prevention Programs.

Reference Books

- Claire M.Renzetti. Jeffrey L.Edleson, Kennedy Bergen, Source Book on Violence against Women,Second Edition,Sage Publication,2011.

- Vera Anderson, *A Women Like you: The face of Domestic Violence,* First edition, Sear Press,1997.
- B.J.Whalen, *Justifiable Homicide: battered women self defense and the law*, second Edition, London Publication, 2010.
- M.K.Roy, Ajay varma, *Violence against women*, commonwealth publication, 2000.
- Larva M.Purdy, Wanda Teays, Stanley G. French, Violence against Women: Philosophical Perspective, First Edition, Cornell University Press, 1998.

UWSV504 WOMEN AND HEALTH

Semester : V **Credit : 1**
Category : Value Education **Hours/Week : 2**
Class& Major : III UG **Total Hours : 26**

Objectives:
To enable the students

- Know about the physiology of women.
- Realize the role of gender in women's health issue.

UNIT-I ANATOMY AND PHYSIOLOGY OF WOMEN 4 Hrs

Review of genitor – urinary system of female organs- structure physiology – internal and external organs of reproduction.

UNIT- II PUBERTY 6 Hrs

Need of knowledge of menstruation- menstrual symptoms- how to handle menstruation problem- menstrual disorders – importance of maintaining the good personal hygiene - misbelieves.

UNIT – III PREGNANCY CARE 7 Hrs

Motherhood as a fulfilling Experience - Stages of Pregnancy – Need of Regular check up – Nutritional Diet – Post Pregnancy care.

UNIT- IV COMMON HEALTH PROBLEM AND HEALTH CARE 5 Hrs

Lack of Nutritional Diet and Diseases - Anemic- irregular menstrual cycle – thyroid problem - Ovarian and Cervical Cancer- Breast Cancer – Fibroid – Importance of Exercises.

UNIT - V HEALTH AND GENDER 4Hrs

Health as a gender issue – Illiteracy – rural, urban Education and its role in Women health – Infant Mortality Rate (IMR) – Nutritional Disorders between men and Women – Gender Bias and Family Planning.

REFERENCE BOOKS

- Aryasadhana, *Women, gender Equity and the state*, Deep and Deep Publications, New Delhi 2000.
- Behraman J and A. Deoalikal, *Health and Nutrition Handbook of Development Economics,* North Hooland, Amsterdam, 2002.
- Diana M.Fraser, *Myles Text book for midwives,* Churchill Livingtance, 2004.

SOFT SKILLS

PREAMBLE

Course Profile and Syllabi for Soft Skills offered to under graduate students is presented in this booklet. This comes into effect from 2015 - 2018 batch onwards.

UG - COURSE PROFILE FOR SOFT SKILLS

Semester	Part	Course code	Course title	Contact Hours/Week	Credit
II	IV	USKS201	Spoken English	2	1
		USKS202	Presentation Skills	2	1
		USKS203	Effective Communication Skills	2	1
IV	IV	USKS401	Life Coping Skills	2	1
		USKS402	Personality Development	2	1
VI	IV	USKS601	Career Skills	2	1
		USKS602	Job Skills	2	1

USKS201 SPOKEN ENGLISH

Semester : II **Credit : 1**
Category : Soft Skills **Hours/week : 2**
Class : I UG **Total Hours : 26**

Objectives:

To enable the students

- Develop acquainted with English Language.
- Develop Speaking Skills
- Prepare for Interviews

UNIT - I **6 Hrs**

Self – Introduction.

UNIT - II **5 Hrs**

Conversation, GD.

UNIT - III **5 Hrs**

Body Language and Art of Small Talk.

UNIT - IV **5 Hrs**

Giving & getting information (Watching, Listening & Reading)

UNIT - V **5 Hrs**

Role Play – Group Dynamics

Text Books

- Dutt, P.Kiranmani, and et al, A Course in Communication Skills, Cambridge University Press, New Delhi, 2008.
- Francis Thamburaj, Communication Soft Skills, Grace Publication, Trichy, 2009.

EVALUATION COMPONENTS

1.	Self Introduction	-	10 Marks
2.	Logical Sequencing	-	10 Marks
3.	Extempore	-	10 Marks
4.	Listening Comprehension	-	10 Marks
5.	Role play	-	10 Marks

	Total		**50 Marks**

USKS202 PRESENTATION SKILLS

Semester : II **Credit : 1**
Category : Soft Skills **Hours/week : 2**
Class : I UG **Total Hours : 26**

Objectives:

To enable the students

- Develop presentation skills
- Develop the overall personality
- Inculcate interpersonal relationship

UNIT - I **4 Hrs**

Techniques of Preparation

UNIT - II **4 Hrs**

Handling Questions

UNIT - III **6 Hrs**

Art of Presentation

UNIT - IV **6 Hrs**

Telephonic Conversation. Tele-conference

UNIT - V **6 Hrs**

Videography and observation and feedback

Text Books

- Dutt, P.Kiranmani, and et al, *A Course in Communication Skills*, Cambridge University Press, New Delhi, 2008.
- Francis Thamburaj, *Communication Soft Skills*, Grace Pub, Trichy, 2009.

EVALUATION COMPONENTS

1.	Multiple choice question	-	10 Marks
2.	Oral testing	-	10 Marks
3.	Topic presentation	-	10 Marks
4.	Role play	-	10 Marks
5.	Reviews	-	10 Marks

	Total		**50 Marks**

USKS203 EFFECTIVE COMMUNICATION SKILLS

Semester	**: II**	**Credit**	**: 1**
Category	**: Soft Skills**	**Hours/week**	**: 2**
Class	**: I UG**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Develop writing skills
- Acquire communication skills
- Prepare for Competitive Exam

UNIT - I **4 Hrs**

Listening – News, film, speech

UNIT - II **4 Hrs**

Reading and Comprehension. Tongue Twisters

UNIT - III **6 Hrs**

Dialogues

UNIT - IV **6 Hrs**

Group Discussion

UNIT - V **6 Hrs**

Skit, Creative Writing

Text Books

- Hancock and Mark, *English Pronunciation in U,* Cambridge University Press, New Delhi, 2003.
- Francis Thamburaj, *Communication Soft Skills,* Grace Pub, Trichy, 2009.

EVALUATION COMPONENTS

1.	Listening comprehension	-	10 Marks
2.	Reading comprehension	-	10 Marks
3.	Dialogue Making	-	10 Marks
4.	Group discussion	-	10 Marks
5.	Staging a skit	-	10 Marks

	Total		**50 Marks**

USKS 401 LIFE COPING SKILLS

Semester	**:**	**IV**	**Credit**	**:**	**1**
Category	**:**	**Soft Skills**	**Hours/week**	**:**	**2**
Class	**:**	**II UG**	**Total Hours**	**:**	**26**

Objectives:

To enable the students

- Cope with depression.
- Develop ability to cope with anger and fear.
- Develop confidence

UNIT - I COPING WITH DEPRESSION **6 Hrs**

Definition – symptoms – causes of depression – impact of depression – how to overcome depression and regain a positive outlook.

Exercise:

- Students to depict depression and its evil reflect on human personality.
- Group discussion to find out ways to confront with depression.

Reference: www.effexorxr.com

www.iugm.qc.ca

UNIT - II COPING WITH FEAR **5 Hrs**

Definition – kinds of fear – handling fear – coping with fear – ways to overcome fear – tips to cope with fear.

Exercise : Students to prepare list of current life situation that regret fear.

Reference : www.counsellingzone.com

Swami Sukhabodhanandha, *Oh, mind relax please!*, Author house, 2005.

UNIT - III COPING WITH ANGER **5 Hrs**

Introduction – Is anger good or bad? – Ways of determining your anger responses – consequences of anger – 13 steps towards anger management – Five ways to handle anger.

Exercise: students to identify five ways to handle anger.

Reference: Les carter and Frank B. minirth, *the anger work book*, T.Nelson, 1998.

UNIT - IV COPING WITH FAILURE & CRITICISM **5 Hrs**

Introduction – positive attitude towards failure – winners Vs looser – coping with failure – definition of criticisms – types of criticism – our response to criticism – coping with criticism – self criticism.

Exercise:

- Brainstorming session to identify the reason for the failure.
- To identify attitude of students towards failure.
- Exercise on response to criticism by others.

Reference: Chandru Gidwani, Ten *secrets to a balanced successful and happy life*, Mumbai, Better Yourself Book, 2001.

UNIT - V STRESS MANAGEMENT **5 Hrs**

Definition – kinds of stress – types of stress – causes of stress – sources of stress – response to stress – control negative stress – how to manage stress – ten commandments for management stress.

Exercise:

- Students to identify stress, they are undergoing currently.
- To identify stressful situations and responses to situation.

Reference: Les carter and Frank B. minirth, *the anger work book*, T.Nelson, 1998.

EVALUATION COMPONENTS

1. Poster presentation - 20 Marks
2. Chart presentation - 20 Marks
3. Oral presentation - 20 Marks
4. Ideas in brainstorming - 20 Marks

5. Group discussion - 20 Marks

Total 100 Marks

USKS402 PERSONALITY DEVELOPMENT

Semester	**: IV**	**Credit**	**: 1**
Category	**: Soft Skills**	**Hours/week**	**: 2**
Class	**: II UG**	**Total Hours**	**: 26**

Objectives:

To enable the students

- Achieve self actualization
- Create self acceptance and positive attitude
- Develop decision making skill

UNIT - I SELF **5 Hrs**

Self Esteem, Self Acceptance, Johari window

Exercise : Expressing feelings about self.

Reference: Shiv kera, *You can win*, MacMillan India Ltd, New Delhi, 1998.

Dr.Mani Jacob, *Resource book for value education*, Institute of value education, 2002.

UNIT - II POSITIVE THINKING **5 Hrs**

Definition – Characteristics of Good Personality - power of positive thinking – learn to turn negative thinking patterns.

Exercise: Story of positive thinking.

Reference: Shiv kera, *You can win*, MacMillan India Ltd, New Delhi, 1998.

Arindam chaudhuri, *Count your chickens before they hatch, Vikas publishing house Ltd, NewDelhi*, 2001.

UNIT - III MOTIVATION AND SELF ACTUALISATION **6 Hrs**

Meaning – motivation leads to self actualization – difference between inspiration and motivation – needs of motivation to demotivation.

Exercise: Case studies of achievers in great leaders to examine their motives

Reference: Shiv kera, *you can win*, MacMillan India Ltd, New Delhi, 1998.

Dr.Mani Jacob, *Resource book for value education*, Institute of value education, 2002.

UNIT - IV GOAL SETTING **5 Hrs**

Definition – focus on the goals – importance – dreams and goals – obstacles to set goals – types of goals – scrutinize your goals – goals must be balanced.

Exercise: Each group gets ball and a bucket or box. Each one of the group takes a turn and tries to throw the ball into the bucket from the distance of 5 meters.

Reference: Shiv kera, *you can win*, MacMillan India Ltd, New Delhi, 1998.

Dr.Mani Jacob, *Resource book for value education*, Institute of value education, 2002.

UNIT - V DECISION-MAKING SKILLS **5 Hrs**

Introduction – decision making process – '5 Cs' of decision making.

Exercise: Students could be asked to be in groups of six and go through the process of decision making by giving them matter for decision making.

Reference: Shiv kera, *you can win*, MacMillan India Ltd, New Delhi, 1998.

Alanbarker, How *to be a better decision maker,* Kogan page India Pvt Ltd., New Delhi, 1996.

EVALUATION COMPONENTS

1. SWOT Analysis of self(Chart)	-	20 Marks
2. Need Hierarchy self (Chart)	-	20 Marks
3. Oral presentation(of self mission, goals)	-	20 Marks
4. Group Discussion	-	20 Marks
5. In basket method	-	20 Marks

Total		**100 Marks**

USKS601 CAREER SKILLS

Semester : VI **Credit : 1**

Category : Soft Skills **Hours/week : 2**

Class : III UG **Total Hours : 26**

Objectives:

To enable the students

- Develop leadership skill.
- Plan for future career.
- Develop the qualities to work as team.

UNIT - I LEADERSHIP **5 Hrs**

Meaning – traits of leadership - Leaders Vs managers - attributes for a good leader

Exercise: To conduct role play of each style of leadership

Reference: S.Hariharan, S.Sundararajan and SP.Shanmughapriya, *Soft skills*, MJP publishers, Chennai, 2010.

UNIT - II TEAM BUILDING **6 Hrs**

Group dynamics and group behavior – morale - interpersonal relationship – Conflict – Grievances procedure.

Exercise: To conduct team work for analyses their contribution of the task.

Reference:

- S.Hariharan, S.Sundararajan and SP.Shanmughapriya, *Soft skills*, MJP publishers, Chennai, 2010.
- Aswathappa, *Organisational behavior*, Tata McGraw hill publication, New Delhi.

UNIT - III OFFICE CORRESPONDENCE **4 Hrs**

Lay out of the business letters – memos – circular – agenda – minutes.

Exercise: To give situation of business proposals for preparing letter

Reference: Rajendra paul, Korlahalli, *Business communication,* Sultan Chand, New Delhi, 1999.

UNIT - IV CAREER GUIDANCE **6 Hrs**

Meaning – definition – principles of career guidance – objectives – components.

Exercise: The faculty should introduce to the students magazines like competition success and career digest and ask the students to go through them and find out how they help them in choosing a career.
Reference: Dr.S.xavier Alphonse, *Change or be changed*, Sultan Chand, New Delhi, 1999.

UNIT - V CAREER PLANNING **5 Hrs**

Introduction – four step process – sources of career placements – choosing a career

Exercise: The faculty should introduce to the students magazines like competition success and career digest and ask the students to go through them and find out how they help them in choosing a career.
Reference: S.Hariharan, S.Sundararajan and SP.Shanmughapriya, *Soft skills*, MJP publishers, Chennai, 2010.

EVALUATION COMPONENTS

1.	Role play	-	20 Marks
2.	Group discussion	-	20 Marks
3.	Writing business letters	-	20 Marks
4.	Log book preparation	-	20 Marks
5.	Poster presentation	-	20 Marks

	Total		**100 Marks**

USKS602 JOB SKILLS

Semester : V **Credit : 1**
Category : Soft Skills **Hours/week : 2**
Class : III UG **Total Hours : 26**

Objectives:

To enable the students

- Prepare resumes.
- Face interviews.
- Participate in group discussion.

UNIT - I C.V / RESUME WRITING SKILLS **5 Hrs**

Writing of C.V, memos, e-mail writing

Exercise:

- To prepare resume
- To write covering letters for different situation

Reference: Rajendra paul, Korlahalli, *Business communication*, Sultan chand, New Delhi, 1999.

UNIT - II APTITUDE TEST **6Hrs**

Meaning – types of test – principles of psychological testing – applications – issues - Psychometric properties – Thematic Apperception Test, Rorschach inkblot test.

Exercise : Psychological testing to identify individual differences.

Reference : Robert M Kaplan and Dennis P Saccuzzo, *Psychological testing*, Books / Cole publishing company, 1993.

UNIT - III INTERVIEW TECHNIQUES – I **5 Hrs**

Preparing for interview, facing interviews, types of interview

Exercise : Mock interview.

Reference : S.Hariharan, S.Sundararajan and SP.Shanmughapriya, *Soft skills*, MJP publishers, Chennai, 2010.

UNIT - IV INTERVIEW TECHNIQUES – II **6 Hrs**

Bargaining, mock interview, Do's and Don'ts of interview

Exercise: Mock interview.

Reference: S.Hariharan, S.Sundararajan and SP.Shanmughapriya, *Soft skills*, MJP publishers, Chennai, 2010.

UNIT - V GROUP DISCUSSION **4 Hrs**

Introduction – different kinds of GD topics – outcome of GD – structure of GD – how to prepare for GD – successful GD techniques - Do's and Don'ts of GD.

Exercise: To segregate the students as each group and give the topic spontaneously and test to the soft skills of students.

Reference: S.Hariharan, S.Sundararajan and SP.Shanmughapriya, *Soft skills*, MJP publishers, Chennai, 2010.

EVALUATION COMPONENTS

1. Resume writing	-	20 Marks
2. Memo writing	-	20 Marks
3. Projective test	-	20 Marks
4. Mock interview	-	20 Marks
5. Group discussion	-	20 Marks

Total		100 Marks

DEPARTMENT OF BIOCHEMISTRY

PREAMBLE

UG: Course Profile, list of courses offered to other departments, & the syllabi of courses Offered in the first two semesters along with evaluation components III & IV (with effect from 2015-2018 batch onwards) and

PG: Course Profile, list of courses offered to the other departments & syllabi of courses along with evaluation components III & IV(with effect from 2015-2017 batch onwards) are presented in this booklet.

COURSE PROFILE B.Sc. (Biochemistry)

Semester	Part	Category	Course code	Course Title	Hours per week	Credit	
						Min	Max
I	I	Language	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil I/ Advanced Tamil I/ Hindi I / French I	4	2	3
	II	English I	UENL107/UENL108	Basic English I/ Advanced English I	5	3	4
	III	Core I	UBCM106	Fundamentals of Biochemistry	2	1	1
		Core II	UBCM105/ UBCM201	Cell Biology	6	5	5
		Core practical I	UBCR101	Cell Biology Practical	3	3	3
		Allied I	UCHA102	Chemistry	5	4	4
		Allied practical	UCHR102	Chemistry Practical	3	3	3
	IV	Value education			2	1	1
				TOTAL	**30**	**22**	**24**
II	I	Language	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil II/ Advanced Tamil II/ Hindi II/ French II	4	2	3
	II	English II	UENL207/ UENL208	Basic English II/ Advanced English II	5	3	4
	III	Core III	UBCM202	Biomolecules	5	5	5
		Core practical II	UBCR201	Qualitative analysis of Biomolecules	3	2	2
		Allied II	UMBA201	Microbiology	4	4	4
		Allied II practical	UMBR201	Microbiology Practical	3	3	3
	IV	Non Major elective			4	2	2
		Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	1	2
				TOTAL	**30**	**23**	**26**
III	I	Language	UTAL307/ UTAL308/ UHIL301/UFRL301	Basic Tamil III/ Advanced Tamil III/ Hindi III/ French III	4	2	3
	II	English III	UENL305/ UENL306	Basic English III/ Advanced English III	5	3	4
	III	Core IV	UBCM304	Biochemical Techniques	6	6	6
		Core practical III	UBCR301	Biochemical Techniques practical I	4	4	4
		Allied III	UMAA305	Biostatistics	5	4	4
	IV	Non major elective			4	2	2
		Value Education			2	1	1
				TOTAL	**30**	**22**	**24**
IV	I	Language	UTAL405/ UTAL406/ UHIL401/ UFRL401	Basic Tamil IV/ Advanced Tamil IV/ Hindi IV/ French IV	4	2	3
	II	English IV	UENL407/UENL408	Basic English IV/ Advanced English IV	5	3	4
	III	Core V	UBCM403	Immunology	5	5	5
		Core VI	UBCM404	Nutrition & Women' s Health	5	5	5
		Core VII	UIDM401	Pharmaceutical chemistry	5	4	4
		Core practical IV	UBCR401	Biochemical Techniques Practical II	4	3	3
	IV	Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	-	2

				TOTAL	**30**	**23**	**27**
V	III	Core VIII	UBCM501	Enzymes & Intermediary metabolism	6	5	5
		Core IX	UBCM502	Human Physiology	6	5	5
		Core X	UBCM503	Basics of Bioinformatics	6	5	5
		Core practical V	UBCR501	Enzymology practical	5	3	3
		Allied optional			5	4	4
		Value education			2	1	1
				TOTAL	**30**	**23**	**23**
VI	III	Core XI	UBCM601	Biotechnology	5	4	4
		Core XII	UBCM602	Clinical Biochemistry	5	5	5
		Core XIII	UBCM603	Molecular Biology	5	5	5
		Core XIV	UBCM604	Comprehensive Viva voce	-	1	1
		Core practical VI	UBCR601	Clinical Biochemistry practical	3	3	3
		Core practical VII	UBCR602	Hematology & Urine analysis	3	3	3
		Core XV	UBCP601/UBCS601	Mini project/ Cancer Biology (Self study paper)	2	1	1
		Major Elective	UBCO604	Stem cell Biology	5	4	4
			UBCO605	Molecular Endocrinology			
			UBCO606	Pathobiology of Human Diseases and Disorders			
			UIDM601	Nano medicine			
	IV	Soft skill			2	1	1
	V	Extension activity/ Physical Education/NCC			-	-	2
				TOTAL	**30**	**27**	**29**
				GRAND TOTAL	**180**	**140**	**153**

COURSES OFFERED TO OTHER DEPARTMENTS
NON MAJOR ELECTIVES

Semester	Part	Category	Course code	Course Title	Contact Hour/ Week	Credit	
						Min	Max
II	IV	Non Major Elective	UBCE202	Biomedical Techniques	4	2	2
			UBCE401/UBCE203	Nutrition & Health			
			UBCE502/UBCE204	Women's Health, Nutrition & Disorders			
III	IV	Non Major Elective	UBCE301	Hormonal Biochemistry	4	2	2
			UBCE302	Food Microbiology			
			UBCE402/UBCE303	Clinical Nutrition			
			UBCE304	Mushroom Cultivation			

ALLIED OPTIONAL
(ELIGIBLE FOR ALL SCIENCE STUDENTS EXCEPT MAJOR)

Semester	Part	Category	Course code	Course Title	Contact Hour/ Week	Credit	
						Min	Max
V	III	Allied Optional	UBCA502	Clinical Diagnostics	5	4	4
			UBCA503	Microbiology	5	4	4
			UBCA504	Reproductive Biology	5	4	4
			UBCA505	Rural Waste Management	5	4	4

EXTRA CREDIT EARNING PROVISION (Only for Interested Students)

Semester	Category	Course Code	Course Title	Min Credit	Max Credit
II	Internship	UBCI201	Summer Internship	-	1
IV	Internship	UBCI401	Summer Internship	-	1

UBCM106 FUNDAMENTALS OF BIOCHEMISTRY

Semester : I **Credit : 1**
Category : Core I **Hours/ week : 2**
Class & Major : I B.Sc. Biochemistry **Total Hours : 26**
Objectives:

To enable the students

- Understand the importance and scope of biochemistry, biosafety measures in laboratory.
- Gain adequate knowledge about structure, properties and functions of biomolecules.
- Evaluate the bioenergetics using biochemical calculations.

UNIT - I INTRODUCTION TO BIOCHEMISTRY 5 Hrs

History and Scope of Biochemistry, Importance of Biochemistry and its applications in various fields. Cells – types, Subcellular organelles; Tissues – types.

UNIT - II BIOMOLECULAR CHEMISTRY 5 Hrs

Structure and Properties of water, Definition & Importance of Carbohydrates, Amino acids, Proteins, Lipids, Nucleic Acids, Vitamins and Hormones.

UNIT - III CELLULAR CHEMISTRY 5 Hrs

Structure of matter - atomic structure, molecular structure; Bonding – Ionic, Covalent, Hydrogen, Co ordinate and Vander walls interaction and chemical reactions; Inorganic compounds - Salts, Ions, Acids and Bases; pH, biological buffers and their significance.

UNIT - IV BIOENERGETICS AND BIOCHEMICAL CALCULATIONS 6 Hrs

Laws of thermodynamics- Zero, First and Second Law, oxidation and reduction reaction, redox potential and energy transfer.

Units of measurements of solutes in solution - Normality, Molality, Molarity, Osmolarity, Ionic strength; Percentage, mole fraction.

UNIT - V QUALITY CONTROL PRACTICES AND BIOSAFETY 5 Hrs

Precision, accuracy, specificity, sensitivity, percentage error and quality control for laboratory methods. Calibration of volumetric- pipette, burette and SMF.

Do's and Don'ts in the laboratory, laboratory associated infections and other hazards, assessment of biological hazards and levels of biosafety, prudent biosafety practices in the laboratory/ institution.

Text Books

- Gupta P.K, *A Text-book of Cell and Molecular Biology*, Rastogi Publications, Meerut, India, 2005.
- Campbell M.K. *Biochemistry*, Saunders College Publishing, Philadelphia, (Jd Edition) 2006.

Reference Books

- Ambika Shanmugam, *Fundamentals of Biochemistry*, 4th edition, Published by Author, 2006.
- Marshal V. C, *Major Chemical Hazards*, 3rd edition, Ellis Horwood Ltd., Chichester, United Kingdom, 2005.
- Raghavan K. V & Khan A.A, *Methodologies in Hazard Identification and Risk Assessment*, 3rd edition, Manual by CLRI, 2002.
- Sadasivam .S and Manickam.A, *Biochemical Methods*, 3rd Edition, New age International (P) Ltd, 2008.

UBCM105/UBCM201 CELL BIOLOGY

Semester : I **Credit : 5**
Category : Core II **Hours/week : 6**
Class & Major: I B.Sc. Biochemistry **Total Hours : 78**

Objectives:

To enable the students

- Understand the dynamic nature of the Cell.
- Specify the structural features and differences between prokaryotes and eukaryotic cells.

UNIT – I ORIGIN & CLASSIFICATION OF CELLS **15 Hrs**

An overview of cells- origin and evolution of cells. Cell theory, Classification of cells-prokaryotic and eukaryotic cells,comparison of prokaryotic and eukaryotic cells. Molecular composition of cells-water, carbohydrates, lipids, nucleic acids and proteins.

UNIT – II CELL MEMBRANE **15 Hrs**

Cell membrane- Fluid mosaic model of membrane structure. Membrane proteins and their properties Membrane carbohydrates and their role. Transport across membranes-Diffusion, active and passive transport.

UNIT – III ENDOPLASMIC RETICULUM, GOLGI APPARATUS AND LYSOSOMES 15 Hrs

Endoplasmic reticulum- types, structure and functions. Golgi apparatus- structure and function. Lysosomes- structure and functions, morphology and functions of peroxisomes and glyoxysomes.

UNIT – IV MITOCHONDRIA CYTOSKELETON **15 Hrs**

Mitochondria- structure and functions. Cytoskeleton- types of filaments and their functions Microtubules- chemistry and functions. Cilia and flagella.

UNIT - V NUCLEUS CHROMOSOMES **18 Hrs**

Nucleus- structure and functions. Chromosomes- chromatin structure. The cell cycle- Phases of cell cycle. Meiotic and mitotic cell division**.** Apoptosis and Necrosis.

Text Book

- Lohar, S.Prakash., *Cell and Molecular Biology,*MJP publishers, 2007.
- Verma.P.S and Agarwal., *Cell biology, Genetics, Molecular Biology, Evolution and Ecology*, S.Chand Publication, 2008.

Reference Books

- Cooper.M., *The cell-A molecular approach*, ASM Press, 1995.
- Harvey Lodish, Baltimore and Arnold Berk, et.al ., , Third Edition, *Molecular and cell biology*, 1995.
- Rastogi.S.C., *Biochemistry*.Second Edition, Delhi,Tata Mc Graw Hill, 2007.

UBCR101 CELL BIOLOGY PRACTICAL

Semester	**: I**	**Credit**	**: 3**
Category	**: Core Practical I**	**Hours/Week**	**: 3**
Class & Major	**: I B.Sc. Biochemistry**	**Total Hours**	**: 39**

Objectives:

To enable the students

- Understand plant and animal cells.
- Gain practical insight of structural features of prokaryotes and eukaryotic cells.
- Apply the methods in cell biology.

1. Use of Microscopes.
2. Blood Smear preparation
3. Mounting buccal epithelium and observing living cells using vital staining.
4. Mitosis in Onion root tip squash.
5. Study of prepared slides of histology(any five)
    a) Columnar Epithelium
    b) Ciliated Epithelium
    c) Glandular Epithelium
    d) Alveolar Connective tissue
    e) Cartilage T.S
    f) Cardiac muscle
    g) Striated muscle
    h) Non Striated muscle
    i) Nervous tissue

6. Barr Body staining from buccal epithelial cells
7. Isolation of chloroplast from spinach leaves.

Text Books

- Dr.S.Rajan & Mrs. R.Selvi Christy, *Experimental procedure in Life Science,* First Edition, Anjanaa Book House, Chennai, 2010.

Reference books

- Chris Hawes & Beatrice Satiat Jeunermaitre(Editors) *Plant Cell Biology: A practical Approach,* 2nd Edition, Oxford University Press, USA 2001.
- John Dawey & Mike Lord, *Essential Cell Biology: A practical approach Vol.2,* 2nd Edition, Oxford University Press, USA 2003.

UBCM202 BIOMOLECULES

Semester: II **Credit : 5**
Category: Core III **Hours/ week : 5**
Class & Major: I B.Sc. Biochemistry **Total Hours : 65**

Objectives:

To enable the students

- Understand the principles of the structure of molecules associated with life processes. and their roles in the functioning of living cells.
- Elucidate the roles of biomolecules in the functioning of living cells.

UNIT- I CARBOHYDRATES **12 Hrs**

Classification of carbohydrates, physical properties- Stereo & optical isomerism, anomeric form & Mutarotation. Occurrence and biological importance of mono, di & polysaccharides - Cellulose, starch, glycogen, pectin. Introduction to mucopolysaccharides (proteoglycans, glycosaminoglycans).

UNIT-II PROTEINS & AMINOACIDS **15 Hrs**

Classification based on solubility, shape, composition and function. Stereo & optical isomerism, Zwitterions, physical & chemical properties, titration of amino acids, Essential amino acids. Protein Introduction, classification based on solubility, shape, composition and function. Functional aspects of protein.Structure of protein- Primary, secondary, tertiary & quaternary structure of protein. Biologically important peptides. Structure and function (Insulin, glutathione, vasopressin).

UNIT – III LIPIDS **15 Hrs**

Definition, classification,& function of fatty acids,phospholipids,glycolipids, sphingomyelin, Plasmalogen & sterol. Essential fatty acid and non- essential fatty acid.

UNIT – IV NUCLEIC ACIDS **13 Hrs**

Nature of nucleic acids, structure of purines, pyrimidines, nucleosides & nucleotides. Structure of DNA - Watson and Crick models. Types of DNA. Structure of RNA and its types. Properties – Denaturation, Renaturation, Tm, Hypo & Hyperchromicity.

UNIT – V VITAMINS **10 Hrs**

Vitamins: Classification of vitamins- water soluble vitamins and non water soluble vitamins. General biological function.

Text Book

- Eric E. Conn, Paul K. Stumpf, George Bruening and Roy H.Dol.,*Textbook of Biochemistry*, John Wiley and Sons, 2005.
- Jain.J.L, Sunjay Jain and Nitin Jain., *Fundamentals of Biochemistry*, S.Chand Publication, 2008.

Reference Book

- Ambika Shanmugam., *Fundamentals of Biochemistry*, Seventh Edition, published by Author, 2006.
- David L.Nelson, Michael M.Cox .,*Lehninger's Principles of Biochemistry* , Fourth edition, Newyork,W.H.Freeman and Company, 2005.
- Satyanarayan.V, Chakrapani.V .,*Essentials Of Biochemistry*, second edition, Kolkota, Books & Allied, 2007.

UBCR201 QUALITATIVE ANALYSIS OF BIOMOLECULES PRACTICAL

Semester : II **Credit : 2**
Category : Core practical II **Hours/ week : 3**
Class & Major: I B.Sc. Biochemistry **Total Hours : 39**

Objectives:

To enable the students

- To acquire the ability to solve problems related to biochemical techniques.
- To analyze the biological fluids for the diagnosis of the diseases.

QUALITATIVE ANALYSIS

1. ANALYSIS OF CARBOHYDRATES **12 Hrs**

Colour reactions of sugars and osazone test.

a) Monosaccharides: Pentoses- Ribose and Arabinose Hexoses- Glucose, Fructose, Galactose and Mannose
b) Disaccharides: Sucrose, Maltose, Lactose
c) Polysaccharides: Starch, Dextrin and Glycogen

2. ANALYSIS OF AMINOACIDS **9 Hrs**

Colour reactions of aminoacids such as Tyrosine, Tryptophan, Arginine, Histidine and Cysteine.

3. ANALYSIS OF PROTEINS **9 Hrs** Egg albumin-Solubility, Biuret, Millons, Xanthoproteic, Denaturation by heat,pH change and Precipitation by acidic reagents.

4. ANALYSIS OF LIPIDS **9 Hrs**

Solubility, Saponification tests for unsaturation and Liebermann Burchard test for cholesterol.

Text Book

- Jayaraman.J., *Laboratory manual in Biochemistry*, New Age International Limited Publication.

Reference Book

- Pattabiraman., *Laboratory Manual in biochemistry,* CBS Publication.
- Singh.S.P., *Practical Manual of Biochemistry*, Sixth Edition, CBS Publication, 2006.
- Varley., *Practical biochemistry,* CBS Publication.

UMBA201 MICROBIOLOGY

Semester : II **Credit : 4**
Category : Allied II **Hours/ week : 4**
Class & Major : I B.Sc. Biochemistry **Total Hours : 52**

Objectives:

To enable the students

- Understand the living microbes present in the environment.
- Specify the impact of endemic bacterial and viral infections on health.

UNIT - I INTRODUCTION **10 Hrs**

History and Scope of Microbiology- Prokaryotes and Eukaryotes- Bacteria, Fungi, Algae, Protozoa and Viruses- Structure and functions of the cellular components-Growth and nutrition- media and culture.

UNIT - II CLASSIFICATION OF MICROBES **10 Hrs**

Classification of microbes- Numerical taxonomy-Molecular taxonomy- methods of microbial identification. Gram positive and gram negative bacteria.

UNIT - III ENVIRONMENTAL MICROBIOLOGY **10 Hrs**

Microbiology of soil – soil microflora - role of soil microbes in biogeochemical cycles(C,N,S) – Role of microbes in waste water treatment-water purification and sewage treatment. Marine and fresh water microbiology.

UNIT - IV MEDICAL MICROBIOLOGY **12 Hrs**

Disease reservoirs- Epidemiological terminologies, Infectious disease transmissions. Respiratory infection caused by bacteria and viruses; Tuberculosis, AIDS, water borne diseases. Antimicrobial agents, antibiotics, Penicillins and cephalosporins, broad spectrum antibiotics.

UNIT - V INDUSTRIAL MICROBIOLOGY **10 Hrs**

Industrial use of microbes - fermentors and fermentation technology, Industrial production of alcohol, antibiotics, aminoacids and enzymes. Microbiology of food - sources of contamination - food spoilage- food preservation methods. Fermentation.

Texts Book

- Pelczar, M.J., Chan, E.C.S., King, N.R. *Microbiology- Concepts and Applications*. 3rd edition, Tata McGraw – Hill, New Delhi, 2001.
- Ananthanarayan, R. and Paniker, C.K.J.. *A text book of Microbiology*, 6th edition,Orient Longman Ltd., Hyderabad, 2000.

Reference Book

- Kathleen Park Talaro and Talaro, A. *Foundation in Microbiology*, 3rd edition, McGraw-Hill, New York.
- Cappuccino, J.G and Sharman, N.. *Microbiology: A Laboratory manua*l, 4th edition. Addition Wesley Longman Inc., New York.
- Daniel Lim. *Microbiology*, 2nd edition. McGraw-Hill, New York.

UMBR201 MICROBIOLOGY PRACTICAL

Semester	**: II**	**Credit**	**: 3**
Category	**: Allied practical II**	**Hours/ week**	**: 3**
Class & Major	**: I B.Sc. Biochemistry**	**Total Hours**	**: 39**

Objectives:

To enable the students

- Learn & practice in a microbiology laboratory.
- Obtain culture , identify and explain microorganisms in environmental cultures**.**

Experiments

1. Preparation of microbiological media.
2. Control of microbial contamination by sterilization techniques.
3. Identification of microbes through staining by simple & differential methods.
4. Microbial pure culture by isolation techniques.
5. Identification and enumeration of microorganisms from soil.
6. Determination of growth pattern by growth curve methods.

Reference Books

- Kathleen Park Talaro & Talaro A., *Foundation in Microbiology*, 2nd edition, McGraw-Hill, New York, 2005.

- Cappuccino J.G & Sharman N., *Microbiology*: *A Laboratory Manual*, 3rd edition, Addition Wesley Longman Inc., New York, 2005.
- Daniel Lim, *Microbiology*, 2nd edition, McGraw-Hill, New York, 2005.

UBCE202 BIOMEDICAL TECHNIQUES

Semester : II **Credit : 2**
Category : Non Major Elective **Hours/week : 4**
Class & Major: II UG **Total Hours : 52**

Objectives

To enable the students:

- Study the different techniques employed in Biochemistry and its importance.
- Experiment the techniques in sample analysis.

UNIT -I BASICS IN LABORATORY TECHNIQUES 12 Hrs

Instrumentation to laboratory equipments and basic laboratory operation and role of lab technician, types of specimen collection, and collection procedure- Blood and Urine. Unit of measurement, reagent preparation and laboratory calculation – metric system.

UNIT -II SEROLOGY 10 Hrs

Blood pressure, pulse, clotting time, bleeding time, Hb estimation, Total count- RBC, WBC, Differential WBC count , ESR and Haematocrit value

UNIT- III BLOOD COLLECTION AND GROUPING 10 Hrs

Blood grouping and Rh factors. Blood collection, screening test-HIV, HBs Ag. Blood grouping, Cross matching, Incompatible blood transfusion.

UNIT – IV HISTOPATHOLOGY 10 Hrs

Brief outline of Histopathology, Tissue cutting, Fixation Embedding Tissue slicing by microtome, slide mounting and staining techniques.

UNIT – V BIOCHEMICAL ANALYSIS 10 Hrs

Techniques of measuring: blood glucose, urea, uric acid, TG, AST, ALT, ALP, ACP, Cholesterol and Total protein.

Text Books

- Ambika Shanmugam., *Fundamentals of Biochemistry for medical students*, Published by the author, 2006.

Reference Books

- Ambika Shanmugam., *Fundamentals of Biochemistry for medical students*, Published by the author, 2006.
- Mukherjee.L., *Medical laboratory technology*, 15th edition, Tata McGraw-Hill Publishing Company Limited, 2004.

- Talib.H., *Medical laboratory technology*, McGraw-Hill Publishing Company Limited

UBCE401/UBCE203 NUTRITION AND HEALTH

Semester : II **Credit : 2**
Category : Non Major Elective **Hours/week : 4**
Class & Major: II UG **Total Hours : 52**

Objectives:
To enable the students:

- Study the relationship between nutrition and its importance in the well being of humans.
- Integrate the biochemical applications and diet therapy.

UNIT – I INTRODUCTION 12HRS

Introduction to nutrition – definition of nutrients, food as a source of nutrients, functions of foods, adequate, optimum and good nutrition, malnutrition; inter relationship between nutrition and health visible symptoms of good health.

UNIT – II NUTRIENTS 10HRS

Digestion, absorption, transport and utilization of nutrients in the body – Carbohydrates, fats and oils, proteins, vitamins and minerals.

UNIT – III NORMAL DIET 10HRS

Role of dietician – hospital and community; basic concepts in diet therapy; therapeutic adaptation of the normal diet; routine hospital diets – regular diet, light diet, soft diet, full liquid diet and tube feeding.

UNIT – IV DIET THERAPY 10 HRS

Therapeutic diets for the following disorders – underweight – definition, etiology, treatment; obesity – definition, etiology, treatment; diseases of gastrointestinal tract; peptic ulcer and duodenal ulcer; dumping syndrome; acute and chronic diarrhea.

UNIT –V FOOD PRESERVATION 10HRS

Biochemical constituents of food grains, fruits and vegetables; changes during processing and preservation; general principles and method of food preservation; preservation with chemicals – mechanism of microbial inhibition, inorganic preservatives, antibiotics, mold inhibitors and antioxidants.

Text Books

- M. Swaminanthan. *Essentials of Food and Nutrition (Vol I & Vol II)*, Bappco publication, 1994.

- Davidson, Passmore. *Human Nutrition and Dietetics,* Bappco publications, 1987.

Reference Books

- Swaminanthan. *Principle of Nutrition,* Bappco publication, 1986.
- Robinson Cornell, *Normal and Therapeutic Nutrition,* Bappco publication, 6th edition, 1982.
- Michael J. Gibney, Ian A Macdonald, Helen M Roche. *Nutrition & Metabolism,* Blackwel publishing ltd., 2004.

UBCE502/UBCE204 WOMEN'S HEALTH, NUTRITION & DISORDERS

Semester : II **Credit : 2**
Category :Non Major Elective **Hours /week : 4**
Class &Major: II UG **Total hours : 52**

Objectives:
To enable the students

- Study the physiological changes that occurs during the women's life.
- Awareness on anaemia and about various diseases due to hormone imbalance.

UNIT - I WOMEN'S HEALTH **10 Hrs**

Women health – definition, concept, stages of women life - child hood, adolescence, young women, middle age, elderly women, physical & psychological changes, Steps to follow healthy life style.

UNIT - II PUBERTY **10 Hrs**

Puberty - definition, stages of development of secondary sexual characteristics, factors affecting the onset of puberty - genetic factors, psychological factors, geographical location, nutritional status, normal & abnormal influence of hormone on reproductive system.

UNIT – III PREGNANCY & LACTATION **10 Hrs**

Pregnancy - definition, stages of pregnancy, role of hormones during pregnancy, influence of drugs during pregnancy, parturition, Lactation, importance of breast feeding, precaution during pregnancy & lactation.

UNIT - IV DISORDERS **12 Hrs**

Menstrual cycle, role of hormone in menstrual cycle, menstrual disorders, premenstrual syndrome, PCOD, endometrioses, mennorhoea, dysmennorohea, amennorhoea, risk factors of hormone replacement therapy - heart attack, breast cancer, stroke. Osteoporosis - sign & symptoms of osteoporosis, treatment for osteoporosis.

UNIT - V ANAEMIA **10 Hrs**

Anaemia - Definition, types of anaemia - iron deficiency, microcytic & macrocytic anaemia, aplastic anaemia, sickle cell anaemia, vitamin deficiency anaemia, anaemia during chronic infection & pregnancy Signs & symptoms of anaemia, diagnosis, treatment & prevention.

Text Books

- Guyton, Arthu C, *Textbook of Medical Physiology*, 8th Edition, Philadelphia, W.B. Saunders , 1991.
- K. Sembulingam and Prema Sembulingam, *Essentials of medical physiology*, Publication, New Delhi, Jaypee Brothers, 2006.

Reference Books

- W Ganong Lange, *Review Of Medical Physiology* , 21st Edition, 2003.
- Hillman RS, Kennet Ault, *Hematology in Clinical Practice*, 5th Edition, New York, McGraw-Hill, 2010.
- Paulman P (2011), Iron deficiency, In ET Bope, et al., eds., *Conn's Current Therapy* 2011, Philadelphia, Saunders.

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core I	UBCM106	Fundamentals of Biochemistry	Open book test	Group Discussion
	Core II	UBCM105	Cell Biology	Album Preparation	Assignment
II	NME	UBCE202	Biomedical Techniques	Assignment	DPA+ Practical Test
		UBCE203	Nutrition & Health	Diet Chart Preparation	Case Study
	Core III	UBCM202	Biomolecules	Model Preparation	Assignment
	Allied II	UMBA201	Microbiology	Food contamination Identification	Culture Preparation

COURSE PROFILE M.Sc. (Biochemistry)

Semester	Category	Course code	Course title	Contact Hours/ Week	Credit	
					Min	Max
I	Core I	PBCM101	Biomolecular Chemistry	5	4	4
	Core II	PBCM102	Cell Biology	5	4	4
	Core III	PBCM103	Analytical Biochemistry	5	4	4
	Core IV	PBCM104	Endocrinology	5	4	4
	Core practical I	PBCR101	Analytical Biochemistry Practicals	5	4	4
	NME			5	4	4
TOTAL				**30**	**24**	**24**
II	Core V	PBCM201	Metabolism & Regulation	5	4	4
	Core VI	PBCM202	Human Physiology	5	4	4
	Core VII	PBCM203	Microbiology	5	4	4
	Core VIII	PBCM204	Molecular Biology	5	4	4
	Core practical II	PBCR201	Microbiology and Molecular Biology Practicals	5	4	4
	Service Learning	PBCX201	Mushroom cultivation (Service Learning)	-	1	1
	NME	PALE201/ PALE301	Preparatory Course for NET/SET	5	4	4
TOTAL				**30**	**25**	**25**
III	Core IX	PBCM301	Enzymology and Enzyme Technology	5	4	4

	Core X	PBCM302	Clinical Biochemistry	5	4	4
	Core XI	PBCM303	Immunology	5	4	4
	Core XII	PBCM401	Research Methodology	5	4	4
	Core Practical III	PBCR301	Enzymology & Clinical Diagnostics	6	5	5
	Core XV	PBCP401	Project	2	-	-
	Value Education (Women's Studies)			2	1	1
TOTAL				**30**	**22**	**22**
IV	Core XIII	PBCM304	Genetics & Genetic Engineering	5	4	4
	Core XIV	PIDM401	Plant Biochemistry& Pharmaceutical chemistry	5	4	4
	Core XV	PBCP401	Project	18	10	10
	Value Education (Women's Studies)			2	1	1
TOTAL				**30**	**19**	**19**
GRAND TOTAL				**120**	**90**	**90**

COURSES OFFERED TO OTHER DEPARTMENTS
NON MAJOR ELECTIVES

Semester	Category	Course code	Course Title	Contact Hours/ Week	Credit	
					Min.	Max.
I	Non major elective	PBCE101	Pharmaceutical Biochemistry	5	4	4
I	Non major elective	PBCE102	Reproductive Biology & Disorders	5	4	4
I	Non major elective	PBCE103	Modern Life style associated diseases	5	4	4

EXTRA CREDIT EARNING PROVISION
SELF STUDY PAPER (Only for Interested Students)

Semester	Category	Course Code	Course Title	Min Credit	Max Credit
III	Self study	PBCS301	Genomics	-	1
III	Self study	PBCS302	Proteomics	-	1

PBCM101 BIOMOLECULAR CHEMISTRY

Semester : I **Credit : 4**
Category : Core I **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Define biomolecules, recognize classifications and structures.
- Elucidate the role of biomolecules in biological functions.

UNIT - I HOMO AND HETEROGLYCANS **13 Hrs**

Polysaccharides - occurrence, structure, isolation, properties and functions of homoglycans - starch, glycogen, cellulose, dextrin, inulin, chitins. Occurrence, structure, properties, and functions of heteroglycans - bacterial cell wall polysaccharides, glycoaminoglycans, pectins, amino sugars and deoxv sugars, blood group substances and sialic acids. Glycoprotein and their biological applications. Lectins structure and functions.

UNIT - II PROTEINS **13 Hrs**

Classification of proteins on the basis of solubility and shape, structure, and biological functions. Isolation, fractionation and purification of proteins. Denaturation and renaturation of proteins. Primary structure - determination of amino acid sequence of proteins. The peptide bond: Ramachandran plot. Secondary structure - weak interactions involved - alpha helix and beta sheet and beta turns structure. Pauling and Corey model for fibrous proteins . Collagen triple helix. Super secondary structures - helix-loop-helix. Tertiary structure - alpha and beta domains. Quaternary structure - structure of hemoglobin. Solid state synthesis of peptides.

UNIT - III NUCLEIC ACIDS **13 Hrs**

Watson - Crick model of DNA structure. A, B and Z - DNA Cruciform structure in DNA, formation and stability of cruciforms, miscellaneous alternative conformation of DNA, slipped mispaired DNA, parallel stranded, anisomorphic DNA, palindrome, secondary and tertiary structure of RNA, hnRNA, methods for nucleic acid sequence determination, denaturation, strand separation, fractionation, isolation and purification of DNA, mRNA, rRNA and tRNA, molecular hybridization, Cot value curve, hypochromic effect, DNA-protein interactions

UNIT - IV LIPIDS **13 Hrs**

Lipids - classification - saturated and unsaturated fatty acids, phospholipids - classification, structure and functions. Ceramides and sphingomyelins. Eicosanoids, structure and functions of prostaglandins, thromboxanes, leukotrienes Types and functions of plasma lipoproteins. Amphipathic lipids - membranes, micelles, emulsions and liposomes. Steroids - cholesterol structure and biological role - bile acids, bile salts.

UNIT - V VITAMINS AND PORPHYRINS **13 Hrs**

Vitamins - water soluble - thiamine, riboflavin, niacin, pyridoxine, folic acid, ascorbic acid-sources, structure, biochemical functions, deficiency diseases, daily requirements; fat soluble - vitamin A, vitamin D2, vitamin E and vitamin K - sources, structure, biochemical functions, deficiency diseases, daily requirements. Porphyrins the porphyrin ring system, chlorophyll, hemoglobin, myoglobin and cytochrome.

Text Books

- David L. Nelson and Michael M. Cox.Lehninger's, *Principle of Biochemistry*, 4th edition , W. H. Freeman, 2004.

- Thomas M. Devlin, John Wiley-Liss, *Text Book of Biochemistry with Clinical Correlation,* 3rd edition, Hobokhen NJ publishers, 2006.

Reference Books

- L. Stryer, *Biochemistry* , 5th Edition, W.H. Freeman and Co,2002
- Voet & Voet, *Fundamentals of Biochemistry,* 2nd edition, John Wiley and sons NY, 2002.
- Zubey, *Biochemistry,* 3rd edition, GL WCB Publishers, 2005.

PBCM102 CELL BIOLOGY

Semester : I **Credit : 4**
Category : Core II **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Understand the structure and functions of prokaryotic, eukaryotic cells and their metabolic process.
- Apply the biochemical techniques for identification of morphological and functional changes in cell related to pathology.

UNIT - I CELLULAR ORGANIZATION, DIVISION AND CYTOSKELETONS 13 Hrs

Cell types - organization of prokaryotic and eukaryotic cells, cell division - mitosis and meiosis, cell cycle - phases of cell cycle, and regulation of cell growth and cell cycle, cell motility - molecular motors, microtubules, structure and composition, microtubular associated proteins - role in intracellular motility.

UNIT - II CELLULAR ORGANELLES 13 Hrs

Cellular organelles - Nucleus - internal organization, traffic between the nucleus the nucleolus, and cytoplasm, endoplasmic reticulum - protein sorting and transport, golgi apparatus and lysosomes, morphology and function of mitochondria, chloroplasts and peroxisomes, glyoxysomes.

UNIT - III METHODS IN CELL BIOLOGY 13 Hrs

Methods for disrupting tissues and cells, organ and tissue slice techniques, isolation of clones, tissue culture techniques (animal and plant), cell fixation - fluid fixatives, freezing and section drying, fixation for electron microscopy - buffered osmium solutions, fixation of organic and inorganic substances, staining techniques acid and basic, fluorescent and radioactive dyes, staining of lipids, steroids, nucleic acids, proteins and enzymatic reaction products. Histopathological studies - organ specific morphohistological examination, identification of morphological changes related to pathology.

UNIT - IV CELLULAR COMMUNICATION AND TRANSPORT 13 Hrs

Differentiation of cell membrane - microvilli, tight junctions, epithelia, Bell and sqot desmosomes - mechanical function, cell-cell interaction, cell adhesion proteins, cell junctions, tight junctions, cell surface of plant cells and cancer cells. Overview of membrane protein - peripheral and

integral, molecular model of cell membrane - fluid mosaic model and membrane fluidity, solute transport across membrane - passive transport, active transport by ATP powered pumps, types of transport systems.

UNIT - V CELL DEATH AND SIGNALING 13 Hrs

Cell aging and death - necrosis and apoptosis - mitochondrial and death receptor pathway. Cell signaling - signaling molecules and their receptors, functions of cell surface receptors, pathways of intracellular signal transduction, G protein coupled receptors, receptors tyrosine kinases, ras, MAP kinase pathways.

Text Books

- Harvey Lodish, *Molecular cell Biology*, Sol edition ,W. H. Freeman, 2007.
- Brachet J.,& Mirsky A. E., *The Cell - Biochemistry, Physiology and Morphology*, 3rd edition, Academic Press, 2005.

References Books

- Becker, *The World of the cell*, 5th edition, Kleinsmith and Harden Academic Internet Publishers, 2006.
- Geoffrey M. Cooper and Robert E. Hausman, *The Cell: A Molecular Approach*, 4th Edition, 2006.
- Gerald Karp, *Cell and Molecular Biology by concepts and experiments*, 4th edition, John Wiley sons & Inc, 2005.

PBCM103 ANALYTICAL BIOCHEMISTRY

Semester : I **Credit : 4**
Category : Core III **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Understand the working principles of analytical instruments.
- Apply and analyze the biochemical samples using analytical instruments.

UNIT - I MICROSCOPY AND ELECTROCHEMICAL TECHNIQUES 13 Hrs

Microscopy - bright field, darkfield, fluorescence and phase contrast microscope. Scanning and transmission electron microscopy. Electrochemical techniques -principles, electrochemical cells - pH, Henderson - Hasselbalch equation, buffer capacity, pH measurement, glass electrode. Ion-selective and gas sensing electrodes, oxygen electrode - principle and application. Biosensors.

UNIT - II ULTRACENTRIFUGATION AND RADIOACTIVITY TECHNIQUES 15Hrs

Ultracentrifugation - basic principles. Preparative ultracentrifugation - differential centrifugation and density gradient centrifugation. Analytical centrifugation -Schlieren optical system - applications - determination of molecular mass and purity of macromolecules.Nature of radioactivity - stable and radioactive isotopes - units and interaction of radioactivity with matter. Detection and

measurement of radioactivity - GM counter, solid and liquid scintillation counter - tissue solubilizers, counting efficiency, primary and secondary fluors, quenching - Cerenkov counting. Autoradiography. Applications of radioisotopes in the biological sciences.

UNIT - III ELECTROPHORESIS TECHNIQUES 13 Hrs

Electrophoresis - General principles, Support media. Electrophoresis of proteins -SDS - PAGE, 2D - PAGE, native gels, gradient gels, isoelectric focusing. Cellulose acetate electrophoresis. Detection, estimation and recovery of proteins in gels. Protein blotting. Electrophoresis of nucleic acids - agarose gel electrophoresis, DNA sequencing gels, pulsed field gel electrophoresis.

UNIT - IV CHROMATOGRAPHY TECHNIQUES 11 Hrs

Chromotographic techniques - General principles of partition and adsorption chromatography. Thin layer, column, ion - exchange, molecular exclusion, gas - liquid and HPLC, normal phase, reverse phase, chromatofocusing, immunoaffinity, capillary electrochromatography.

UNIT - V SPECTROSCOPY TECHNIQUES 13 Hrs

Laws of absorption and absorption spectrum. Principles of turbidimetry and nephelometry. Principle, instrumentation and application of luminometry. Atomic spectroscopy - Principle and applications of atomic flame and flameless spectrophotometry. Use of lasers for spectroscopy.

Text Books

- Wilson K. & Walker, *Practical Biochemistry*, Cambridge University press, 5th edition, 2000
- David T. Plummer. *An introduction to Practical Biochemistry* 2005.

References Books

- David Frifelder. *Physical Biochemistry*, W. H. Freeman; 3 edition, 2005
- Galen Wood Ewing Mcgraw, *Instrumental Methods of Chemical Analysis* by -Hill College , Fifth edition .
- Robert D. Braun, *Introduction to Instrumental Analysis* , Pharma Book Syndicate,2006.

PBCM104 ENDOCRINOLOGY

Semester : I **Credit : 4**
Category : Core IV **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Acquire in-depth knowledge about types, classification, biosynthesis, interaction, function and regulation of hormones.
- To assess the involvement of signaling pathways in response to hormones.

UNIT - I CLASSIFICATION AND MECHANISM 13 Hrs

Hormones - definition, classification based on receptors, hormone cascade system involving CNS, hypothalamus, anterior pituitary, target gland, feed back mechanisms, classification of hormones

(polypeptides, glycoproteins and POMC peptides), major polypeptide hormones and their actions, genes and formation of polypeptide hormones - POMC peptides and vasopressin.

UNIT - II AMINO ACID DERIVED HORMONES 13 Hrs

Synthesis of amino acid derived hormones-epinephrine and thyroxine, inactivation and degradation of hormones, signal transduction and second messengers - adenylate cyclase system, cAMP, adrenalin and glycogen degradation. G-protein as cellular transducer, inositol triphosphate and calcium release, glycogen phosphorylase kinase, DAG and protein kinase C-pathway

UNIT -III CYCLIC HORMONAL CASCADE SYSTEM AND PROTEIN KINASES 13Hrs

Cyclic hormonal cascade system - chronotropic control, melatonin and serotonin - light and dark cycle, ovarian cycle and role of hormones, hormone - receptor interactions, multiple hormone subunits Sactchard analysis, structure beta -adrenergic receptor and insulin receptor, internalization of receptors, intracellular action - protein kinases, insulin receptor - transduction through tyrosine kinase, vasopressin - protein kinase A, GnRH-protein kinase C, atrial natriuretic factor - protein kinase G.

UNIT - IV STEROID HORMONES 13 Hrs

Structure, biosynthesis, transport of steroid hormones in blood and metabolic inactivation of steroid hormones, control of synthesis and release of steroid hormones, Hormones that directly stimulate synthesis and release of steroid hormone with reference to the second messengers and the signal pathway (cortisol, aldosterone, testosterone, 17B - estradiol, progesterone and calcitriol).

UNIT-V HORMONE RECEPTORS AND REGULATION 13 Hrs

Steroid hormone receptors, intracellular protein receptors, structural organization of receptor protein, hormone binding domain, antigenic domain and DNA binding domain, organizations of functional elements - hormone response elements, positive and negative transcriptional effects of S.R, receptor activation - upregulation and down regulation, apoptosis - steroid hormone action at cell level, multiple endocrine neoplasia - different types.

Text Books

- Devlin, Wiley-Liss; *Biochemistry (with clinical correlation)* , 6th edition, 2005.
- Wilson and Foster, *Endocrinology* , 4th edition, W.B. Saunders Co, 2005.

Reference Books

- R.K. Murray et al. *Harper's Biochemistry*, 27 edition, McGraw-Hill Medical, 2006.
- Austin and Short,prema Jaypee brothers, *Mechanism of hormone action*, 3rd edition, 2005.
- Sembulingam.K and Sembulingam, *Essential of Medical Physiology,* 4th Edition, *P*rema Jaypee brothers, Delhi, 2006.

PBCR101 ANALYTICAL BIOCHEMISTRY

Semester : I **Credit : 4**
Category : Core Practical I **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Carry out biochemical analysis.
- Attain technical competence in the specific discipline.

Experiments

1. Preparation of buffers and measurements of pH.
2. Titrable acidity of aminoacids.
3. Paper chromatography of sugars & aminoacids.
4. Thin layer chromatography of aminoacids and lipids.
5. Separation of plant pigments by column chromatography.
6. Paper electrophoresis.
7. SDS PAGE/Agarose gel electrophoresis.
8. Preparation of cell free homogenate, isolation of mitochondria & nuclei from liver and chloroplast from leaves.

PBCM201 METABOLISM AND REGULATION

Semester	**: II**	**Credit**	**: 4**
Category	**: Core V**	**Hours/ week**	**: 5**
Class & Major	**: I M.Sc. Biochemistry**	**Total Hours**	**: 65**

Objectives:
To enable the students

- Understand the reactions involved in metabolism of biomolecules.
- Coordinate and regulate the metabolic pathways .

UNIT - I BIOENERGETICS **13Hrs** Free energy and entropy. Phosphoryl group transfers and ATP. Enzymes involved in redox reactions. The electron transport chain– organization and role in electron capture.Oxidative phosphorylation- electron transfer reactions in mitochondria. F1F0 ATPase- structure and mechanism of action. The chemiosmotic theory. Inhibitors of respiratory chain and oxidative phosphorylation- uncouplers, ionophores. Regulation of oxidative phosphorylation. Mitochondrial transport systems- ATP/ADP exchange, malate / glycerophosphate shuttle.

UNIT - II CARBOHYDRATE METABOLISM **13Hrs**

Glycolysis and gluconeogenesis– pathway, key enzymes and co-ordinate regulation. Mechanism of pyruvate dehydrogenase multienzyme complex and the regulation of this enzyme through reversible covalent modification. The citricacid cycle and regulation. The pentose phosphate pathway. Metabolism of glycogen and regulation. Glycogen storage diseases. Blood glucose homeostasis– role of tissues and hormones.

UNIT - III LIPID METABOLISM **13 Hrs**

Lipogenesis- Control of acetyl CoA carboxylase - Role of hormones - Effect of diet on fatty acid biosynthesis. Regulation of biosynthesis of triacylglycerol, phospholipids and cholesterol. Metabolism of triacylglycerol during stress. α, β, γ, Oxidation of fatty acids– Role of carnitine cycle in

the regulation of β- oxidation. Ketogenesis and its control. Lipoprotein metabolism exogenous and endogenus pathways.

UNIT - IV METABOLISM OF AMINO ACIDS, PURINES AND PYRIMIDINES 13 Hrs

Overview of biosynthesis of nonessential amino acids. Catabolism of amino acid nitrogen– transamination, deamination, ammonia formation, the urea cycle and regulation of ureogenesis. Importance of glutamate dehydrogenase. Catabolism of carbon skeletons of amino acids– overview only. Disorders of amino acid metabolism– phenylketonuria, alkaptonuria and albinism only. Digestion and absorption of nucleoproteins, Metabolism of purines- de novo and salvage pathways for purine biosynthesis, regulation of biosynthesis of nucleotides. Purine catabolic pathway. Hyperuricemia. Metabolism of pyrimidinesbiosynthesis and catabolism. Orotic aciduria.

UNIT - V METABOLIC INTEGRATION AND HORMONAL REGULATION 13 Hrs

Key junctions in metabolism– glucose-6-phosphate, pyruvate and acetyl CoA. Metabolic profiles of brain, muscle, liver, kidney and adipose tissue. Metabolic inter relationships in various nutritional and hormonal states– obesity, aerobic, anaerobic endurance, exercise, pregnancy, lactation, IDDM, NIDDM and starvation.

Text Books

- Stryer, *Biochemistry*, 3rd ed, Freeman, 2002.
- Murray et al., *Harper's Biochemistry*, 2nd ed, Mc. GrawHill, 2000.

References Books

- Nelson Cox, Lehninger's, *Principles of Biochemistry*, 3rd Edition, McMillan Worth, 2000.
- Donald Voet, J.G. Voet, John Wiley, *Biochemistry*, 4th edition, 2006.
- Davidson & Sittman, *Biochemistry NM., 3rd edition*, Lippincott. Willams and Wilkins, 2005

PBCM202 HUMAN PHYSIOLOGY

Semester : II **Credit : 4**
Category : Core VI **Hours/ week : 5**
Class & Major: I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Understand the physiology of human body and to study the way the body functions.
- Revise the function and coordination of organs to maintain normal biological system.

UNIT - I BLOOD AND RESPIRATION 13 Hrs

Composition and functions of blood and plasma. Blood groups. Blood coagulation - mechanism, fibrinolysis, anticoagulants. Hemoglobin - structure, abnormal types, anemia. Structure of heart, cardiac cycle, heart sounds, E.C.G (elementary knowledge) vasomotor circulation, coronary circulation, blood pressure, spleen, lymph, normal composition and function of lymph - role of different lymph cells. Structure of lungs, mechanism and regulation

of respiration. Transport of blood gases - O2 and CO2. Acid-base balance - role of buffers, erythrocytes, respiratory system and kidneys. Acidosis and alkalosis - metabolic and respiratory. Fluid electrolyte balance - regulation of water balance and sodium balance - role of renin-angiotensin and ADH.

UNIT-II DIGESTION AND EXCRETION 13 Hrs

Digestive secretions - composition, functions and regulation of saliva, gastric, pancreatic, intestinal and bile secretions. Digestions and absorption of carbohydrates, lipids, proteins and nucleic acids. Excretory system - structure of nephron. Formation of urine - glomerular filtration, tubular reabsorption of glucose, water and electrolytes, tubular secretion

UNIT - III REPRODUCTIVE SYSTEM 13 Hrs

Structure and function of reproductive organs, composition of semen, transport of sperm, ovulation, sexual cycle, physiology of pregnancy, parturition and lactation.

UNIT - IV NERVOUS SYSTEM 13 Hrs

Structure and function of nerves, neurons, resting and action potential, transmission of nerve impulses, synaptic transmission, compounds affecting synaptic transmission, neuromuscular junction, composition and functions of cerebrospinal fluid, brain - chemical composition and metabolic adaptation, neurotransmitters and cAMP, biochemical aspects of learning and memory, enkephalins and endorphins. Structure of muscle cells and muscle contraction, molecular organization of muscle, proteins of contractile element - their organization and role in contraction, energy for contraction.

UNIT –V MUSCULAR AND CYTOSKELETON SYSTEM 13 Hrs

Structure of muscle cells and muscle contraction, molecular organization of muscle, proteins of contractile element - their organization and role in contraction, energy for contraction. Types of tissue. Epithelium – organization and types. The basement membrane.Bone and cartilage. Major classes of cell junctions – anchoring, tight and gap junctions. Major families of cell adhesion molecules (CAMs) – the cadherins (classical and desmosomal). The integrins. The extracellular matrix of epithelial and nonepithelial tissues. ECM components – collagen, elastin, fibrilling,fibronectin, laminin and proteoglycans.

Text Books

- William. F. Ganong. *Review of Medical Physiology,* 22nd ed, McGraw-Hill Medical, 2008.
- M.S.Swaminathan, *Principles of Nutrition,* 3rd Edition, 2004.

References Books

- Guyton, *Human Physiology and Mechanisms of Disease* , 6th edition, Saunders Publications, 2004.
- C.C. Chatterjee *Human physiology*, 11th edition, 2007.
- Davidson & Passmore, *Human Nutrition and Dietetics*. Churchill Livingstone; 8th edition, 2004.

PBCM203 MICROBIOLOGY

Semester : II **Credit : 4**
Category : Core VII **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Study the structure and organization of microorganisms in various fields.
- Elucidate the role of microbes in industrial, clinical and environmental domains.

UNIT - I GENERAL MICROBIOLOGY 13 Hrs

Introduction and scope of microbiology. Brief study of structure and organization of major groups of microorganisms - archaebacteria, cyanobacteria, eubacteria, fungi, algae, protozoa and viruses. Culture of microorganisms - batch, continuous and pure cultures. Control of microorganisms - physical, chemical and chemotherapeutic agents.Preservation of microorganisms.

UNIT - II ENVIRONMENTAL MICROBIOLOGY 13 Hrs

Microbiology of soil - soil microflora, role of soil microbes in biogeochemicalcycles (C,N,S) - Marine and fresh water microbiology. Contamination of domestic and marine waters. Water purification and sewage treatment. Microbes in waste water treatments. Microbiology of air.

UNIT - III INDUSTRIAL MICROBIOLOGY 13 Hrs

Selection of industrially useful microbes. Fermentors and fermentation technology. Industrial production of alcohol, vinegar, lactic acid, antibiotics, enzymes and amino acids. Microbiology of food: sources of contamination, food spoilage and food preservation methods.

UNIT - IV CLINICAL MICROBIOLOGY 13 Hrs

Epidemic, endemic, pandemic and sporadic diseases. Pathogenicity, virulence and infection. Epidemiology of infectious diseases. Bacterial diseases of human (typhoid, cholera, syphilis, gonorrhoea and pertusis). Fungal diseases of human (superficial, cutaneous, subcutaneous and systemic mycoses).Viral diseases of human (AIDS, hepatitis, polio, rabies and measles).Mycoplasmal, Chlamydial, Rickettial and protozoan diseases of human. Mycotoxins.

UNIT - V APPLIED MICROBIOLOGY 13 Hrs

Role of microbes in the manufacture of antibiotics and vaccines. Microorganisms as biofertilizers. Microbes as foods - SCP production. Role of microbes in biogas production, petroleum industry and mining. Microbial degradation of lignin, cellulose and pesticides. Microbial immobilization. Microbes in biological warfare.

Text Books

- Pelczar et al., *Microbiology*, 3rd edition, Tata McGraw-Hill, New Delhi, 2004.
- Prescott et al., *Microbiology*, 2nd edition, WMC Brown Publishers, USA, 2003.

Reference Books

- Martin Alexander , *Introduction to soil microbiology*, 4th edition, WileyInternational, NY, 2004
- Gladwin & Trattler, *Clinical Microbiology Made Ridiculously Simple*, 6th edition, Medmaster, UK,2013

PBCM204 MOLECULAR BIOLOGY

Semester : II **Credit : 4**
Category : Core VIII **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Study the molecular mechanisms of Prokaryotes and Eukaryotes.
- Assess the structure and function of genes and proteins by Genomics & Proteomics.

UNIT - 1 PROKARYOTIC TRANSCRIPTION AND REGULATION 13 Hrs

Replication of DNA: DNA in prokaryotes and eukaryotes. Enzymes involved in replication, events on the replication fork and termination, mechanism of replication. Inhibitors of DNA replication and DNA repair. Type of damages, types of mutation – point mutation and frame shift mutation. Suppressor mutations – nonsense & missense suppression. Gene mutation and chromosomal aberration. Basic principles of transcription. Transcription- initiation, elongationand termination. . Inhibitors of transcription. Post-transcriptional processing of rRNA and tRNA. Regulation of transcription in prokaryotes– the lac, trp, Arab,Gal operon.

UNIT - II EUKARYOTIC TRANSCRIPTION AND REGULATION 13 Hrs

Eukaryotic RNA polymerases- structure and functions. RNA pol I, II and IIIpromoters, transcription factors, transcription complex assembly and mechanism of transcription. Transcriptional regulation in eukaryotes- hormonal (steroid hormone receptors), phosphorylation (Stat proteins), activation of transcriptional elongation by HIV Tat protein, cell determination, homeodomain proteins. Posttranscriptional processing of mRNA, rRNA and t-RNA. Alternative splicing. Catalytic RNA (ribozymes), RNA editing, Antisense RNA and RNAi

UNIT- III GENETIC CODE, TRANSLATION 13 Hrs

The genetic code- general features. Mitochondrial genetic code. Components of protein synthesis– mRNA, ribosomes and tRNA. Mechanism of protein synthesis in bacteria and eukaryotes- amino acid activation, initiation, elongation and termination. Translational control in bacteria and eukaryotes. Regulation of protein synthesis- constitutive, and narrow domain regulation. Inhibition of protein synthesis. Co- and post-translational modifications. Protein
targeting- the signal sequence hypothesis, targeting proteins to membranes, nucleus and intracellular organelles. Protein degradation: the ubiquitine pathway. Protein folding- models, molecular chaperones.

UNIT – IV GENE EXPRESSION AND REGULATION 13 Hrs

Levels of gene expression. Principles of gene regulation, Upregulation, downregulation, induction, repression, global and narrow domain mechanisms. Genetic and epigenetic gene regulation by DNA methylation. DNA methylation in prokaryotesrestriction- modification systems, Dam

methylation, Dcm methylation. DNA methylation in eukaryotes- cytosine methylation, CpG islands. Methylation and gene regulation in mammals and plants. Epigenetic
12 gene regulation by DNA methylation in mammals- role of imprinting and Xchromosome inactivation.

UNIT - V GENOMICS **13 Hrs**

Genomics: an overview. Genome projects: HGP Genome sequencing approaches;Structural genomics; chromosome maps– RFLP, SSLP, RAPD Physical mapping. Positional cloning. Functional genomics– study of gene interactions; Proteomics. SNPs and implications; DNAmicro arrays. Developmental genetics: overview. Drosophila development maternal effect genes and zygotic genes.

Text Books

- Alberts, *Molecular Biology of the Cell*, 4th ed, Garland Sci, 2002.
- Lodish et al, *Molecular Cell Biology*, 4th ed, Freeman, 2000.
- Pitot HC, *Fundamentals of Oncology*, 3rd edition, Marcel Dekker, 2002.

Reference Books

- Stansfield et al. *Molecular Cell Biology, 2nd edition,* Schaum's Outlines, McGraw Hill, 2002.
- Lewin. *Genes VII*, 2nd edition, Oxford University Press, 2000.
- Twyman. *Advanced Molecular Biology* , 3rd ed, Viva Publ, 2005.

PBCR201 MICROBIOLOGY & MOLECULAR BIOLOGY PRACTICAL

Semester : II **Credit : 4**
Category : Core Practical II **Hours/ week : 5**
Class & Major : I M.Sc. Biochemistry **Total Hours : 65**

Objectives:
To enable the students

- Gain practical knowledge about Microbes.
- Experiment molecular biological techniques.

Microbiology:

1. Determination of microbiological techniques by sterilization, media preparation, preparation of slants and stabs, pouring of medium into plates, sub-culturing.

2. Isolation of microorganisms from soil collected from different places by serial dilution, plating for counting colonies, single colony isolation techniques and its preservation.

3. Examination of microorganisms by simple staining, gram staining, acid fast staining, Endospore staining, staining of flagella, staining of capsule, staining of fungi, localization of root nodule bacteria by staining.

4. Determination of bacterial growth studies by haemocytometer, colony counting, bacterial growth curve and generation time.

5. Antibiotic sensitivity tests by paper disc, cup method and MIC determination.

Molecular Biology:

6. Preparation of genomic DNA from plant tissue by CTAB method.

7. Plasmid DNA isolation by alkaline lysis method.

8. Isolation of chromosomal DNA from blood samples by phenol Chloroform method.

9. Demonstration of ELISA.

Reference Books

- Kathleen Park Talaro & Talaro A., *Foundation in Microbiology*, 2nd edition, McGraw-Hill, New York, 2005.
- Daniel Lim, *Microbiology*, 2nd edition, McGraw-Hill, New York, 2005.
- Carlson and Susan , *Molecular Biology Techniques*, 3rd Edition.
- Stefan Surzycki,*Basic Techniques in Molecular Biology*, (Springer lab manuals)

PBCX201 MUSHROOM CULTIVATION

Semester : II **Credit : 1**
Category : Service Learning **Total Hours : 40**
Class & Major: I M.Sc. Biochemistry
Target Group : Villagers in the age group of 20-50 years

Objectives:
To enable the students

- Create awareness on the nutritive value of mushroom.
- Enable mushroom cultivation in a small scale range.

UNIT – I INTRODUCTION **8 Hrs**

Definition, Edible & Poisonous mushroom, Nutritive & Medicinal value of mushroom. Composting - Importance in waste recycling.

UNIT - II GROWTH CHARACTERISTICS OF MUSHROOM **8 Hrs**

Growth & substrate for volvariella species, Pleurotus species, Agaricus species, Calcybe species & Lentinus species of mushroom.

UNIT – III CULTIVATION OF MUSHROOM **8 Hrs**

Conditions for tropical & temperate countries, isolation, spawn production, growth media, spawn running and harvesting of mushroom.

UNIT - IV DISEASE & POST HARVEST TECHNOLOGY **8 Hrs**

Insect pest, nematodes, Mites, Viruses, Fungal competitors & other important diseases. Post harvest technology, freezing, dry freezing, drying, canning etc. entrepreneurship

UNIT - V FEED BACK & RESULT FROM SOCIETY 8 Hrs

Evaluation of results, Mushroom yield, Income through mushroom cultivation, Feed back- oral & written from villagers. Activity: Cultivation of mushroom for commercial purposes.

Text books

- Nita Bahl, *Hand book of Mushroom*, 4th edition,Vijay primlani for oxford Publication Co.Pvt Ltd,New Delhi, 2002.
- *Hand Book of Mushroom Cultivation*, 3rd edition, TNAU Publications, 2003.

Reference Books

- Chang.T.S. & Hayes. W.A, *The biology and Cultivation of Edible Mushrooms*, 2nd edition, Academic Press, New York, 2001.
- Nair M.C & Gokulapalan. C and Lulu das, *Topics on Mushroom Cultivation*, 3rd edition, Scientific Publishers, Jodhapur, India, 2001.
- Ignacimuthu.S, *Applied Plant Biotechnology*, 3rd edition, Oxford & IBH Publishing Co.Pvt.Ltd, New Delhi, 2002.

PBCE101 PHARMACEUTICAL BIOCHEMISTRY

Semester: I **Credit : 4**
Category: Non-Major Elective I **Hours/week : 5**
Class & Major: I PG **Total hours : 65**

Objectives

To enable the students

- Study the general metabolism of drugs.
- Evaluate their clinical importance and effects by bioassays.

UNIT – I ABSORPTION, DISTRIBUTION AND METABOLISM OF DRUGS 15Hrs

Sedatives, Analgesics, NSAIDS, Neuroleptics, Antidepressants, Anxiolytics, Anticonvulsants, Antihistaminics, Local anaesthetics, Cardio vascular drugs – Antianginal agents, Vasodilators, Adrenergic & cholinergic drugs, Cardiotonic agents, Diuretics, Antihypersenstive drugs, Hypoglycemic agents, Antilipedmic agents, Coagulants, Anticoagulatns, Antiplatelet agents. Chemotherapeutic agents – Antibiotics, Antibacterials, Sulphadrugs. Antiprolizoal drugs, Antiviral, Antitubercular, Antimalarial, Anticancer, Antiamoebic drugs. Diagnostic agents.

UNIT – II BIOMEDICAL IMPORTANCE OF DRUGS 12Hrs

Biochemical role of hormones, Vitamins, Enzymes, Nucleic acids, Bioenergetics. General principles of immunology. Immunological techniques. Adverse drug interaction. Preparation and storage and uses of official Radiopharmaceuticals.

UNIT – III TOXICOLOGY **15 Hrs**

Toxicology, drug interactions and pharmacology of drugs acting on central nervous system, Cardiovascular system, Autonomic nervous system, Gastro intestinal system and Respiratory system. Hormones, Chemotherapeutic agents including anticancer drugs. Their Bioassays.

UNIT – IV BIOPHARMACEUTICALS **11 Hrs**

Development, manufacturing standards, labeling, packing as per the pharmacopoeal requirements, storage of different dosage forms and new drug delivery systems. Biopharmaceuticals and Pharmacokinetics and their importance in formulation.

UNIT – V PHYTOPHARMACEUTICALS **12 Hrs**

Chemistry, tests, isolation, characterization and estimation of phytopharmaceuticals belonging to the group of Alkaloids, Glycosides, Terpenoids, Steroids, Bioflavanoids, Purines, Guggul lipids. Pharmacognosy of crude drugs which contain the above constituents. Standardisation of raw materials and herbal products. WHO guide lines. Quantitative microscopy including modern techniques used for evaluation. Biotechnological principles and techniques for plant development tissue culture.

Text Books

- Devin., *Text Book of Biochemistry with clinical correlation,* 1992
- Donald Voet., *Biochemistry*, 2004
- Harper's., *Illustrated Biochemistry*, 2006

Reference Books

- Alfred Burger., *A guide to chemical basis of drugs design,* John Wiley & Sons.
- Goodman and Gilman's., *The Pharmacological Basis of Therapeutics*, 8th edition Pergamon Press.
- John Smith and Haywel Williams., *Introduction to the principles of drug design,* Wright PSG.
- Manfred E Wolff., *Burgers Medicinal chemistry – The basis of Medicinal Chemistry*. Part – I. John Wiley & Sons.

PBCE102 REPRODUCTIVE BIOLOGY AND DISORDERS

Semester : I **Credit : 4**
Category : NME **Hours/ week : 5**
Class & Major : I PG **Total Hours : 65**

Objectives:
To enable the students

- Study on biological aspects of human reproduction
- Discussion about birth control, infertility and sexually transmitted diseases

UNIT - I INTRODUCTION OF REPRODUCTIVE SYSTEM 15 Hrs

Reproduction – Definition, Structure and function of male and female reproductive system. Endocrine control of reproductive function.

UNIT – II REPRODUCTIVE CYCLE 10 Hrs

Menstrual cycle – Ovarian cycle (Follicular phase, ovulation, luteal phase), Uterine cycle (Menstruation, proliferative phase and secretory phase), Cycle abnormalities and disorders – Dysmenorrhea, Hypomenorrhea, Menorrhagia, Polymenorrhea, Oligomenorrhea, Metrorrhegia, Infertility, Abortion, Polycystic ovarian syndrome.

UNIT – III GAMETES AND FERTILIZATION 10 Hrs

Ultra structure of sperm and egg, Gametogenesis, Oogenesis. Fertilization – external, internal, artificial and in-vitro. Embryo transfer, test for sperm viability and function.

UNIT – IV FOETAL DEVELOPMENT 15 Hrs

Pregnancy and fetal development – Prenatal development of foetus, stages of fetal growth and pregnancy test, contraception, risk factors of miscarriage, pregnancy loss and still birth.

UNIT – V SEXUALLY TRANSMITTED DISEASES 15 Hrs

HIV/AIDS – definition, causes and symptoms, diagnosis, mode of transmission, prevention and treatment. Syphilis – types, causes and symptoms, diagnosis, congenital syphilis, prevention and treatment.

Text books

- Sastry K.V, *Endocrinology and Reproductive biology*, Rastogi publications.
- Sachdeva R.K, *A guide to obstetrics and gynaecology*, Jaypee brother publications.

Reference books

- Richard. E. Jones., Kristin H. Lopez. *Human reproductive biology*, Third edition.
- Taylor, J., Green N.P.O., Stout G.W. *Biological sciences 1 & 2*, Third edition.

PBCE103 MODERN LIFESTYLE ASSOCIATED DISEASES

Semester : I **Credit : 4**
Category : NME **Hours/ week : 5**
Class & Major : I PG **Total Hours : 65**

Objectives:
To enable the students

- Obtain knowledge and understanding of health, nutrition and other lifestyle and associated diseases.
- Choose healthy life style to cope with modern life.

UNIT I - DIABETES **13Hrs**

Definition, types, causes, prevalence, diagnosis,complications, treatment and preventive measures.The Diabetic lifestyle, gestational diabetes, diabetes and diet coping skills for diabetics.

UNIT II - HYPERTENSION **11Hrs**

Definition, signs and symptoms, causes, types (Primary and secondary).Blood pressure (effectively and benefit of BP reduction).Retinopathy, diagnosis, treatment and prevention.

UNIT - III OBESITY AND CORONARY HEART DISEASE **15Hrs**

Definition, causes of obesity, BMI, health consequences, strategies to reduce obesity, strategies to promote health, childhood obesity, and diet, prevention.

Coronary heart disease: types, symptoms, diagnosis, prevention and management and treatment.Medication requirement, CHD, and diet, stroke prevention measures, Pharmacological management of CHD.

UNIT IV - OSTEOPOROSIS **13Hrs**

Definition, types, symptoms, treatment, causes and prevention. Diagnosis, diet and osteoporosis and exercise. Drugs in osteoporosis, bone disease, dietary requirement for osteoporosis.

UNIT V - ANAEMIA **13Hrs**

Definition, causes, types, symptoms, and treatment of anaemia. Iron deficiency, diet and anaemia.Anaemia and pregnancy – prevalence and consequences of anaemia in pregnancy. Anaemia treatment.

Textbooks

- Guide to prevention of lifestyle diseases. M Kumar, R Kumar. Publication: Deep and Deep Publications, 2004.

Reference books

- Tudith stern, Alexendra Kuzaks. *Obesity: a reference handbook.* ABC-CLIO, 2009.
- . Mindori Hiramatsu, Toshikazu Toshikawa, Lister Packer. *Molecular interventions in lifestyle related diseases*. CRC Press, 2009,
- David L Katz, *Diseases Proof*. Plume, 2014.

III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core I	PBCM101	Bimolecular Chemistry	Assignment	Seminar
	Core II	PBCM102	Cell Biology	Poster Presentation	Seminar
	Core III	PBCM103	Analytical Biochemistry	Model Preparation	Seminar
	Core IV	PBCM104	Endocrinology	Model Preparation	Seminar
II	Core V	PBCM201	Metabolism and Regulation	Assignment	Seminar
	Core VI	PBCM202	Human Physiology	Model Preparation	Seminar
	Core VII	PBCM203	Microbiology	Assignment	Culture Preparation
	Core VIII	PBCM204	Immunology	Poster Presentation	Seminar
	NME	PBCE201	Pharmaceutical Biochemistry	Assignment	Seminar
		PBCE202	Reproductive Biology and Disorder	Seminar	Seminar
		PBCE203	Modern life Style Associated Disease	Case study	Seminar

DEPARTMENT OF CHEMISTRY

PREAMBLE

UG: Course profile, list of courses offered to other departments and the syllabi of courses offered in the first two semesters along with evaluation components III and IV (with effect from 2015-2018 batch onwards) and

PG: Course profile, list of courses offered to other departments and the syllabi of courses along with evaluation components III and IV **(**with effect from 2015-2017 batch onwards) are presented in this booklet

COURSE PROFILE B.Sc (Chemistry)

Semester	Part	Category	Course code	Course Title	Contact Hrs/ Week	Credits	
						Min	Max
I	I	Tamil/Hindi/French	UTAL105/ UTAL106/ UHIL101/ UFRL101	Basic Tamil-I/ Advanced Tamil-I/ Hindi-I/ French-I	4	2	3
	II	English	UENL107/ UENL108	Basic English-I/ Advanced English-I	5	3	4
	III	Core I	UCHM104	Fundamentals of Chemistry	2	1	1
		Core II	UCHM105	General Chemistry –I	4	4	4
		Core III	UCHM106	Analytical Chemistry	4	4	4
		Core Practical I	UCHR204	Semimicro Qualitative Inorganic Analysis	3	-	-
		Allied I	UPHA102	Allied Physics - I	3	3	3
		Allied Practical I	UPHR103	Allied Physics Practical-I	3	2	2
	IV	Value Education			2	1	1
				Total	**30**	**20**	**22**
II	I	Tamil/Hindi/French	UTAL205/ UTAL206/ UHIL201/ UFRL201	Basic Tamil-II/ Advanced Tamil-II/ Hindi-II/ French-II	4	2	3
	II	English	UENL207/ UENL208	Basic English-II/ Advanced English-II	5	3	4
	III	Core IV	UCHM202	General Chemistry –II	6	6	6
		Core Practical I	UCHR204	Semimicro Qualitative Inorganic Analysis	3	4	4
		Allied II	UPHA202	Allied Physics II	3	3	3
		Allied Practical I	UPHR203	Allied Physics Practical-II	3	2	2
	IV	NME			4	2	2
		Soft skill			2	1	1
	V	Extension Programme/ Physical Education/NCC			-	1	2
				Total	**30**	**24**	**27**
III	I	Tamil/Hindi/French	UTAL305/ UTAL306/ UHIL301/ UFRL301	Basic Tamil-III/ Advanced Tamil-III/ Hindi-III/ French-III	4	2	3
	II	English	UENL307/ UENL308	Basic English-III/ Advanced English-III	5	3	4
	III	Core V	UCHM303	General Chemistry –III	4	4	4
		Core Practical II	UCHR404	Semimicro Titrimetric Analysis	3	-	-
		Core VI	UCHM304	Separation & Purification Techniques	**2**	**3**	**3**

				Virtual Lab	**1**		
		Allied	UMAA306	Algebra, Differential Calculus and Trignometry	5	5	5
	IV	NME			4	2	2
		Value Education			2	1	1
				Total	**30**	**20**	**22**
IV	I	Tamil/Hindi/French	UTAL405/ UTAL406/ UHIL401/ UFRL401	Basic Tamil-IV/Advanced Tamil-IV/ Hindi-IV/ French-IV	4	2	3
	II	English	UENL407/ UENL408	Basic English/ Advanced English	5	3	4
	III	Core VII	UCHM402	General Chemistry –IV	6	5	5
		Core Practical II	UCHR404	Semimicro Titrimetric Analysis	3	4	4
		Core VIII	UCHM403	Instrumental Methods of Analysis	5	5	5
		Allied	UMAA406	Integral Calculus, Laplace Transform & Ordinary Differential Equation	5	5	5
	IV	Soft skill	USKS401		2		
	V	Extension Programme/ Physical Education/NCC			-	-	2
				Total	**30**	**24**	**28**
V	III	Core IX	UCHM504	Inorganic Chemistry – I	5	4	4
		Core X	UCHM505	Organic Chemistry –I	6	5	5
		Core XI	UCHM506	Physical Chemistry –I	5	4	4
		Core Practical III	UCHR606	Inorganic & Organic Chemistry Practical	4	-	-
		Core Practical IV	UCHR605	Physical Chemistry Practical	3	-	-
		Allied Optional			5	4	4
	IV	Value education			2	1	1
				Total	**30**	**18**	**18**
VI	III	Core XII	UCHM607	Inorganic Chemistry II	4	4	4
		Core XIII	UCHM608	Organic Chemistry II	4	4	4
		Core XIV	UCHM609	Physical Chemistry II	4	4	4
		Core XV	UIDM601	Solid State Chemistry	4	4	4
		Major elective	UCHO602/ UCHO603	Polymer Chemistry / Medicinal Chemistry	5	4	4
		Core Practical III	UCHR606	Inorganic & organic chemistry practical	4	8	8
		Core Practical IV	UCHR605	Physical Chemistry Practical	3	4	4
		Viva –Voce	UCHM605	Comprehensive Viva-Voce	-	1	1
	IV	Soft Skill	USKS601		2	1	1
	V	Extension Programme/ Physical Education			-	-	2
				Total	**30**	**34**	**36**
				Grand Total	**180**	**140**	**153**

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course code	Course title	Hrs per week	Credits	
					Min	Max
II	Core	UCHI201	Internship	-	-	1
IV	Core	UCHI401	Internship	-	-	1
V	Core	UCHM507	Geo Chemistry(Self Study Paper)	-	-	1
	Core	UCHP501	Mini Project	-	-	1

LIST OF COURSES OFFERED TO OTHER DEPARTMENTS
ALLIED AND ALLIED OPTIONAL COURSES

Semester	Part	Category	Course code	Course title	Contact hrs per week	Credits	
						Min	Max
I	III	Allied	UCHA102	Chemistry – I	5	4	4
IV	III	Allied	UCHA402	Chemistry – II	3	3	3
I	III	Allied Practical	UCHR101	Volumetric & Organic Analysis	3	2	2
IV	III	Allied Practical	UCHR403	Volumetric & Organic Analysis	3	2	2
V	III	Allied Optional	UCHA502 UCHA504	Industrial Chemistry Dairy Chemistry	5	4	4

NON MAJOR ELECTIVE COURSES

Semester	Part	Category	Course code	Course title	Contact hrs per week	Credits	
						Min	Max
II	IV	Non major elective	UCHE204	Food Chemistry	4	2	2
III	IV	Non major elective	UCHE302 UCHE303	Cosmetics and Detergents Green Chemistry	4 4	2 2	2 2

UCHM104 FUNDAMENTALS OF CHEMISTRY

Semester : I **Credit : 1**
Category : Core I **Hours/Week : 2**
Class & Major : I B.Sc Chemistry **Total Hours : 26**

Objectives:
To enable the students

- Acquire knowledge in equivalent weight and calculate it .
- Classify acid, base and chemical bonding
- Formulate the organic reactions and solutions

UNIT-I ATOMS AND MOLECULES **6 Hrs**

Mass and radius of an electron. Properties of an electron, proton and neutron. Atom, molecule. Atomic number, atomic weight. Oxidation, reduction, oxidation state of the ion, oxidizing and reducing agent. Equivalent weight. Calculation of equivalent weight. Molecular weight, mole concept-stoichiometry.

UNIT-II ACIDS AND BASES **5 Hrs**

Arrehenius concept, proton transfer theory- conjugate acids and bases, Lewis concept. Dissociation of a weak acid. Dissociation of a weak base, ionic product of water- the pH scale.pH of the solution. Buffer solution.Common ion effect.

UNIT-III CHEMICAL BONDING **6 Hrs**

Types of bonds-ionic, covalent,co-ordinate bond and metallic bond. Hydrogen bond, vander Walls interaction. Hybridisation.VSEPR Theory- Shapes of H_2O, NH_3.

UNIT-IV BASIC CONCEPTS OF ORGANIC MOLECULES **4 Hrs**

Electrophile, nucleophile, freeradical. Types of organic reactions addition substitution, elimination, rearrangement reactions. Carbocation, carbanion,nitrene.

UNIT-V SOLUTIONS **5 Hrs**

Electrode, anode, cathode, electrolyte, electrolysis. Solid, liquid, gas, Solution-saturated, unsaturated solution. Homogeneous and heterogeneous solution. Phase, component. Intensive and extensive properties. Process-reversible and irreversible, System, Surrounding.

Text Books

- Bahl.S and Arunbahl, *Advanced Organic Chemistry*, Revised Edition, S.Chand and Company Ltd,Ram Nagar,New Delhi,2010.
- Madan.R.D, *Modern Inorganic Chemistry* ,3rd edition, Chand.S & Company Limited, New Delhi,2011
- Puri.B.R, Shaema.L.R & Pathania.M.S, *Principles of Physical Chemistry*, Millennium Edition, Vishal Publishing & Co, Jalandhar, 2011.

Reference Books

- Soni.P.L, *Text Book of Physical Chemistry*, 22nd revisied edition, Sultan Chand, New Delhi, 2011
- Puri.B.R, Sharma.L.R and K.C.KALLIA, *Inorganic Chemistry*, MilstonePublisher, New Delhi,2006
- Soni.P.L, *Text Book of Organic Chemistry*, 25th revised edition, Sultan Chand, New Delhi, 2011.

UCHM105 GENERAL CHEMISTRY-I

Semester : I **Credit : 4**
Category : Core II **Hours/ week : 4**
Class & Major : I B.Sc Chemistry **Total Hours : 52**

Objectives:

To enable the students

- Recognize the modern periodic classification of element & states of matter
- Predict the Nomenclature of the organic compounds
- Evaluate the gaseous and thermo chemical equations

UNIT –I ATOMIC STRUCTURE **10 Hrs**

Bohr's model of atom- limitations of Bohr's model, Sommerfield's model , photoelectric effect, Compton effect, de-Broglie equation. Davisson and Germer experiment-Heisenberg's Uncertainty principle – Schrodinger's wave equation (statement only) Significance of wave functions. ψ and ψ^2 - probability distribution of electrons-radial probability distribution curves- concept and shapes of orbitals.

UNIT-II MODERN PERIODIC TABLE & ELECTRONIC CONFIGURATION 11 Hrs

Modern Periodic Table & Electronic Configuration of atoms- Aufbau Principle, Hund's rule of maximum multiplicity, stability of half-filled and completely filled orbitals. Shapes of s, p ,d& f block elements. Classification & characteristic properties of s, p d & f block elements. **Periodicity of Properties-** Definition and periodicity of Atomic radii, Ionization potential, Electron affinity, and Electro negativity

UNIT-III STRUCTURE AND BONDING 12 Hrs

Basics Concepts of Bonding in Organic Chemistry- Hybridization and geometry of molecules-Methane, ethane, ethylene, acetylene and benzene. Electron displacement effects-inductive, inductomeric, electromeric, mesomeric, resonance, hyperconjugative and steric effects. Cleavage of Bonds-Homolytic and heterolyticfission of carbon-carbon bond, reaction intermediates, carbocation, carbanion and free radicals – their stability .Classification and Nomenclature of organic compounds. Functional groups-homologous series- IUPAC recommendations for naming simple aliphatic, alicyclic and aromatic compounds- polyfunctional compounds and heterocyclic compounds.

UNIT-IV GASEOUS STATE 10 Hrs

Gas laws from the kinetic theory of gases – kinetic gas equation – derivation- kinds of velocities-mean, rms, most probable velocity. Calculation of molecular velocity .Maxwell's distribution of molecular velocity (no derivation). Experimental verification of velocity distribution- effect of temperature on velocity distribution –equipartition of energy – Virial equation of state - Boyle's temperature. Liquid State- Surface tension- effect of temperature on surface tension.Parachor-definitions and applications only- coefficient of viscosity- effect of temperature- effect of pressure.

UNIT-V THERMOCHEMISTRY 9 Hrs

–State function, path function. Extensive and intensive properties. Energy, Enthalpy, Entropy. System, surroundings. state variables. Thermodynamic process , first law of thermodynamics, Heat capacity. Expansion of an ideal gas and changes in thermodynamic properties, joule Thomson effect joule Thomson co-efficient.

Text Books

- Bahl.S and ArunBahl, *Advanced Organic Chemistry*, Revised Edition, S. Chand and Company Ltd, Ram Nagar,New Delhi,2010.
- Puri.B.R, Sharma.L.R & Pathania.M.S, *Principles of Physical Chemistry*, Millennium Edition, Vishal publishing & Co, Jalandhar,2006.
- Puri.B.R, Sharma.L.R and Kallia.K.C, *Inorganic Chemistry*, Milstone Publisher, New Delhi, 2006.

Reference Books

- Malik.W.U, Tuli.G.D and Madan.R.D, *Selected topics in inorganic chemistry*, 7th Edition, S.Chand Publications, New Delhi,2012.
- Morrison.R.T and Boyd, *Organic Chemistry*, VI Edition, Prentice Hall of India, New Delhi, 2006.

- Soni.P. L, *Text book of physical chemistry*, 22nd Revised Edition, Sultan Chand, New Delhi,2010.
- Soni.P. L, *Inorganic chemistry*, 20th Revised Edition, Sultan Chand, New Delhi, 2010.

UCHM106 ANALYTICAL CHEMISTRY

Semester : I **Credit : 4**
Category : Core III **Hours/ week : 4**
Class & Major : I B.Sc Chemistry **Total Hours : 52**

Objectives:

To enable the students

- Understand the manipulating skills in handling apparatus & instruments
- Employ the first aid techniques in laboratory
- Formulate the theoretical aspects of qualitative, volumetric analysis & analytical techniques in chemistry

UNIT-I WORKING IN CHEMISTRY LAB 8 Hrs

Introduction –personal protection – nature of chemicals- toxic, corrosive, explosive, inflammable, carcinogenic , other hazardous chemicals – safe storing and handling of chemicals – disposal of chemical wastes, glassware – handling of glassware – handling of different types of equipments like Bunsen burner, centrifuge, Kipp's apparatus etc – ventilation facilities – philosophy of lab safety- first aid techniques – general work culture inside the chemistry lab- importance of wearing lab coat. Indian and International standards.

UNIT-II DATA ANALYSIS 10 Hrs

Types of errors – idea of significant figures and its importance with examples-precision-accuracy-methods of expressing accuracy – error analysis – minimizing errors- methods of expressing precision – average deviation- standard deviation and confident limit. Physical quantities and their dimensions- International system of Units-derived units, subsidiary units-prefixes used for SI units-some useful constants and their values. Elements and their symbols. Nomenclature of Inorganic compounds, Nomenclature of cations, anions, free radicals, oxy acids, salts, hydrates, double salts, balancing equations.

UNIT-III THEORY OF INORGANIC QUALITATIVE ANALYSIS 8 Hrs

Principles of acid –base equilibrium, common ion effect and solubility product and their applications in qualitative analysis. Reaction involved in the separation and identification of cations and anions in the analysis-spot test reagents- aluminon, cupferon-DMG, thiourea, magneson, alizarin &Nessler's, reagent ,semi micro techniques.

UNIT-IV PRINCIPLES OF VOLUMETRIC ANALYSIS 15 Hrs

Definitions of molarity, molality, normality & mole fraction. Definitions & examples for primary & secondary standards. Theories of acid-base, redox, complexometric, iodometric & iodimetric titrations. Calculations of equivalent weights. Theories of acid-base, redox, metal ion & adsorption indicators, choice of indicators.

UNIT-V PRINCIPLES OF GRAVIMETRIC ANALYSIS 11 Hrs

Characteristics of precipitating agents, choice of Precipitants & conditions of precipitation-specific & selective precipitants-DMG, Cupferon, salicylaldehyde ,ethylene diammine, sequestering agents, precipitation from homogenous medium, co-precipitation ,post precipitation, peptisation-differences.

Text Books

- Gopalan.R, Subramanian.P.S & Rengarajan.K, *Elements of Analytical chemistry*, 3rd Revised Edition, Sultan Chand & Sons, New Delhi, 2007.
- Sharma.B.K, *Instrumental methods of chemical analysis*, 12th Edition, Krishna Prakashan Media (P) Ltd, 2007.
- Gurdeep.R, Chatwal Sham.K., Anandh, *Instrumental methods of chemical analysis*, Himalaya Publishing House, 2005.

Reference Books

- Janarthanam.P.B, *Physical - Chemical techniques of analysis*, Vol-I and II, Asian Publications,Mumbai, 2007.
- Skoog.A,West.M & Holler, *Fundamentals of Analytical chemistry*,8thEdition,Saunders publication, Tokyo,2009.
- Skoog.A, *Instrumental methods of analysis*,7th sub Edition, Wadsworth publishing company,2008 .
- Vogel's, *Hand book of quantitative Inorganic Analysis*, 3rdEdition,Longman Publications, London, 2009.

UCHR204 SEMIMICRO QUALITATIVE INORGANIC ANALYSIS

Semester	**: I & II**	**Credit**	**: 4**
Category	**: Core practical - I**	**Hours/Week**	**: 3+3**
Class & Major	**: I B.Sc Chemistry**	**Total Hours**	**: 78**

Objectives:

To enable the students

- Identify the basic and acid radicals
- Develop analytical skills in qualitative inorganic analysis

INORGANIC ANALYSIS

1. Analysis of simple salt and binary salt containing cations and anions

2. Analysis of a mixture containing two cations and two anions, one of which will be an interfering ion by Semi-micro methods using the conventional scheme and identify simple acid radical, interfering radical and Elimination of Interfering acid radical for the following anions: carbonate, sulphide, sulphate, fluoride, chloride, bromide, nitrate, oxalate, phosphate, borate and chromate.

3. Separation of basic radicals into groups and analysis of groups for the following: cations, lead, copper, cadmium, bismuth, aluminium, iron, manganese, zinc, cobalt, nickel, calcium, strontium, barium, magnesium and ammonium.

Reference Books

- Dr.Ramanujam.V.V, *Inorganic Semi Micro Qualitative Analysis,* The National Publishing Company, 2009.
- Thomas.A.O, *Practical chemistry,* 2nd Edition, Scientific book center, Cannanore, 2006.
- Venkateswaran.V, Veerasawamy.R & Kulandaivelu.A.R, *Basic Principles of practical Chemistry,* 2nd edition, S. Chand & Sons Publications, New Delhi, 2005.

UCHA102 CHEMISTRY - I

Semester : I **Credit : 4**
Category : Allied **Hours/ week : 5**
Class & Major : I B.Sc Biochemistry **Total Hours : 65**

Objectives:

To enable the students

- Acquire the basic concepts in structure and bonding in the molecular structure.
- Interpolate the concepts in co-ordination chemistry and Stereochemistry .
- Validate the thermodynamic derivations and biomolecular properties.

UNIT-I CHEMICAL BONDING **10 Hrs**

Types of bonds-ionic, covalent,co-ordinate bond and metallic bond. Hydrogen bond, vander Walls interaction.VSEPR Theory- Shapes of H_2O, NH_3.

UNIT-II CO-ORDINATION CHEMISTRY **10 Hrs**

Nomenclature. Of co-ordination compounds-werner theory –chelation –Functions and structure of Haemoglobin and Chlorophyll. Stereo isomerism- Elements of symmetry, optical activity- Isomerism of lactic acid and tartaric acid. Racemisation, Resolution, Geometrical isomerism of maleic acid and fumaric acid.

UNIT-III KINETICS AND ELECTRO CHEMISTRY **15 Hrs**

Chemical Kinetics- order and molecularity. First order rate equation–determination of rate constant of hydrolysis of ester. Catalysis- Catalyst- auto catalyst- enzyme catalyst – promoters- catalytic poisoning- active center-distinction between homogeneous and heterogeneous catalysis- industrial application of catalysts. Electro chemistry-Specific and equivalent conductivity- their determination effect of dilution of conductance.

UNIT-IV SOLUTIONS **15 Hrs**

Solutions: solute-solvent-types of solutions with one example each. - Strengths of solutions- Calculation of Equivalent weights- normality, molality, molarity, molefraction, percentage by weight & ppm. Preparation of standard solutions . First law of Thermodynamics- concept of internal energy, enthalpy. Thermochemistry- as applied to biochemical reactions-

second law of thermodynamics- concept of entropy, free energy, criteria for spontaneity**.** Water and its effect on biomolecules– Introduction-water as solvent- proton mobility-ionic product of water-PH scale-buffering against PH changes in biological system- Henderson equation – biological buffers.

UNIT –V BIOMOLECULES 15 Hrs

Polymer- types of polymerization- addition and condensation- thermosetting and thermoplastics- rubber-natural and synthetic fibers-nylon-6 and 66, polyesters, PE, PVC, polyvinyl acetate. Amino acids- Classification and sources of amino acids, preparation and properties of Glycine, Zwitter ion structure, isoelectric point.

Text Books

- Bahl B.S and ArunBahl, *Advanced Organic Chemistry*, 14th Edition, S. Chand, New Delhi,2010 .
- Madan R.D, *Modern Inorganic Chemistry,* 5th Edition, S.Chand& Company Limited, New Delhi, 2012.
- Puri B.R, Sharma L.R & Pathania M.S, *Principles of Physical Chemistry*, Millennium Edition, Vishal publishing & Co, Jalandhar, 2011.

Reference Books

- Malik W.U, Tuli G.D and Madan R.D, *Selected Topics in Inorganic Chemistry*, 7th Edition, S.Chand Publications, 2012.
- Morrison R.T and Boyd, *Organic Chemistry*, VI Edition, Prentice Hall of India, New Delhi, 2011.
- Soni P.L, *Text book of physical chemistry*, 25th Revised Edition, Sultan Chand, New Delhi, 2011.

UCHR101 VOLUMETRIC& ORGANIC ANALYSIS

Semester	**: I**	**Credit**	**: 2**
Category	**: Allied Practical**	**Hours/ week**	**: 3**
Class &Major	**: I B.Sc Biochemistry**	**Total Hours**	**: 39**

Objectives:

To enable the students

- Identify the analyzing skills of Organic functional groups
- Standardize the volumetric analysis

Volumetric Analysis

1. Estimation of sodium hydroxide standard sodium carbonate
2. Estimation of HCl . using standard oxalic acid
3. Estimation of oxalic acid by $KMnO_4$ using standard oxalic acid
4. Estimation of borax- std sodium carbonate
5. Estimation of Ferrous sulphate – Std – Mohrs salt solution

Organic Analysis:

Reaction of the following functional group

Aldehyde (Aromatic), ketone (Aliphatic & Aromatic), Carboxylic acid (mono & di), carbohydrate (reducing) & phenol, Aromatic primary amine, Amide &diamide. Systematic analysis of organic compound containing one functional group & characterization by confirmatory tests or derivative.

Reference Books

- Dr. Ramanujam V.V, *Inorganic Semi Micro Qualitative Analysis,* the National Publishing Company, 2009.
- Thomas A.O, *Practical chemistry,* 2nd edition, Scientific Book Center, Cannanore, 2006.
- Venkateswaran V, Veerasawamy R & Kulandaivelu A.R, *Basic Principles of practical Chemistry,* 2nd edition, Chand S & Sons Publications, New Delhi, 2005.

UCHM202 GENERAL CHEMISTRY-II

Semester : II **Credit : 6**
Category : Core IV **Hours/ week : 6**
Class & Major : I B.Sc Chemistry **Total Hours : 78**

Objectives:

To enable the students

- Acquire the basics in acids& bases, solid state, s-block element and metallurgy.
- Developing the structure determination skills in conformational analysis
- Validate the properties of acids& bases, solid state, s-block element and metallurgy

UNIT –I SOLUTIONS OF LIQUIDS IN LIQUIDS 16 Hrs

Raoult's law-Ideal solutions-deviations in ideal behaviors vapour pressure – composition and vapour pressure – temperature curves- fractional distillation of binary liquid solutions ,azeotropicmixtures. Distillation immiscible liquids , solubility of phenol-water system, aniline – hexane system, triethylamine-water system, nicotine- water system. **Solutions of gases in liquids**: Factors influencing solubility of a gas-Henry 'slaw.

UNIT-II STEREO ISOMERISM 16 Hrs

Definition –classification into optical and geometric isomerism. Optical isomerism: optical activity – optical and specific rotations–conditions for optical activity-asymmetric center-chirality-achiral molecules – meaning of (+) and (-) and D and L notations – Elements of symmetry. **Conformational Analysis:** Introduction of terms –conformers – configuration-dihedral angle-torsional strain-conformational analysis of ethane and n- butane including energy diagrams .conforms of cyclo hexane(axial and equatorial) mono and di substituted cyclo hexanes-1,2 and 1,3 interactions.

UNIT-III ALKANES & CYCLOALKANES 15 Hrs

Methods of preparation of alkanes-chemicalproperties-Mechanism of free radical substitution in alkanes.Preparation of cycloakanes using wurtz's reaction.Dieckman's ring closure & reduction of aromatic hydrocarbons. Substitution and ring opening reactions.

UNIT-IV METALLURGY **15 Hrs**

Extraction of metals- minerals-and ore difference-ore.dressing or concentration of ore- types of ore dressing-froth floatation- and magnetic separation refining of metals-types of refining electrolytic, Van Arkel and zone refining. Solid state: Crystal lattices-laws of crystallography-elements of symmetry-crystal systems-unit cell-space lattice-Bravais lattices-structure of NaCl-structure of CsCl-Miller's indices.

UNIT-V PROPERTIES OF S – BLOCK ELEMENTS **16 Hrs**

Periodic Properties of Alkali metals: Li, Na, K, Rb, Cs. Occurrence, comparative study of elements- oxides, halides, hydroxides and carbonates. Exceptional property of Li. Diagonal relationship of Li with Mg. Periodic Properties of Alkaline earth metals: Be, Mg, Ca, Sr, &Ba. Occurrence and comparative study of the elements.- oxides, hydroxides, halides, sulphates& carbonates. Exceptional properties of Be.Diagonal relationship of Be with Al.

Text Books

- Bahl.S and ArunBahl, *Advanced Organic Chemistry*, Revised Edition, S. Chand and Company Ltd, Ram Nagar,New Delhi, 2010.
- Madan.R.D, *Modern Inorganic Chemistry*, 3nd Edition, S.Chand& Company Limited, New Delhi, 2011.
- Puri.B.R, Sharma.L.R & Pathania M.S, *Principles of Physical Chemistry*, Millennium Edition, Vishal publishing & Co, Jalandhar, 2011.

Reference Books

- Malik W.U, Tuli G.D and Madan R.D, *Selected topics in inorganic chemistry*, 7th Edition, S.Chand Publications, New Delhi, 2012.
- Puri B.R, Sharma L.R, and Kallia K.C, *Inorganic Chemistry*, Milstone Publisher, New Delhi, 2006.
- Morrison R.T and Boyd, *Organic Chemistry*, VI Edition, Prentice Hall of India, New Delhi, 2006.
- Soni P.L, *Text book of physical chemistry*, 22ndRevised Edition, Sultan Chand, New Delhi, 2011.

UCHE204 FOOD CHEMISTRY

Semester	**: II**	**Credit**	**: 2**
Category	**: NME**	**Hours/Week**	**: 4**
Class & Major	**: I-UG**	**Total Hours**	**: 52**

Objectives:

To enable the students

- Acquire the knowledge of Chemistry in Foods
- Recognize the nutritional values of food
- Analyze the causes of food spoilage and adulteration

UNIT-I FOOD **8 Hrs**

Sources and types of food- Advantages and disadvantages - food preservation and storage. Calorific value of food.

UNIT-II ANALYSIS OF FOOD **10 Hrs**

Specification of drinking water- purification of water- zeolites, reverse osmosis – activated charcoal – chlorination – ozone – UV light disinfection – water borne- source and detection.

Composition of Milk – fat content in Milk whole & skimmed – Pasturation – Dairy products – cheese, butter – ghee and kova.

UNIT-III CARBOHYDRATE **15 Hrs**

Carbohydrate: classification. Sources & properties of glucose, fructose & sucrose - Manufacture of refining of sugar- Role of insulin. Storage of carbohydrate in body – photosynthesis – Digestion of cellulose by animals. Fats and oil :Source of oil – production and refining of vegitable oils – saturated and unsaturated fatty acids- Iodine value – Role of MUFA and PUFA in preventing heart diseases. Food additives: Definition – artificial sweetners – saccharin – food flavours – esters, aldehydes, heterocycles, compounds, - food colors – restricted uses. Emulsifying agents – baking powder – yeast – taste enhancer – MSG – Vinegar.

UNIT IV FAST FOOD AND BEVERAGES **10 Hrs**

Modern foods: Ingredients – and disadvantages of snack food – fast food – instant food – dehydrated food. Beverages: Soft drinks – soda – fruit juices and alcoholic beverages (types and content of alcohol) e.g. carbonation and addiction to alcohol composition and health hazards of soft drink. PAF, FPO, FDA, Drug licenses, WHO, standard, ISI, Specification, Packing and label requirements.

UNIT-V FOOD ADULTTERATION **9 Hrs**

Definition, classification – Common adulteration in food and their ill effects – Packing hazards-food additives. Food laws and standards- Bureau of Indian Standards- AGMARK- Consumer protection act.

Text Books

- Alex V. Ramani, *Food Chemistry*, MJP Publisher, 2009.
- Dr. Swaminathan M, *Handbook of food and Nutrition*, 5th Ed., Bangalore Printing and Publishing Co Ltd., Bangalore, 2007.
- Raheena Begum M, *A Text Book of Foods, Nutrition and Dietetics*, Sterling Publishers, Delhi, 2010.

Reference Books

- Jayashree Ghose, *Fundamental Concepts of Applied Chemistry*, 1st Ed., CBS Publishers and Distributors, New Delhi, 2006.
- Chopra H.K and Panesar P.S, *Food Chemistry*, Narosa Publisher, 2010.

UG Evaluation Component-III and IV

Semester	Course Code	Course Title	Component-III	Component-IV
I	UCHM104	Fundamentals of Chemistry	Molecular Model Preparation	Fun with Chemistry Experiments
	UCHM105	General Chemistry –I	Poster presentation	Open Book Quiz
	UCHM106	Analytical chemistry	Chart Preparation	You tube Presentation
II	UCHM202	General Chemistry –II	Poster presentation	Open Book Quiz
I	UCHA102	Chemistry for bio-chemistry	Poster presentation	Open Book Quiz
II	UCHE204	Food and Nutrition Chemistry	Food Adulteration testing experiments	Case study

COURSE PROFILE M.Sc (Chemistry)

Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credits	
					Min	Max
I	Core-I	PCHM107	Organic Chemistry-I	5	4	4
	Core-II	PCHM108	Inorganic Chemistry-I	5	4	4
	Core-III	PCHM109	Physical Chemistry-I	5	4	4
	Core Practical-I	PCHR203	Organic Practical	5	-	-
	Core Practical-1I	PCHR204	Inorganic Practical	5	-	-
	Non-Major Elective			5	4	4
			Total	**30**	**16**	**16**
II	Core-IV	PCHM204	Organic Chemistry-II	5	4	4
	Core-V	PCHM205	Inorganic Chemistry-II	5	4	4
	Core-VI	PCHM206	Physical Chemistry-II	5	4	4
	Core Practical-I	PCHR203	Organic Practical	5	5	5
	Core Practical-II	PCHR204	Inorganic Practical	5	5	5
	Non-Major Elective	PALE201/PALE301	Preparatory Course for NET/SET	5	4	4
	Service Learning	PCHX201	Vermicomposting	-	1	1
			Total	**30**	**27**	**27**
III	Core-VIII	PCHM301	Organic Chemistry-III	6	5	5
	Core-IX	PCHM302	Inorganic Chemistry-III	5	4	4
	Core –X	PCHM305	Physical Chemistry-III	5	4	4
	Core-XI	PCHM304	Research Methodology	5	4	4
	Core Practical –III	PCHR401	Physical Chemistry Practical	5	-	-
	Core	PCHP401	Project	2	-	-
	Value Education	PWSV301	Women's Studies	2	1	1
			Total	**30**	**18**	**18**
IV	Core-XIII	PCHM401	Organic Chemistry-IV	5	4	4
	Core-XIV	PCHM402	Inorganic Chemistry-IV	5	4	4
	Core-XV	PCHM404	Physical Chemistry-IV	5	4	4
	Core-XVI	PCHM405	Chemistry for UGC-NET and SET Exam	4	4	4
	Core Practical –III	PCHR401	Physical Chemistry Practical	5	6	6
	Core	PCHP401	Project	4	6	6
	Value Education	PWSV401	Women's Studies	2	1	1
			Total	**30**	**29**	**29**
			Grand Total	**120**	**90**	**90**

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course Code	Course Title	Hrs/Week	Credits	
					Min	Max
III	Core - XII	PCHM306	Textile Chemistry(Self Study Paper)	-	-	1
II	Core – VII	PCHI201	Internship	-	-	1

COURSES OFFERED TO OTHER DEPARTMENTS
NON MAJOR ELECTIVE

Semester	Category	Course Code	Course Title	Contact hrs/Week	Credits	
					Min	Max
I	NME	PCHE103	Environmental Science	5	4	4
		PCHE 104	Applied Chemistry	5	4	4

PCHM107 ORGANIC CHEMISTRY- I

Semester : I **Credits : 4**
Category : Core I **Hours/Week : 5**
Class &Major : I M.Sc Chemistry **Total Hours : 65**

Objectives:
To enable the students

- Recall the structure & reactivity in organic molecules.
- Develop the advanced reaction mechanism in aliphatic compounds.
- Deduce the structures of organic compounds in Stereo chemical aspects

UNIT-I STRUCTURE AND REACTIVITY 15 Hrs

Effect of structure on reactivity-resonance and field effects, steric effects. Generation reaction and stability of carbocation, carbanion, free radical, carbenes and nitrenes. Quantitative treatment-the Hammett equation and linear free energy relationship, substituent and reaction constant, Taft equation. Thermodynamic and kinetic requirement for reactions, thermodynamic and kinetic control reactions Hammonds postulate, Microscopic reversibility. Potential energy diagrams, transition states and intermediates, Methods of determining mechanisms-identification of products and determination of the presence of an intermediate, isotope labelling, isotope effects .

UNIT- II STEREOCHEMISTRY-I 14 Hrs

Homotopic, heterotropic- enantiotopic and diastereotopic. Fischer, Newmann and Sawhorse projections and their interconversion. Optical activity-Concept of chirality–biphenyls, allenes and spiranes. R and S notations. E–Z notation of olefins containing one double bond and multiple bond. Stereospecific and stereoselective synthesis with suitable examples, asymmetric synthesis – Racemisation, Resolution, Concept of enantiometric excess, asymmetric induction. Crams rule.

UNIT–III ALIPHATIC NUCLEOPHILIC SUBSTUTION REACTION 13 Hrs

S_N1, S_N2 and S_Ni reactions-mechanism, reactivity-effect of substrate, nucleophile, leaving group and medium. Neighboring group mechanism, nucleophilic substitution at an allylic carbon, aliphatic trigonal carbon, vinylic carbon, ambient nucleophile and substrate. Reactions-Hydrolysis of epoxides, amides, dehydration of alcohols, trans esterifications, alcoholysis of epoxides, alkylation of onium salts, acyloxy-dehalogenation, alkylation of amines, trans amination, amination of epoxides and alkanes. Darkin reaction, Etard reaction, Stark Enamine reaction, Mannich reaction,Ullmann reaction, Wilsmeiyer reaction.

UNIT–IV ELIMINATION REACTIONS 12 Hrs

E_1,E_2,E_1CB mechanism, reactivity- substrate, attacking base, leaving group and medium.

Mechanism and orientation of the pyrolytic and conjugate elimination. Reactions-dehydrohalogenation, dehydrogenation, cleavage of ethers, quaternary ammonium hydroxide, amine oxide. Chugaev reaction, elimination of boranes.

UNIT-V CARBOHYDRATES 11 Hrs

Classification of carbohydrates, reactions of glucose, fructose, cyclic structure and configuration of monosaccharides – Haworth representation – Fischer projection formula – Structure & reactions of Starch & Celloulose.

Text Books

- Jerry March. M.B, *Advanced Organic Chemistry*, 7th edition, John Wiley & Sons.NewYork, 2012.
- Ernest L.Eliel, *Stereochemistry of Carbon Compounds*, T.M.H Edition,TataMcGraw-Hill Publishing Company,NewDelhi,2011.
- Finar. I.L, *Organic Chemistry Volume I & II*, 5th edition, ELBS Publication, 2009.

Reference Books

- Francis Carey, *Organic Chemistry*, 5th edition, McGraw Hill Company, New York, 2010.
- Peter Sykes, *a guide book to mechanism in organic chemistry*, 6th edition, Orient Longman, London, 2003.
- Kalsi. P.S, *Stereochemistry-Conformation & mechanism*,7th Edition, Newage Interanational publishers, Newyork, 2012.
- Nasi Puri.D, *Stereochemistry of Organic Compounds: Principles and Applications*, 3rd Edition, New Age International, 2004.

PCHM108 INORGANIC CHEMISTRY– I

Semester : I **Credit : 4**
Category : Core II **Hours/ week : 5**
Class&Major : I M.Sc Chemistry **Total Hours : 65**

Objectives:
To enable the students

- Recognize the properties of Periodicity.
- Interpolate the properties in bonding nature of the compounds.
- Assess the various types of coordination compounds using p- block element

UNIT–I ATOMIC STRUCTURE AND PERIODIC PROPERTIES 15 Hrs

Atom as nucleus with orbital electrons, concept of wave-functions, quantum numbers, shape of orbitals and their radial distribution functions, electronic configuration of atoms, Afbhau Principle, Pauli Exclusion Principle, and Hund's rule. Slater's rules for the determination of screening constants. Arrangement of elements in Groups in the Periodic Table. s-block, p-block, d-block and f-block elements; periodic properties- ionic radii, ionization potential, electron affinity, electronegativity(Pauling and Mulliken scale).

UNIT-II CHEMICAL BONDING 12 Hrs

Types of bonds- ionic, covalent, metallic and coordinate bond. MO and VB theory. Concept of hybridization, the extent of d- orbital participation in molecular bonding, bond energy and bond order, concept of resonance, dipole moment. Fajan's rule. Lattice energy –Born Haber Cycle, Born Lande Equation – Kapustinski Equation .

UNIT–III COORDINATION CHEMISTRY-I 13 Hrs

Werner's Theory, EAN rule, VBT, Crystal Field Theory, crystal field splitting, application of d-orbital splitings to explain magnetic properties, low spin and high spin complexes, crystal field stabilization energy, spectrochemical series, thermodynamic and related aspects of crystal fields, ionic radii, lattice energies, site preference energies. MO theory of complexes (quantitative principles involved in complexes with no pi and with pi bonding) and ligand filed theories and molecular symmetry, angular overlap model, John Teller effect, electronic spectra of transition metal complexes, Orgal and Tanabe-Sugano diagrams, charge transfer and d-d transitions, nephelauxetic series.

UNIT–IV COORDINATION CHEMISTRY-II 12 Hrs

Substitution reactions in square planar and octahedral complexes - the rate law for nucleophilic substitution in a square planar and octahedral complex, inert and labile compounds. The trans effect - theories of trans effect- mechanisms of redox reactions - outer sphere mechanisms - inner sphere mechanisms - mixed valance complexes. Stepwise and overall stability constant, irving William series, factors affecting the stability, determination of stability constant – spectrophotometric, solubility, electrochemical, polorograpic and job's method.

UNIT–V STRUCTURE AND PROPERTIES OF SOME COMPOUNDS OF P-BLOCK ELEMENTS 13 Hrs

Synthesis, properties and structures of Boron hydrides (small boranes and their anions, B_1-B_4), boron nitride, borazines, carboranes, metalloboranes, metallocarboranes; silicates, silicones, diamond, graphite, zeolites. Nitrogen, Phosphorous, Sulphur and noble gas compounds- Hydrides, oxides and oxy acids of Nitrogen, Phosphorous, Sulphur and halogens. Phosphazines, Sulphur-Nitrogen (S_4,N_4)compounds, inter halogen compounds, pseudo halogens, noble gas compounds of Xenon.

Text Books

- Lee .J.D, *A New Concise Inorganic chemistry*, 5th Edition, ELBS, New Delhi, 2012**.**
- James .E. Huheey, *Advanced InOrganic Chemistry*, Fourth Edition, Harper& Collins, New York, 2005.

Reference Books

- Purcell. K.F & Kotz. J.C**,** *Inorganic Chemistry***,** W.B.Saunders Co, USA, 2012.
- Shriver .D.F, Atkins P.W, Langford C. H., *Inorganic Chemistry*, ELBS, New Delhi, 2009.
- Cotton .F.A. & Wilkinson.G, *Advanced Inorganic Chemistry, A Comprehensive Textbook*, Fifth Edition, John Wiley & Sons, 2011.

PCHM109 PHYSICAL CHEMISTRY – I

Semester : I **Credit : 4**
Category : Core–III **Hours/ week : 5**
Class & Major : I-M.Sc Chemistry **Total Hours : 65**

Objectives:

To enable the students

- Acquire the knowledge of thermodynamics, quantum and photochemical reactions.
- Deduce the Quantum mechanics & photo chemical reactions.
- Assess the properties of kinetic and photochemical reactions.

UNIT-I QUANTUM CHEMISTRY–I **13 Hrs**

Inadequacy of classical mechanics, Black body radiation, Planck's quantum concept, Photoelectric effect. Bohr's theory of hydrogen atom :Hydrogen spectra, Wave-particle dualism, Uncertainty principle, Inadequacy of old quantum theory. Schrödinger equation, Postulates of quantum mechanics. Operator algebra: operator, linear and hermitian, eigen functions and eigen values, angular momentum operator, commutation relations, related theorems.

UNIT-II CLASSICAL THERMODYNAMICS **14 Hrs**

Thermodynamics of systems of variable composition – partial molar properties – chemical potential, relationship between partial molar quantities - Gibb's Duhum equation–Calculation of partial molar quantities from experimental data. Thermodynamic properties of real gases, Fugacity concept – calculation of fugacity of real gas – activity and activity coefficient concept – definition – standard states and experimental determination of activity and activity coefficient of non-electrolyte Phase rule : Phase rule -three component system, systems of three liquids – solid, liquid systems(eutectic systems and two salts and water)

UNIT-III STATISTICAL THERMODYNAMICS **13 Hrs**

Bohr-Einstein, Fermi-Dirac, Maxwell-Boltzmann statistics and distribution, ensembles, partition functions and molecular partition functions, mean energy, residual entropy, heat capacity of mono and diatomic gases, chemical equilibrium, Einstein and Debye theories of heat capacity of solids. Non-equilibrium thermodynamics- Postulates and methodologies, linear laws, Gibbs equation, Onsager reciprocal theory.

UNIT-IVCHEMICAL KINETICS **13 Hrs**

ARRT, Potential energy surface – Partition function and activated complex – Eyring equation – calculation of free energy, enthalpy and entropy of activation and their significance. Kinetic isotopic effects – linear free energy relationship – Hammet and Taft equation. Kinetics of complex reactions, reversible reactions, consecutive reactions, parallel reaction, chain reactions, general treatment of chain reactions – chain length – Rice Herzfeld mechanism – Super fast reactions, relaxation method , stopped flow and flash photolysis.

UNIT-V PHOTOCHEMISTRY **12 Hrs**

Absorption & Emission of Radiation – Frank condum principle – Decay of electronically excited phosphorescence – Spin Forbidden radiative transition – Internal conversion & Intersystem crossing (ISC) – Energy transfer process – Excimers & exciplexes – Static & Dynamic quenching –

Stern-Volmer Equation. Quantum Effeciency and life time measurements – steady state principle – Quantum yield and chemical actinometry- kinetics of photochemical reactions – hydrogen and halogen reactions, photo redox , photo substitution, photo isomerization and photo sensitizied reactions.

Text Books

- Rajaram .J & Kuriacose .J.C, *Thermodynamics for Students of Chemistry*, LalNagin Chand, NewDelhi, 2005.
- Atkins P.W, *Physical chemistry*, Ninth Edition,Oxford University Press, 2010.
- Rohatgi.K.K, Mukerherjee, *Fundamentals of Photochemistry***,** Wiley Eastern Ltd,New York, 2006.

Reference Books

- Moore .W.J, *Physical Chemistry*, Orient Long man,London,2009.
- McClelland. B.C**,** *Statistical Thermodynamics*, Chapman& Hall,London,2006.
- P.W.Atkins., *Quantum Chemistry*,Oxford Chemistry Series,2004

PCHR203 ORGANIC PRACTICAL

Semester : I & II **Credit : 5**
Category : Core Practical –I **Hours/Week : 5+5**
Class & Major : I-M.Sc Chemistry **Total Hours : 130**

Objectives:

To enable the students

- Acquire the skills in the Estimation & Preparation of organic compounds.
- Analyze the various isolation techniques

I. Extraction

1. Isolation of lactose from milk(Demo)
2. Isolation of caffine from tea dust (Demo)
3. Isolation of citric acid from lemon.

II. Qualitative Analysis

Identification of components in a two component mixture and preparation of the derivative.

III. Functional group inter conversion

a)Single stage

1. Hydrolysis.
2. Oxidation.
3. Reduction.
4. Nitration.
5. Acetylation

b) Double stage

1. Hydrolysis
2. Nitration

IV .Estimation

1. Estimation of Phenol.
2. Estimation of Aniline.
3. Estimation of Glucose.
4. Estimation of Ketone.
5. Estimation of Iodine, Saponification & Acetyl value of oil. (Demo)

V. Chromatographic Separations (demo)

1. Column Chromatography- Separation of Anthracene and Picric acid from anthrancene picrate.

2. TLC Separation of green leaf pigments

VI. Determination of physical constants (Melting Point)

Note: Two sets of Questions can be given for End Semester Examination as the following lot system

1. Qualitative Analysis and preparation.

2. Estimation and preparation.

Text Books

- Dr.Gnanaprgasam.N.S and Ramamoorthy.G, *Organic Chemistry Lab Manual*, S.Viswanathan printers & Publishers Pvt.Ltd., 2008.
- Glasstone.S, *Statistical Thermodynamics***,** Affliated EastWest Press, NewDelhi, 2010.

Reference Books

- Thomas .A.O, P*ractical Chemistry,* Scientific Book Center, Cannanore,2005.
- Vogel's, *Text Book of Practical Organic Chemistry,* Longman, London,2009.

PCHR204 INORGANIC PRACTICAL

Semester	**: I & II**	**Credit**	**: 5**
Category	**: Core Practical -II**	**Hours/Week**	**: 5 +5**
Class&Major	**: I M.Sc Chemistry**	**Total Hours**	**: 130**

Objectives:

To enable the students

- Formulate the preparation of inorganic complexes.
- Develop the skills to separate and analyze the inorganic compounds.

- Analyze the metal or ions present in the compound or substance by volumetrically or gravimetrically.

I. Semi Micro Qualitative analysis of mixture containing two common and two rare cations.

The following are the rare cations to be included. W, Ti, Mo, Te, Se, U,Th, Ce, Zr, V, Li, & Be.

II. Preparation of the following Complexes:

1. Potassium tris(oxalato) Chromate(III)
2. Bis(acetyl acetanato)copper (II)
3. SodiumBis (Thiosulphato)Cuprate(II)
4. Tris (thiourea) Copper(I)chloride

III. Estimation of metal ions by Volumetric and Gravimetrical analysis.

1. Estimation of copper and sulphate ion.
2. Estimation of Manganese and Nickel
3. Estimation of copper and Zinc.
4. Estimation of Calcium and Magnesium.

IV. Spectro photometry (only for demonstration)

1. Estimation of Iron.
2. Estimation of Nickel.
3. Estimation of Copper.
4. Estimation of Manganese.

Note: Two sets of Questions can be given for End Semester Examination as the following lot system

1. Semi micro qualitative analysis and preparation.
2. Estimation of metals by Volumetry & Gravimetry and preparation.

Text Book

- Ramanujam. V, *Inorganic Semi Micro Qualitative Analysis,* The National publishing Company, New Delhi, 2009.

Reference Books

- Thomas A.O, *Practical Chemistry,* Second Edition, Scientific Book Center, Cannanore, 2005.
- Venkateswaran. V, Veerasawamy & Kulandaivelu.A. R, *Basic principles of Practical Chemistry,* S. Chand & Sons publications, New Delhi, 2010.

PCHM204 ORGANIC CHEMISTRY- II

Semester : II **Credits : 4**
Category : Core IV **Hours/Week : 5**
Class&Major : I-M.Sc Chemistry **Total Hours : 65**

Objectives

To enable the students

- Analyze the advanced reaction mechanism in aromatic compounds.
- Predict the chemistry of Hormones.
- Synthesize to extract terpenoids from natural products.

UNIT–I AROMATICITY 12 Hrs

Huckel's and Craigs rule. Aromaticity of benzenoid, heterocyclic and non-benzenoid compounds, aromatic systems with pi electron compounds- other than six pi electrons, non–aromatic and anti aromatic systems, systems with more than 10 pi electrons-annulenes.

UNIT-II AROMATIC NUCLEOPHILIC SUBSTITUTION REACTION 13 Hrs

Introduction – S_NAR, Benzyne mechanism –Reactivity – Effect of substrate, structure, leaving group, attacking nucleophile and solvent. Reactions of hydroxy deamination, oxido-desulphanate substitution, alkoxy dehalogenation, amino dehydroxylation, Rosenmund ,Vonbrown reaction, amination by hydroxylamine, hydroxy deazotisation - Scheiman reaction, Bucherer reaction Goldberg reaction, Nencki reaction, Ullmann reaction and Chichibabin reaction.

UNIT–III AROMATIC ELECTROPHILIC SUBSTITUTION REACTION 13 Hrs

The arenium ion mechanism. Orientation and reactivity (ortho, para and meta directing groups). Typical reactions-Sulphnation,Nitration, Halogenations,Fridel Craft Acylation and Alkylation, diazocoupling, Reimer- Tieman reaction, Vilmesyer – Hack, Gattermann – Koch and Kolbe reaction.

UNIT–IV STEREOCHEMISTRY-II 14 Hrs

Conformation analysis of simple cyclic(chair and boat cyclohexanes) and acyclic(n-butane) systems, strain theories, conformation of simple1,2-disubstituted derivatives–ethylene chlorohydrins and ethylene glycol, Conformational analysis and stereochemical aspects of mono and disubstituted cyclohexanes(1,2;1,3;1,4-dialkylcyclohexanes), conformation and stereochemistry of cis and trans decaline, effects of conformation on reactivity in acyclic and cyclohexanes. Optical rotatory dispersion and Circular Dichroism, Octant rule, Cotton effect.

UNIT-V TERPENES AND STEROID 13 Hrs

Occurrence, Nomenclature, classification and isolation of terpenes, Isoprene rule, Gem dialkyl rule, General methods of structural elucidation. Structural elucidation of limonene, fenchone, Zingiberene. Nomenclature and classification of steroids and Hormones. Structural elucidation of Cholesterol (synthesis not required), ergosterol, stigmasterol.

Text Books

- Ernest L.Eliel, *Stereochemistry of Carbon Compounds,* T.M.H Edition, TataMcGraw-Hill Publishing Company,NewDelhi,2011.
- Jerry March, *Advanced Organic Chemistry,* 7th edition, John Wiley & Sons, NewYork, 2012.

- Finar .I.L, *Organic Chemistry, Volume I & II*, 5th edition, ELBS Publication, 2007.

Reference Books

- Kalsi P.S, *Stereochemistry-Conformation & mechanism*, 7th Edition, Newage Interanational publishers,Newyork,2012.
- Mukerjee .S.M and Singh .S.P, *Organic reaction mechanism*, McMillan India Ltd., Chennai, 2010.
- Ahluwalia .V.K., *Organic Reaction Mechanism*, 4th edition, Narosa Publishers, 2011.

PCHM205 INORGANIC CHEMISTRY – II

Semester : II **Credit : 4**
Category : Core-V **Hours/ week : 5**
Class & Major: I M.Sc Chemistry **Total Hours : 65**

Objectives:

To enable the students

- Recognize the bonding of inorganic & organo- metallic compounds.
- Interpret the arrangements of ions in the structure from various solid substances.
- Deduce the photochemistry of inorganic compound and function of bio-inorganic compounds.

UNIT- I CHEMICAL BONDING 13 Hrs

Hard and Soft acids and bases- classifications. Acid-base strength, hardness, symbiosis. Theoretical basis of Hardness and Softness, applications of HSAB. Polyacids, Isopolyacids of V,Cr,Mo and W. Heteropolyacids of Mo and W(only structural aspects). Chelate effects and factors affecting. Macrocyclic complexes and template effect.

UNIT – II ORGANOMETALLIC COMPOUNDS 13 Hrs

Compounds with transition metal to carbon bonds: classification of ligands, nomenclature, 18 electron rule, transition metal carbonyls. Structure, bonding, preparation, reactions of organometallics(Fe, Zn, Cr, V, Mo). Metal alkyls, metal alkylidenes and metal alkylidynes - Structure and bonding.

UNIT-III SOLID- STATE CHEMISTRY 12 Hrs

Defects in solids- Point defects, line defects and surface defects, Dislocations-Non-stoichiometric compounds. Solid state reactions – Types & examples. Magnetic properties of solids (low and high temperature), high temperature superconductors, use of X-ray powder data in identifying inorganic crystalline solids. Details for cubic systems. Structures of NiAs, CdI_2, Pervoskite, rutile, fluorite and antifluorite, zinc blende and wurtzite.

UNIT –IV PHOTOCHEMISTRY OF INORGANIC SYSTEMS 15 Hrs

Electronic transitions in metal complexes, Jablonski diagram, metal-centered and charge-transfer transitions – Various photophysical and photochemical processes of coordination compounds – Unimolecular charge-transfer photochemistry of cobalt (III) complexes.Mechanism of CTTM photoreduction. Ligand-field photochemistry of chromium(III) Complexes. Adamson's rules, photoactive excited states, V-C model – photophysics

and photochemistry of ruthenium-polypyridine complexes, emission and redox properties – photochemistry of organometallic compounds, metal carbonyl compounds, compounds with metal-metal bonding Reinecke's salt chemical actinometer.

UNIT-V BIOINORGANIC CHEMISTRY 12 Hrs

Transport proteins: Oxygen carriers, metalloenzymes, carbonyl peptidase, carbonic anhydrase, redox process, iron-sulphur proteins, chlorophyll, salient features of the photo synthetic process, vitamin B_{12} role of sodium, potassium, calcium, zinc and copper; fixation of nitrogen cycle. Anti-cancer drugs and their mechanism of action,

Text Books

- James Huhey, *Inorganic Chemistry*, Fourth Edition, Harper & Collins, NewYork, 2005.
- Cotton .F.A. & Wilkinson.G, *Advanced Inorganic Chemistry, A Comprehensive Textbook,* Fifth Edition, John Wiley & Sons, 2011.

Reference Books

- Purcell. K.F & Kotz. J.C**,** *Inorganic Chemistry***,** W.B.Saunders Co, USA, 2012.
- Powell. P, *Principles of Organometallic Chemistry*, Chappman & Hall, 2006.
- Manku.G.S, *Theoretical principles of Inorganic Chemistry***,** McGraw Hill, Education, 2005.
- Shriver D.F, Atkins .P.W, Langford .C. H, *Inorganic Chemistry*, ELBS,New Delhi, 2009.

PCHM206 PHYSICAL CHEMISTRY - II

Semester	**: II**	**Credit**	**: 4**
Category	**: Core-VI**	**Hours/ week**	**: 5**
Class & Major	**: I M.Sc Chemistry**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Understand the fundamentals of group theory and identify the point group in the molecules.
- Analyze different chemical reaction occurring in electrode and electrochemistry.
- Apply the wave mechanics to simple system..

UNIT-I QUANTUM CHEMISTRY II 13 Hrs

Approximation methods – Perturbation and variation methods – application to hydrogen and helium atom- spin orbit interaction – LS coupling and JJ coupling- Term symbols and spectroscopic states. Ground state term symbols for simple atoms. Applications of wave mechanics to simple systems – particle in a box, one and three-dimensional box.

UNIT–II ELECTROCHEMISTRY 13 Hrs

Introduction to electrochemistry- Mean ionic activity & Mean ionic activity co- efficient - determination of activity co-efficient. Debye- Huckel limiting law- verification and limitation of

Debye –Huckel limiting law - Debye- Huckel- Bronsted equations. electrolyte interface--electrical double layer – electro capillary phenomenon – Lippmann equation- structure of Helmholtz double layer – Guoy, Chapman & stern model of electrical double layers. Diffusion – Fick's law of diffusion – effect of ionic association on conductance – electro kinetic phenomena – membrane potential.

UNIT-III KINECTICS OF ELECTRODE PROCESSES 13 Hrs

Essential of electrode reactions – current density – over potential, Tafel equation, Butler-Volmer equation. Standard rate constant (Ko) and Transfer Co-efficient(a),exchange current. Irreversible Electrode process- criteria for irreversibility, Information from irreversibile wave. Determination of kinetic parameters by koutchey and Geling's method.

UNIT- IV GROUP THEORY -I 13 Hrs

Elements of group theory-Definition- symmetry elements and operations conjugate classes-conjugate and normal sub groups- -point group- group multiplication tables - assignment of point groups to molecules. Matrix representation of geomentric transformation and point groups. Reducible & Irreducible representations- properties of irreducible representation-direct product-symmetry adapted linear combinations-projection formula.

UNIT-V GROUP THEORY –II 13 Hrs

Orthogonality theorem and its consequences-construction of character table for C_{2v} & C_{3v} hybrid orbitals in non-linear molecules (CH_4,XeF_4,BF_3,SF_6 & NH_3)Determination of representations of vibrational modes of non linear molecules (H_2O, and NH_3). Symmetry selection rules of infra red and Raman spectra. Application of group theory in predicting the structure of the molecule.

Text Books

- Glasstone.S, *Introduction to Electrochemistry***,** Affliated EastWest Press, NewDelhi,2010.
- Chandra.A.K, *Fundamentals of Quantam chemistry*, Kluwer Academic publishers, 2011.
- Cotton. F**.**A, *Chemical Applications of Group theory***,** John Wiley, NewYork,2011.

Reference Books

- Thinham.N., *Group Theory & Quantum Mechanics*, McGrawHill Book Company, NewYork, 2005**.**
- Crow D.R, *Principles & Applications to Electrochemistry***,** Chappman& Hall,2008.
- Laidler .R.J, *Chemical Kinetics***,** Harber & Row, NewYork, 2005.
- P.W.Atkins., *Quantum Chemistry*, Oxford Chemistry Series,2004

PCHX201 VERMICOMPOSTING

Semester : II **Credit : 1**
Category : Service Learning **Total Hours : 40hrs**
Class &Major : I- M.Sc Chemistry
Target Group : Villagers in the age Group of 20-50yrs

Objectives:
To enable the students

- Create awareness about utilization of Natural fertilisers to the society.
- Implement Vermicomposting at a small scale.

UNIT – I INTRODUCTION **8 Hrs**

Definition – Usage – Advantage of Over Artificial Fertilisers,Ingredients **Activity:** Spreading awareness on Vermicomposting

UNIT–II BIO-DEGRADABLE & NON BIODEGRADABLE **8 Hrs**

Introduction,Organic waste , Difference in Biodegradable & non-biodegradableCommon items suitable for Biocomposting: Clean Paper, Dried net, Egg Shell, Leaves Garden Trimming, Fruits & vegetables wastes, Coffee & Tea extract. **Activity:** Separation & Collection of Biodegradable & non-Biodegradable.

UNIT–III VERMI GROWTH **8 Hrs**

Earthworm – Introduction-Nature of Soil required – Easily usable waste – Factors affecting growth of the Vermi.**Activity:** Vermi Growth in Soil-Earthworm

UNIT-IV VERMICOMPOSTING METHOD **8 Hrs**

Grub composting – Compost Tea – Humanure – Vermicompost – Bokashi composting Common. Activity: Carrying out the Methods & Identifying the most effective method to be used

UNIT–V FEEDBACK & RESULT FROM SOCIETY **8 Hrs**

Evaluation of Results & difference in Plant growth with Vermicompost oral & written feedback from Villagers. **Activity:** Measurement of Plant Growth Assessment of utilization of household waste.

Reference Books

- Thompson. P.M, Das .S.A, K.C, *Bioresource Technology*, 2005.
- Nancarrow, Loren and Janet Hogan Taylor, *The Worm Book*, Ten Speed Press, 2007.
- Logsdon, Gene. *Worldwide Progress in Vermicomposting* Biocycle, October, 2009.

PCHE103 ENVIRONMENTAL SCIENCE

Semester	**:I**	**Credit**	**: 4**
Category	**: Non-Major Elective**	**Hours/Week**	**: 5**
Class & Major	**: I PG**	**Total Hours**	**: 65**

Objectives:
To enable the students

- Impart the knowledge of Environmental impact in the society
- Analyze the environmental effects & remedial measures.
- Generalization of chemistry involved in various environmental issues

UNIT–I ECOLOGY **13 Hrs**

Ecosystem ; Biome & ecosystem ; Energy flow through the ecosystem ; Food chain& webs ; Ecological pyramids ; Biological Magnification Hydrologic Cycle, carbon cycle, oxygen cycle, nitrogen cycle, phosphorus cycle, sulphur cycle,forest ecosystem.

UNIT-II ENERGY RESOURSE **13 Hrs**

Global Energy Consumption ,Conventional sources of energy for Man- kind, Biomass or Dried organic matter, Fossil Fuels or Coal , Oil and Natural gas, Nuclear energy – NuclearPower Generation ,The Potential of Fusion Reaction, Hydro Electric power. The Dependence of Human Society on Fossil Fuels. Non –Conventional energy sources . Alternative sources of energy for man - kind ,Wind power , Energy from oceans - Tidal Energy,, Energy of waves,hermal energy of oceans. Geo – thermal energy. Direct use of solar energy, Bio- mass based energy- Bio –gas, petroplants, Dendrothermal Energy. Hydrogen as the future fuel.

UNIT-III POLLUTION BY HYDRO CARBON **13 Hrs**

Oil spills, Natural oil seeps , Problem Associated with crude petroleum pollution ;-Light and medium Fraction of crude oil . Heavier Fraction, Greases, Waxes and Tar. Ecological problems caused by crude Petroleum,Fate of crude petroleum in marine environment, Oil spill Cleaning operations.

UNIT-IV SOLID WASTE MANAGEMENT **13 Hrs**

Management of solid wastes Resistant to Degradation ; (1)Handling of the problem of Leachates (2) Disposal of solid wastes Resistant to Degradation (i) Incineration (ii) Pyrolysis and verification of solid wastes (iii) Microbial Degradation (iv) Sorting and Recycling of solid wastes resistant to degradation.

UNIT – V SCIENCE OF ENVIRONMENT **13 Hrs**

Introduction , Method of Expressing , Pollutant concentration , Particle Dispersion, Stoichiometry, Acid – Base Reaction , Colloaids , Mass balance Reactor for waste Treatment, Basics of Microbiology,Environmental Quality Objective, Policies on Development project and their impacts.

Text Books

- Asthana .D.K & Meera Asthana, *Environment: Problems and solutions*, S. Chand & company,New Delhi, 2006.
- Benny Joseph, *Environmental studies*, Tata McGraw Hill, New Delhi, 2005.

Reference Books

- Rajamannar, *Environemntal Studies*, Evr College Pub, Trichy, 2005.
- Kalavathy.S., *Environmental Studies*, Edition 2004, Bishop Heber College Pub, Trichy, 2008.

PCHE104 APPLIED CHEMISTRY

Semester : I **Credit : 4**
Category : Non-Major Elective **Hours/Week : 5**
Class & Major : I PG **Total Hours : 65**

Objectives:

To enable the students

- Provide basic knowledge in chemistry involved in daily life
- Recognizes the uses of food and nutrition
- Implications of chemistry in pharma drugs and fertilizers

UNIT-I GENERAL SURVEY OF CHEMICALS USED IN EVERYDAY LIFE 13 Hrs

General Survey of chemicals used in everyday life. Cosmetics –talcum powder, tooth paste, Shampoo, Nail polish, perfumes, Soaps and detergents, - General formation and preparation – hazards of cosmetic use.

UNIT – II FOOD AND NUTRITION 13 Hrs

Food and nutrition – carbohydrates, proteins, fats, minerals and Vitamins – Definition, sources and their physiological importance – balanced diet. Adulterants – in milk, ghee, oil, coffee powder, tea, asafoetida, chilli powder, pulses and turmeric powder – identifications.

UNIT – III CHEMICALS IN FOOD PRODUCTION 13 Hrs

Chemicals in food production – Fertilizers in used in natural sources – Fertilizers – urea, NPK and super phosphates – needs, uses and hazards.

UNIT- IV POLYMERS 13 Hrs

Plastics, polyethene, PVC, Bakelite, Poly esters, resins – properties and applications. Natural Rubber, synthetic rubber- vulcanization – definition and its applications – Color chemicals used in food – soft drinks- and its health hazards.

UNIT – V DRUGS 13 Hrs

Pharmaceutical drugs – analgesics and antipyretics – antibiotics – definition, examples and its applications. Antiseptics – disinfectants, definition, examples and applications. Explosives – classification and its examples.

Text Books

- Sharma B.K, *Industrial Chemistry*, 1st Edition, Goel Publication, Meerut.2006.
- Charabarthy B.N., *Industrial Chemistry*, 1st Edition., Oxford and IBH Publishing, New Delhi,2007.

Reference Books

- Gowariker V.P. and Viswanathan N.V, *Polymer Science*, 1st Edition, Wiley Easter Pvt. Ltd., New Delhi, 2005.
- Ghosh, Jayashree, *Text Book of Pharmaceutical Chemistry*, 3rd Edition, S.Chand & Co. Ltd., New Delhi, 2008.
- Krishnamoorthy, P. Vallinayagan & K. Jaya Subramanian *Applied Chemistry*, 2nd Edition, Tata MaGraw-Hill Publishing Co. Ltd., New Delhi, 2007.

PG Evaluation Component-III and IV

Semester	Course Code	Course Title	Component-III	Component-IV
I	PCHM104	Organic Chemistry-I	Mechanism Writing	Power Point Presentation
	PCHM105	Inorganic Chemistry-I	Problem solving	Preparation of Question bank
	PCHM106	Physical Chemistry-I	Problem solving	Power Point Presentation
	PCHE103 PCHE104	Environmental Science Applied Chemistry	Poster Presentation Problem Solving	Field Survey Report Paper Presentation
II	PCHM204	Organic Chemistry-II	Mechanism Writing	Paper presentation
	PCHM205	Inorganic Chemistry-II	Problem solving	Power Point Presentation
	PCHM206	Physical Chemistry-II	Problem solving	Power Point Presentation

COURSE PROFILE B.Sc. (Mathematics)

Preamble

UG : Course Profile, list of courses offered to other departments & the syllabi of courses offered in the first two semesters. (With effect from batch 2015-2016 onwards)

PG : Course Profile, list of courses offered to the other departments & the syllabi of courses offered in the first two semesters. (With effect from batch 2015-2016 onwards) and

M.Phil : Course Profile & the syllabi of courses offered in the first two semesters. (With effect from batch 2015-2016 onwards) are presented in this booklet.

Semester	Part	Category	Course code	Course Title	Contact Hrs/ week	Credit	
						Min	Max
I	I	Language	UTAL105/UTAL106/ UHIL101/UFRL101	Basic Tamil-I/Advanced Tamil-I/Hindi-I / French-I	4	2	3
	II	English	UENL107/ UENL108	Basic English-I/ Advanced English-I	5	3	4
	III	Core I	UMAM103	Fundamentals of Mathematics	2	1	1
	III	Core II	UMAM104	Differential calculus	5	4	4
	III	Core III	UMAM105	Analytical Geometry	6	5	5
	III	Allied	UMAA111	Mathematical Statistics	6	5	5
	IV	Value Education			2	1	1
TOTAL					30	21	23
II	I	Language	UTAL205/UTAL206/ UHIL201/UFRL201	Basic Tamil II/ Advanced Tamil-II/ Hindi-II /French-II	4	2	3
	II	English	UENL207/UENL208	Basic English II/ Advanced English II	5	3	4
	III	Core IV	UMAM204	Integral Calculus	5	5	5
	III	Core V	UMAM402/ U MAM205	Graph Theory	5	4	4
	III	Core VI	UMAM606/ UMAM206	Discrete Mathematics	5	4	4
	IV	Non Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education			-	1	2
TOTAL					30	22	25
III	I	Language	UTAL305/UTAL306/ UHIL301/UFRL301	Basic Tamil III/ Advanced Tamil-III/ Hindi-III /French-III	4	2	3
	II	English	UENL307/UENL308	Basic English III/ Advanced English III	5	3	4
	III	Core VII	UMAM302/ UMAM301	Differential Equation	**5**	**4**	**4**
	III	Core VIII	UMAM305	Statics	4	4	4
	III	Allied	UCSA303	Mathematical Programming in C	3	3	3
	III	Allied Practical	UCSR305	Mathematical Programming in C Practical	3	2	2
	IV	Non Major Elective			4	2	2
	IV	Value Education			2	1	1
TOTAL					30	21	23

IV	I	Language	UTAL405/UTAL406/ UHIL401/UFRL401	Basic Tamil IV/ Advanced Tamil-IV/ Hindi-IV/French-IV	4	2	3
	II	English	UENL407/UENL408	Basic English IV/ Advanced English IV	5	3	4
	III	Core IX	UMAM405	Applications of Mathematics	4	3	3
	III	Core X	UMAM403	Dynamics	5	4	4
	III	Core XI	UMAM404	Mathematical modeling	5	4	4
	III	Allied	UPHA402	Electronics for Mathematics	3	3	3
		Allied Practical	UPHR404	Electronics for Mathematics Practical	2	2	2
	IV	Soft Skill			2	1	1
	V	Extension programme/ Physical Education			-	-	2
				TOTAL	30	22	26
V	III	Core XII	UMAM501	Modern Algebra	6	5	5
	III	Core XIII	UMAM505	Sequence And Series	6	5	5
	III	Core XIV	UMAM602/ UMAM507	Complex Analysis	5	5	5
	III	Allied	UCSA507	Object Oriented Programming Using Java	3	3	3
		Allied Practical	UCSR508	Object Oriented Programming Using Java	3	2	2
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
				TOTAL	30	25	25
VI	III	Core XV	UMAM610	Fuzzy Set Theory	5	5	5
	III	Core XVI	UMAM608	Operations Research	6	6	6
	III	Core XVII	UMAM604	Linear Algebra	6	6	6
	III	Core XVIII	UMAM607	Real Analysis	6	6	6
	III	Major optional	UMAO604	MAT lab for beginners	5	4	4
			UMAO605	Numerical Methods using Java			
	III	Comprehensive Viva	UMAC601		-	1	1
	IV	Soft Skill			2	1	1
	V	Extension programme/ Physical Education			-	-	2
				TOTAL	30	29	31
				GRAND TOTAL	180	140	153

Extra Credit Earning Provision

Semester	Part	Category	Course code	Course Title	Contact Hrs/ week	Credit	
						Min	Max
II	III	Core	UMAI201	Summer Internship	-	-	1
IV	III	Core	UMAI401	Summer Internship	-	-	1
VI	III	Core	UMAM609 UMAS601 UMAS602 UMAS603	Mini project Fourier and Z –Transforms Simulation Number Theory(Self study Paper)	-	-	1

COURSES OFFERED TO OTHER DEPARTMENTS-UG ALLIED

Class & Major	Semester	Category	Course Code	Course Title	Contact Hrs/ week	Credit	
						Min	Max
I B Com & I BCom (CA)	I	Allied	UMAA112	Business Mathematics	5	4	4
I B.SC PHY			UMAA104	Mathematics for Physics-I	5	5	5
I BCA			UMAA110	Mathematical Methods I	6	5	5
I B.Sc (CS)			UMAA113	Statistical Methods	6	4	4
I B.Sc (CS)	II		UMAA218	Mathematics for computer Science	6	4	4
I B.A (C.E)			UMAA105/ UMAA213	Statistics-I	5	4	4
I BCA			UMAA216	Mathematical Methods II	6	5	5
I B.SC PHY			UMAA212	Mathematics for Physics-II	**5**	**5**	**5**
II B.Sc Chem	III		UMAA304	Algebra, Differential Calculus and Trigonometry	5	5	5
II B.Sc BIO			UMAA305	Bio-Statistics	5	4	4
II B.A(CE)			UMAA205/ UMAA303	Statistics-II	5	5	5
II BBA/ II B.COM/ II B.COM CA			UMAA211/UMAA403/UMAA107/UMAA301	Business Statistics	5	4	4
II B.Sc Chem	IV		UMAA406	Integral Calculus, Laplace Transform And Ordinary Differential Equations	5	5	5
II BBA			UMAA505/ UMAA410	Quantitative techniques for Business	5	4	4

Non-Major Elective

Semester	Part	Category	Course Code	Course Title	Contact Hrs/ week	Credit
II	IV	Non Major Elective	UMAE204	Basic Mathematics for Science	4	2
			UMAE202	Mathematics for Business and Decision Making	4	2
III			UIDE302/ UMAE302	Numerical Methods using C++	4	2
			UMAE402/UMAE306	Operations Research for Managers	4	2
			UMAA501/UMAE305	Statistical Data Analysis through SPSS	4	2
			UIDE501/UIDE304	Preparatory Course for TANCET Exams	4	2
			UMAE502/UMAE308	Mathematics for Competitive Exams	4	2

ALLIED OPTIONAL

Class & Major	Semester	Category	Course Code	Course Title	Contact Hrs/ week	Credit	
						Min	Max
III UG	**V**	Allied Optional	UMAA502/UMAA510 UMAA512	Space Science / Discrete Mathematical Structures	5	4	4

UMAM103 FUNDAMENTALS OF MATHEMATICS

Semester : I **Credit : 1**
Category : Core I **Hours/Week : 2**
Class & Major : I B.SC Mathematics **Total Hours : 26**

Objectives:

To Enable the Students

- Acquire in depth knowledge in theory of equation, Algebra and Discrete Mathematics.
- Solve the Problems of theory of equation, Algebra and Discrete Mathematics.
- Use the Mathematical Method of Induction, contradiction, implication for proving the theorems.

UNIT - I THEORY OF EQUATION **4 Hrs**

Polynomial equation - Irrational roots - Complex roots.

UNIT - II THEORY OF EQUATION (CONTD) AND FUNCTIONS **4Hrs**

Reciprocal equations - Transformation of function.

UNIT- III ALGEBRA **6 Hrs**

Functions and Operators - one-one function - onto functions - Special type of functions - Invertible functions - Composition of functions – Binomial - Exponential and Logarithmic Series.

UNIT - IV DISCRETE MATHEMATICS **6 Hrs**

Propositional logic - Logical operators – Conjunction – Disjunction - Conditional and Bi-conditional operators - logically equivalent - Tautology and Arguments and Validity of Arguments.

UNIT - V DISCRETE MATHEMATICS (CONTD) **6 Hrs**

Method of Proof - Mathematical induction - Proof by implication – Converse - Inverse - Contra Positive – Negation – contradiction - Direct proof by using truth tables - Proof by counter example.

Text Books

- Dr.Venkatraman.M .K, Discrete Mathematics, National Publishing Company, Chennai, 2003.
- Narayanan and Manicavachagom Pillay.T.K, Algebra, Viswanathan. K Printers & Publishers Pvt, Ltd., Chennai, 2004.

UMAM104 DIFFERENTIAL CALCULUS

Semester : I **Credit : 4**
Category : Core II **Hours/Week : 5**
Class & Major : I- B.Sc Mathematics **Total Hours : 65**

Objectives

To enable the students

- Understand functions, limits, derivative, continuous and inverse trigonometrically functions.

- Solve problems that deal with continuous change in quantities.
- Determine the limit existing, continuous, differentiable functions.

UNIT- I FUNCTIONS **10 Hrs**

Functions – Shifting Graphs – Trigonometric functions

UNIT- II LIMITS AND CONTINUITY **12 Hrs**

Rules for finding the limits - Definition of limits and its Extension – Continuity.

UNIT- III DERIVATIVES **14 Hrs**

The Derivative of a function – Differentiation Rules – Rates of change – Derivatives of Trigonometric functions - The Chain Rule.

UNIT- IV APPLICATIONS OF DERIVATIVES **15 Hrs**

Extreme values of Functions – Mean value theorem – The first Derivative test for Local Extreme Value – Graphing with y' and y'' – Limits as $x \to \pm\infty$, Asymptotes, and Dominant Terms.

UNIT-V TRANSCENDENTAL FUNCTIONS **14 Hrs**

Inverse Trigonometric Functions – Derivatives of Inverse Trigonometric Functions; Integrals – Hyperbolic Functions – First order Differential Equations.

Text Book

- Thomas / Finney, *Calculus and Analytic Geometry,* Addison –Wesley, 13th Edition, 2014.

Reference Book

- Tom.M.Apostol, *CalCulus Volume –I* , Second Edition,1966.

UMAM105 ANALYTICAL GEOMETRY

Semester : I **Credit : 5**
Category : Core III **Hours/Week : 6**
Class &Major: I B.SC Mathematics **Total Hours : 78**

Objectives:

To Enable the Students

- Understand the fundamentals aspects of conics, Straight lines, Sphere and cone.
- Solve the geometrical problems of curves, straight lines, cone and sphere.

UNIT - I PARABOLA AND ELLIPSE **16Hrs**

Conics – polar of any point with respect to the parabola-pole of the line with respect to the parabola – equation chord of the parabola in terms of midpoint – Conjugate diameters for ellipse-tangents at the extremities of a chord will intersect on the diameter bisecting the chord.

UNIT - II HYPERBOLA **15Hrs**

Asymptotes of hyperbola – Rectangular hyperbola – Polar equations of a line, circle and conic.

UNIT - III PLANES OF STRAIGHT LINES **15Hrs**

Planes – Straight lines – The plane and the straight lines – Coplanar lines.

UNIT – IV SPHERES **16Hrs**

Definition – Equation of a Sphere – Equation of circle on a sphere – Equation of the tangent plane to the sphere.

UNIT – V CONE **16Hrs**

Cone – Right circular cone – Tangent plane and normal – Angle between the lines.

Text Books

- Manickavachagam Pillai ,T.K. and Natarajan,T. *Analytical geometry (part I),* S.Viswanathan printers and publishers, 2010.
- Manickavachagam Pillai, T.K. and Natarajan,T. and Ganapathy, K.S. *Analytical geometry,* S.Viswanathan printers and publishers, 2010.

Reference Book

- Sharma S. Singhal.K, Gupta D.B, *Text book of Analytical Geometry,* Krishna prakasham Mandir, Meerat,1995.

UMAA111 MATHEMATICAL STATISTICS

Semester : I **Credit : 5**
Category : Allied **Hours/Week : 6**
Class & Major : I- B.Sc Mathematics **Total Hours : 78**

Objectives

To enable the students

- Study some Statistical Characteristics, Discrete and Continuous Distributions and their properties.
- Introduce sampling theory significance tests and testing of hypothesis.
- Study Correlation and Regression.

UNIT-I DISCRETE AND CONTINUOUS PROBABILITY DISTRIBUTION 15 Hrs

Random variable – Probability distributions – Discrete and Continuous, Mathematical expectation, moments, moment generating function, characteristic function.

UNIT-II SPECIAL DISCRETE AND CONTINUOUS DISTRIBUTIONS 15 Hrs

Introduction – Binomial, Poisson Distributions – Normal Distributions.

UNIT-III CORRELATION AND REGRESSION 12 Hrs

Correlation co-efficient, linear regression – equations of lines of regression.

UNIT-IV TEST OF SIGNIFICANCE – LARGE SAMPLE 18 Hrs

Introduction- Types of sampling – Large samples – Testing the significance for a single proportion - Testing of significance for difference of proportions – Sampling of values of a variable – Sampling distribution of the mean – confidence limits – Testing the significance of difference between standard deviations of two large sample.

UNIT-V TESTS OF SIGNIFICANCE - SMALL SAMPLES 18 Hrs

: Introduction – Chi- square distribution – Student's *t*- distribution – Snedecor's *F* distribution(Definitions only) – Properties(Statements only) – Test of Significance based on *t, F*-distributions, χ^2 test of goodness of fit, χ^2 test of independence.

Text Book

- Mathematical Statistics, Kapur J. N. and H.C. Saxena, 20-th Edition, S. Chand & Co. Ltd., New Delhi, 2010.

Reference Books

- Gupta S.C. & V.K.Kapoor, *Fundamentals of Mathematical Statistics*, 9-th Edition, Sultan Chand & Sons, New Delhi, 1994.
- Vittal P.R., *Mathematical Statistics*, Margham Publications, Chennai, 2002.

UMAM204 INTEGRAL CALCULUS

Semester : II **Credit : 5**
Category : Core IV **Hours/Week : 5**
Class & Major : I- B.Sc Mathematics **Total Hours : 65**

Objectives:
To enable the students

- Acquire knowledge of Integration, techniques of Integration, Multiple and line integrals.
- Determine the Area, volume, length of a curve.

UNIT- I INTEGRATION **14 Hrs**

Indefinite Integrals – Differential Equations, Initial value problem, and Mathematical modeling- Integration by substitution – Running the Chain Rule Backward – Properties, Area, and the Mean value Theorem – The fundamental Theorem – Substitution in Definite Integrals.

UNIT- II APPLICATION OF INTEGRALS **13 Hrs**

Areas between curves- Finding Volumes by slicing -Volumes of solids of revolution- Cylindrical shells- Lengths of plane curves – Area of Surface of Revolutions.

UNIT- III TECHNIQUES OF INTEGRATIONS **13 Hrs**

Basic integrations formulas- Integration by Parts- Partial Fractions- Trigonometric Substitution.

UNIT- IV MULTIPLE INTEGRALS **12Hrs**

Double Integrals – Areas, Moments and center of mass – Double integrals in polar forms- Triple integrals in rectangular co-ordinates- masses and moments in three dimensions – Triple integrals in cylindrical and spherical co-ordinates.

UNIT-V INTEGRATION IN VECTOR FIELD **13 Hrs**

Line Integrals – Vector fields, Work, Circulation and Flux – Path independence, Potential Functions and Conservative Fields – Green's Theorem in Plane – Surface area and Surface integrals.

Text Book

- Thomas/ Finney, *Calculus and Analytic Geometry*, Addison –Wesley, 13-th Edition, 2014.

UMAM402/UMAM205 GRAPH THEORY

Semester : II **Credit : 4**
Category : Core V **Hours/Week : 5**
Class & Major : **Total Hours : 65**

Objectives:
To enable the students

- Understand the fundamentals of graph theory
- Relate the basic concepts of graph theory with the real life problems.
- Apply the concepts of colorings, matching in real life challenges like scheduling, map coloring etc.

UNIT-I GRAPHS & SUB GRAPHS **10 Hrs**

Graphs and simple graphs – Graph Isomorphism – The incidence and Adjacency Matrices – Sub graphs – Vertex Degrees – Simple exercise problems.

UNIT-II PATHS & CYCLES **10 Hrs**

Path and Connections – Cycles – Shortest path problem _ Simple exercise problems.

UNIT-III TREES **10 Hrs**

Trees – Cut edges and Bonds – Cut vertices – The connector problem.

UNIT-IV CONNECTIVITY **17Hrs**

Connectivity – Blocks – Euler tours – Hamiltonian Cycles –The Chinese Postman Problem.

UNIT-V MATCHINGS & COLORINGS **18 Hrs**

Matchings – Matchings and Coverings in Bipartite Graphs – Edge Chromatic number – The Timetabling problem.

Text Book:

- **J.A. Bondy and U.S.R Murty** "*Graph Theory with Applications"* The Macmillan Press Ltd, Associated company in Madras.

Reference Book:

- **Douglas B. West** "*Introduction to Graph theory"* Second edition, Prentice Hall in India, 2000

UMAM606/UMAM206 DISCRETE MATHEMATICS

Semester : II **Credit : 4**
Category : Core VI **Hours/Week : 5**
Class & Major : I B.Sc. Mathematics **Total Hours : 65**

Objective:
To enable the students

- Know the concept of automation and Boolean algebra.
- Apply Automata formal Languages in compiling and complexity theory.
- Apply Boolean algebra in Logic circuits

UNIT –I LOGIC **10 Hrs**

Logic- Introduction- TF Statements- Connectives- Atomic and Compound statements- well formed (statement) formulae-Truth table of a formula- Tautology-Tautological Implications and Equivalence of Formulae.

UNIT – II NORMAL FORMS **10Hrs**

Normal forms – Disjunctive Normal forms- conjunctive Normal Forms- Principal Normal Forms – Principal Disjunctive Normal Forms- Principal Conjunctive Normal Forms.

UNIT – III LATTICES **12 Hrs**

Lattices- Some Properties of Lattices- New Lattices-Modular and Distributive Lattices.

UNIT – IV BOOLEAN ALGEBRA **15 Hrs**

Boolean algebra- Boolean Polynomials- Karnaugh Map- Switching Circuits.

UNIT – V AUTOMATA THEORY **18 Hrs**

Automata- Introduction- Finite Automation-Definition- Representation of finite Automation- Acceptability of a string by a Finite Automation- Languages accepted by a Finite automation- Non-Deterministic Finite automata- Acceptability of a String by Non-Deterministic Finite Automata- Equivalence of FA and NFA- Procedure for finding an FA equivalent to a given NFA.

Text Book

- Dr.Venkatraman.M.K, Sridharan.N, Chandrasekaran.N, " *Discrete Mathematics*", The National Publishing Company, Chennai. 2006

Reference Books

- Sundaresan.V, Ganapathy Subramanian.K.S & Ganesan.K " *Discrete Mathematics*", A.R.Publications, 1996.

UMAA112 BUSINESS MATHEMATICS

Semester : II **Credit : 4**
Category : Allied **Hours/We : 5**
Class & Major : I B.Com/B.Com(CA) **Total Hours : 65**

Objectives

To enable the students

- Introduce basic in mathematics which are applicable in business.
- Improve the analytical skills .
- Develop the computational skills.

UNIT-I OPTIMIZATION **10 Hrs**

Basic Calculus – Rules for Differentiation – Maxima and Minima and their Applications to Business.

UNIT-II COMMERCIAL ARITHMETICS **13 Hrs**

Commercial Arithmetic –Simple and Compound Interest –Annuties-Sinking Funds-Discount and Present Values of Perpetuity.

UNIT-III DETERMINISTIC BUSINESS MODELS **15 Hrs**

Simple Marketing Models-A Simple Advertising Budget Model-A Simple Inventory Model-determination of optimum warehouse torritories.

UNIT-IV MATRICES **15Hrs**

Matrix – Operations on Matrices– Inverse of a Square Matrix (not more than 3rd order).

UNIT-V INTEGRATION **12 Hrs**

Solving simultaneous equations using matrix method- Integration and their applications to business.

Text Book

- Sundaresan.V & Jeyaseelan.S.D, *An Introduction to Business Mathematics,* S.Chand and Co, Pvt.Ltd, New Delhi, 2003.

Reference Book

- Aggarwal B.M, *Business Mathematics and Statistics Fundamentals,* Sultan Chand and Sons Pvt.Ltd, New Delhi, 2003.

UMAA104 MATHEMATICS FOR PHYSICS-I

Semester : II **Credit : 5**
Category : Allied **Hours/Week : 5**
Class & Major : I B.Sc Physics **Total Hours : 65**

Objectives

- To acquire knowledge in Mathematics.
- To apply the techniques of various branches of mathematics.
- To motivate the students to apply the techniques in their respective major subjects.

UNIT-I ALGEBRA **15 Hrs**

Binomial theorem for rational index-exponential and logarithmic series – summation and simple approximations related to binomial, exponential and logarithmic series.

UNIT-II MATRICS **13 Hrs**

Cayley Hamilton theorem – verification – finding inverse of a matrix using Cayley Hamilton theorem-Eigen values and Eigen vectors (simple problems only for matrices of order upto3 X 3).

UNIT-III DIFFERENTIAL CALCULUS **10 Hrs**

Successive differentiation-Leibentiz theorem and its applications- Jacobian- Concept of polar coordinates radius of curvature in Cartesian coordinates.

UNIT-IV TRIGONOMETRIC SERIES **12 Hrs**

Complex numbers-Applications of De-Movire's theorem-Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$,- Expansions of $\sin^n\theta$, $\cos^n\theta$-Expansion of $\sin\theta$, $\cos\theta$, $\tan\theta$ in powers of θ.

UNIT-V HYPERBOLIC FUNCTIONS **15 Hrs**

Hyperbolic Functions-Inverse Hyperbolic Functions -relation between circular and hyperbolic functions-logarithm of complex numbers.

Text Books

- Narayanan and Manichavaschagam Pillay,*Algebra Volume I,* Viswanathan.S (Publishers & Printers) Pvt. Ltd., 1996.

- Narayanan and Manichavachagam Pillay,*Calculus*, Volume I Viswanathan.S (Publishers & Printers) Pvt. Ltd., 1994.
- Narayanan.S & Manicavachan Pillay.T.K, *Trignometry*, Chennai. Vishwanathan.S Printers & Publishers pvt ltd., 9th edition, 1994.

UMAA110 MATHEMATICAL METHODS – I

Semester : II **Credit : 5**
Category : Allied **Hours/Week : 6**
Class & Major : I BCA **Total Hours : 78**

Objectives:
To enable the students

- Understand the basic concepts of set theory and relations.
- Explore themselves to the fundamentals of differentiation.
- Apply binary operators in automation.

UNIT-I SYMBOLIC LOGIC 16Hrs

Proposition- Logical operators- conjunction- disjunction- negation- conditional and bi-conditional operators- converse- Inverse- Contra Positive- logically equivalent- tautology and contradiction-Arguments and validity of arguments.

UNIT-II SET THEORY 10 Hrs

Sets- set operations- venndiagram- Properties of sets- number of elements in a set Cartesian product.

UNIT-III RELATIONS 16 Hrs

Equivalence relation- Equivalence clas- Partially and Totally Ordered sets- Functions- Types of Functions- Composition of Functions.

UNIT-IV BINARY OPERATORS AND AUTOMATA THEORY 16 Hrs

Types of Binary Operations- Commutative- Associative- Distributive and Identity Boolean algebra- Simple Properties.Finite state machine.

UNIT-V DIFFERENTIATION 20 Hrs

Derivation-Differential coefficient of a sum (or difference) – Product rule-Quotient rule Successive differentiation- partial differentiation- Applications of differentiation- Tangent and Norma- angle between two curves- Maximum and Minimum values[Second derivatives test].

Text Books

- Venkataraman.M.K,*Discrete Mathematics*, National Publishing Company.Chennai,2003.
- Narayanan.S & Manicavacham pillay.T.K ,Differential Calculus,Volume I, Viswanathan.S(Publishers and Printers)Pvt.Ltd,Chennai,2003.

Reference Books

- Balaji.G, *Discrete Mathematics*,G.Balaji Publishers,Chennai, 2006.
- Kandasamy.P,Thilagavathi.K,Gunavathi.K,*Engineering Mathematics-I*,S.Chand & Company Ltd.Chennai,2003.

UMAA113 STATISTICAL METHODS

Semester : II **Credit : 4**
Category : Allied **Hours/Week : 5T+1P**
Class & Major : I BCA **Total Hours : 78**

Objectives:
To enable the Students

- Get adequate knowledge in the distributions involving univariate and bivariate.
- Understand the Significance of Statistical techniques.
- Develop sound statistical techniques for handling, analyzing, and interpreting numerical data.

UNIT – I PRESENTATION OF DATA (12+2) Hrs

Diagrammatic and graphical representation of Statistical data-Significance of diagrams and graphs-types of diagrams-one dimensional diagrams, two dimensional diagrams-pictograms and cartograms. Graphs of frequency distribution-Histogram, frequency polygon, frequency curve-Ogive curves.

UNIT - II MEASURES OF CENTRAL TENDENCY (13+3) Hrs

Measures of central tendency-Requisites of a good average-types of averages- Arithmetic Mean, Median, Mode, Geometric mean, Harmonic mean and their merits and demerits-Graphical determination of Median, Quartiles, Deciles, Percentiles and Mode.

UNIT - III MEASURES OF DISPERSION (13+3)Hrs

Measures of Dispersion-Range, Quartile deviation, Mean deviation, Standard deviation, and their relative measures, Combined Standard deviation, Coefficient of Variation-Merits and demerits of these methods-Lorenz curve. Skewness-Measures of Skewness-Karl Pearson's coefficient of skewness, Bowley's coefficient of skewness, Kelly's co-efficient of Skewness-moments-Measures of skewness based on moments and Measure of Kurtosis.

UNIT - IV CORRELATION (15+3)Hrs

Correlation Analysis-Significance or the study of correlation- types of correlation-Methods studying Correlation-Scatter diagram method, Graphical methods, Karl Pearson's co-efficient of correlation, Spearman's Rank correlation coefficient, Concurrent Deviation method-Properties of Coefficient of Correlation.

UNIT - V REGRESSION (12+2)Hrs

Regression Analysis-Uses of Regression analysis-Regression lines-Regression equations-Properties of regression coefficient.

Practical

- Presentation of data-Diagrams &Graphs
- Calculation of Measures of central tendency-Mean, Median, Mode, Geometric mean,
- Harmonic Mean
- Calculation of Measures of Dispersion-Range, Quartile deviation, Mean deviation,
- Standard deviation and its relative measures and Skewness
- Karl Pearson's correlation coefficient
- Regression equation of X on Y &Y on X

Text Book

- GuptaS.P.,*Statistical Methods*,Sultan Chand and Sons,2011.

Reference Books

- Gupta.S.C.and Kapoor.V.K,*Elements of Mathematical Statistics*,Sultan Chand and Sons,2006.
- SnedecorG.W and Cochran W.G.,*Statistical Methods*,Oxford Press and IBH.1967.

UMAA 218 MATHEMATICS FOR COMPUTER SCIENCE

Semester : II **Credit : 4**
Category : Allied **Hours/Week : 6**
Class & Major: I B.SC computer science /I B.SC ISM **Total Hours : 78**

Objectives

To enable the Students

- Acquire knowledge in Mathematics.
- Apply the techniques of various branches of mathematics.
- Motivate the students to apply the techniques in their respective major subjects.

UNIT-I ALGEBRA **15 Hrs**

Binomial Series – Statement of binomial theorem for any index – A few important expansions – application of the binomial theorem to the summation of Series. Exponential series – summation of series using exponential series – the Logarithamic series.

UNIT-II DIFFERENTIAL CALCULUS **16 Hrs**

Higher derivative – n^{th} derivative – Formation of equation involving derivative – Leibnitz formula for the n^{th} derivative of a product (statement only). Radius of curvature (Cartesian formula only) Jacobian

UNIT-III TRIGNOMETRY **15 Hrs**

Expansion of Cos $n\theta$ and Sin $n\theta$- Powers of sines and cosines of θ in terms of function of multiple of θ - Expansion of $\cos^n\theta$ when n is the positive integer – Expansion of $\sin^n\theta$ when positive integer. Logarithm of complex number .

UNIT-IV INTEGRATION **16 Hrs**

Definite integral – properties of definite integrals – Integration by parts using Bernouli's formula – double integral.

UNIT-V LAPLACE TRANSFORM **16 Hrs**

Definition – Inverse Laplace transform – Solving second order differential equations using Laplace transform.

Text Books

- Narayanan.S, Hanumantha Rao.R, Manicavachagom Pillay "*Ancillary Mathematics Volume –I"***,** S.Viswanathan (Printers & Publishers) Pvt .Ltd, Chennai, 2008.
- Narayanan.S, Hanumantha Rao.R, Manicavachagom Pillay, "*Ancillary Mathematics Volume –II",* S.Viswanathan (Printers & Publishers) Pvt .Ltd, Chennai, 2008.

Reference Books

- Narayanan.S & Manickavachagom Pillay, T.K "*Algebra Volume I*"**,** Vishwanathan.S (Printers & Publishers) pvt ltd., Chennai, 1996.
- Narayanan.S & Manickavachagom Pillay, T.K "*Calculus Volume I*"**,** Vishwanathan.S (Printers & Publishers) pvt ltd., Chennai, 1994.
- Narayanan.S & Manickavachagom Pillay, T.K "*Trignometry*"**,** Vishwanathan.S (Printers & Publishers) pvt ltd., Chennai, 9th Edition 1994.

UMAA105/UMAA213 STATISTICS -I

Semester : II **Credit : 4**
Category : Allied **Hours/Week : 4T+1P**
Class & Major : I B.A. Corporate Economics **Total Hours : 65**

Objectives
To enable the Students

- To introduces various Statistical measures applicable in Business and Economic analysis.
- Apply Statistical tools to business problems.

UNIT-I NATURE SCOPE AND SIGNIFICANCE **10 Hrs**

Nature and Scope of Statistics-Significance and Limitation of Statistics- Collection, Classification and tabulation of data.

UNIT-II PRESENTATION OF DATA **(10+5) Hrs**

Diagrammatic and Graphic representation –Bar diagrams-Pie diagrams-Histogram-Cartograms- Frequency distribution- Frequency curve- Graphs- Ogives- Lorenz curve.

UNIT-III MEASURE OF CENTRAL TENDENCY **(12+3) Hrs**

Arithmetic mean- Median- Quartiles- Percentiles and Deciles- Mode- Geometric mean and Harmonic mean

UNIT-IV MEASURE OF DISPERSION **(10+3)Hrs**

Range- Quartile Deviation- Mean Deviation- Standard Deviation- Co-efficient of variation.

UNIT-V SKEWNESS AND KURTOSIS **(10+2) Hrs**

Karl Pearson,s and Bowley,s co-efficient of Skewness- moments

Practical

- Presentation of data- Diagrams and Graphs**.**
- Calculation of Measures of central tendency- Mean, Median, Mode, Geometric mean, Harmonic mean
- Calculation of measures of Dispersion – Range, Quartile deviation, Mean deviation, standard deviation and its relative measures and skewness.

Text Books

- Gupta S.P., Statistical Methods, Sultan Chand and Sons, 2011.

Reference Books

- Agarwal B.L.,Basic Statistics, Wiley Eastern, 2002

UMAA216 MATHEMATICAL METHODS – II

Semester	**: II**	**Credit**	**: 5**
Category	**: Allied**	**Hours/Week**	**: 6**
Class & Major	**: I BCA**	**Total Hours**	**: 78**

Objectives

To enable the students

- Understand the basic concepts of matrices.
- Explore themselves to the fundamentals of integration.
- Apply the technique of differentiation in vectors.

UNIT-I MATRICES 13 Hrs

Multiplication of matrices- Singular and Non-Singular matrices- Adjoint of a Matrix-Inverse of a Matrix Symmetric and Skew –Symmetric-Hermitian and Skew- Hermitian-Orthogonal and Unitary matrices-Rank of a matrix.

UNIT-II SOLVING LINEAR EQUATIONS 15 Hrs

Solution of Simultaneous Linear equations by Matrix Inversion Method- Test for Consistency and Inconsistency of Linear equations(Rank Method) Characteristic roots and Charactetristic Vectors-Cayley – Hamilton Theorem.

UNIT-III INTEGRATION 15 Hrs

Integration by Substitution- Integration of rational and irrational function of the form

$$\frac{1}{ax^2+bx+c}, \frac{1}{\sqrt{ax^2+bx+c}}, \sqrt{ax^2+bx+c}, \frac{px+q}{ax^2+bx+c}, \frac{px+q}{\sqrt{ax^2+bx+c}}$$

.

UNIT-IV DEFINITE INTEGRAL 17 Hrs

Definition and Properties of definite Integrals- Reduction formulae for

$$\int x^n e^{ax}dx, \int sin^n xdx, \int \cos^n xdx, \int x^m(1-x)^n dx,$$

UNIT-V DIFFERENTIATION OF VECTORS 18Hrs

Vector functions-derivatives of vectors-Gradient-Divergence and Curl, Properties of Curl,Properties of a Gradient functions-Directional Derivative-Solenoidal and Irrotationals.

Text Book

- Manicavachagom pillay & Natarajan,Ganapathy, *Vector Analysis,* S.Viswanathan Printers and publishers *Pvt.Ltd* , 2003.

Reference Book

- Duraipandian.P, Dr.Udayabaskaran.S, *Allied Mathematics – Volume I,* Muhil Publishers, Chennai, 1997.

UMAA212 MATHEMATICS FOR PHYSICS-II

Semester : II **Credit : 5**
Category : Allied **Hours/Week : 5**
Class & Major : I B.Sc Physics **Total Hours : 65**

Objectives
To enable the students

- Acquire knowledge in Mathematics
- Apply the techniques of various branches of Mathematics.

UNIT-I INTEGRATION 12 Hrs

Standard Integrals-Properties of definite integrals.

UNIT-II INTEGRATION BY PARTS 15 Hrs

Integration by parts – Double integrals – Applications of double integrals to find areas.

UNIT-III SEQUENCE AND SERIES 15 Hrs

Sequence and series- functions of a complex variable- Analytic functions- Cauchy Riemanns Equations- Harmonic Functions- Construction of analytic functions.

UNIT-IV LAPLACE TRANSFORM 10 Hrs

Laplace transform of functions – Inverse Laplace transforms – Application of Laplace transforms in solving differential equations.

UNIT-V DIFFERENTIAL EQUATIONS 13 Hrs

Formation of Partial Differential Equation – Second order differential equations with constant co-efficients –Homogeneous linear differential equations of the second order with variable co-efficients.

Text Books

- Manicavachagom pillai, T.K, *Ancillary Mathematics Integral calculus,* Viswanathan.S Publishers & Printers Pvt.Ltd., Chennai, 2010.
- Narayanan.S & Manicavachagom Pillay.T.K, *Complex Analysis,* Vishwanathan.S Printers & Publishers, Pvt.Ltd., Chennai, 1994.

UMAE204 BASIC MATHEMATICS FOR SCIENCE

Semester : II **Credit : 2**
Category : Non Major Elective **Hours/Week : 4**
Class & Major : I UG **Total Hours : 52**

Objectives

To enable the students

- Understand the basic concepts of Matrices and Trigonometry.
- Explore themselves to the fundamentals of differentiation and integration.

UNIT-I MATRICES **10 Hrs**

Multiplication of matrices-Singular and Non-Singular matrices-Adjoint of a matrices-Inverse of a matrices-Symmetric and skew Symmetric-Hermitian and Skew Hermitian-Orthogonal and unitary rank of a matrix.

UNIT-II SOLVING LINEAR EQUATIONS **10 Hrs**

Solution of Simultaneous Linear Equations by Matrix Inversion Method-Test for consistency and Inconsistency of Linear equations(Rank Method).

UNIT-III DIFFERENTIATION **11 Hrs**

Derivation-Differential coefficient of a sum (or difference)-Product rule-Quotient rule, Function of Function Rule.

UNIT-IV INTEGRATION **11 Hrs**

Definition-Standard formulae.

UNIT-V INTEGRATION BY PARTS **10 Hrs**

Integration by parts. Simple problems.

Text Books

- S.Narayanan Manicavachagom Pillay & Natarajan, Ganapathy,*Vector Analysis*, Vishwanathan.S Printers & Publishers Pvt,Lltd., Chennai, 1991.
- Kandhasami Thilagavathy, *Allied Mathematics Volume-II*,S.Chand & Co Pvt. Ltd.,New Delhi,2004.
- Dr.Venkatraman.M.K,Manorama Sridhar,*Allied Mathematics*,Agasthiar Publications Pvt.Ltd.,Trichy,2005

UMAE202 MATHEMATICS FOR BUSINESS AND DECISION MAKING

Semester : II **Credit : 2**
Category : Non Major Elective **Hours/Week : 4**
Class & Major : I UG **Total Hours : 52**

Objectives

To enable the students

- Provide a scientific basis to the decision-makers for obtaining optimal solution.
- Introduce a few basic concepts of mathematics, their application in business.

- Analyze decision problem, with effective application to real life in optimization of objectives.

UNIT-I SET THEORY **10 Hrs** Set and set operation – Venn diagrams- elements of co-ordinate systems – the slope intercept form of equation of the straight line.

UNIT-II MATRICES **10 Hrs**

Matrices; Fundamental ideas about matrices and their operational rules – Matrix multiplication – inverse of square matrices of not more than 3 X3 order-basic of calculus-rules of differention-intergration and their applications to business.

UNIT-III MATHEMATICS FOR FINANCE **10 Hrs**

Simple and Compound interest – Annuities – Sinking funds – Discounts and present Values.

UNIT-IV DECISION THEORY **10 Hrs**

Introduction – Decision making environment – the maximin or minimax criterion – the savage criterion – the Hurwitz criterion.

UNIT-V THEORY OF GAMES **12 Hrs**

Pure Strategy (Saddle point) – Dominance property – Mixed Strategies (2X2 Games,2Xn Games or mX2 Games, 3X3 Games) – Two-Person Zero Sum Games.

Text Books

- Gupta,P.K, Hira,D.S, Operations Research, S.Chand &Company Ltd.
- T Kanthi Swarup,P.K.Gupta, Manmohan, *Operation Research*, S.Chand & Co, Pvt Ltd, New Delhi,2006.
- Sundharesan and Jayaseelan, *An Introduction to Business Mathematics*, S.Chand and Co Pvt.Ltd, New Delhi, 2003.

III & IV Evaluation Components of CIA

S.No	Course code	Course Title	Component III	Component IV
1	UMAM103	Fundamentals of Mathematics	Problem Solving	Assignment
2	UMAM104	Differential Calculus	Model Building	Problem Solving
3	UMAM105	Analytical Geometry	Problem Solving	Assignment
4	UMAM204	Integral Calculus	Poster presentation	Assignment
5	UMAM302/ UMAM301	Differential Equation	Problem Solving	Assignment
6	UMAA111	Mathematical Statistics	DPA	Assignment
7	UMAA112	Business Mathematics	Assignment	Problem Solving
8	UMAA104	Mathematics for Physic –I	Assignment	Poster Presentation
9	UMAA110	Mathematical Methods – I	Assignment	Written Quiz
10	UMAA113	Statistical Methods	Assignment	DPA
11	UMAA218	Mathematics for Computer Science	Assignment	Problem Solving
12	UMAA105/	Statistic – I	Assignment	DPA

	UMAA203			
13	UMAA216	Mathematical Methods - II	Assignment	Written Quiz
14	UMAA212	Mathematics for Physics - II	Assignment	Problem Solving

COURSE PROFILE M.Sc. (Mathematics)

Semester	Category	Course Code	Course Title	Contact Hrs/ Week	Credit	
					Mini	Max
I	Core I	PMAM101	Modern Algebra	6	4	4
	Core II	PMAM102	Real Analysis	6	4	4
	Core III	PMAM103	Ordinary Differential Equations	6	4	4
	Core IV	PMAM 104	Graph Theory	6	4	4
	Non Major Elective			5	4	4
	Library / Seminar			1	-	-
			TOTAL	**30**	**20**	**20**
II	Core V	PMAM201	Field Theory	5	4	4
	Core VI	PMAM202	Measure and Integration	5	4	4
	Core VII	PMAM206	Partial Differential Equations	5	4	4
	Core VIII	PMAM207	Classical Mechanics	5	4	4
	Core IX	PMAM208	Operations Research	5	4	4
	Non Major Elective	PALE201/ PALE301	Preparatory Course for NET/SET	5	4	4
	Service Learning	PMAX201/ PMAX202	Mathematics for School Student/Elementary Mathematics(Service Learning)		1	1
			TOTAL	**30**	**25**	**25**
III	Core X	PMAM305	Complex Analysis	5	4	4
	Core XI	PMAM306	Discrete Mathematics	6	4	4
	Core XII	PMAM307	Topology	6	4	4
	Core XIII	PMAM308	Number Theory and Cryptography	5	4	4
	Core XIV	PMAM309	Stochastic process	4	3	3
	Core XIX	PMAP401	Project stage-I	2	-	-
	Value Education			2	1	1
			TOTAL	**30**	**20**	**20**
IV	Core XV	PMAM405	Functional Analysis	6	5	5
	Core XVI	PMAM406	Mathematical Statistics	6	5	5
	Core XVII	PMAM403	Differential Geometry	6	5	5
	Core XVIII	PMAM405	Fuzzy Analysis	6	4	4
	Value Education			2	1	1
	Core 20	PMAP401	Final Project	4	5	5
			TOTAL	**30**	**25**	**25**
			GRAND TOTAL	**120**	**90**	**90**

Extra Credit Earning Provision

Semester	Category	Course code	Course Title	Hrs/ week	Credit	
					Min	Max
III	Self study paper	PMAS301/ PMAS302	Difference Equation Combinatorial Analysis	2	-	1

COURSES OFFERED TO OTHER DEPARTMENTS – PG

Semester	Category	Course Code	Course Title	Contact Hrs/ Week	Credit	
					Mini	Max
I	Core III	PCAM103	Mathematical Foundation	4	4	4
		PCSM108	Theoretical foundations for computers	6	4	4
		PCAM504	Operations Research	4	4	4
	Non Major Elective	PMAE101	LaTeX and MATLab	3	4	4
	Practical		LaTeX and MATLab	2		
	Non Major Elective	PMAE102	Operations Research	5	4	4
II	Core VI	PCAM206	Applied Statistics	5	4	5
	Non Major Elective	PMAE202	NET/SET/ Competitive Exam	5	5	5
		PMAE203	Discrete mathematics	5	4	4

PMAM101 MODERN ALGEBRA

Semester : I **Credit : 4**
Category : Core I **Hours/Week : 6**
Class & Major : I M.SC Mathematics **Total Hours :78**

Objectives
To enable the students

- Introduce the concepts and to develop working knowledge on class equation, solvability of groups, finite abelian groups, linear transformations, real quadratic forms.
- Understand the concept of algebra in detail.
- Apply real time problems.

UNIT-I SYLOW'S THEOREM **16 Hrs**

Another Counting principle- class equation for finite groups and its applications-Sylow's theorem.

UNIT-II FINITE ABELIAN GROUPS **16 Hrs**

Solvable groups- Direct products- Finite abelian groups- Modules.

UNIT-III LINEAR TRANSFORMATIONS **16 Hrs**

Linear Transformations: Canonical forms – Triangular form- Nilpotent transformations.

UNIT-IV JORDAN FORM **15 Hrs**

Jordan form- Rational Canonical form.

UNIT-V TRACE AND TRANSPOSE **15 Hrs**

Trace and transpose – Hermitian, Unitary, normal transformations, and real quadratic form.

Text Book

- Herstein.I.N, *Topics in Algebra*, Wiley Eastern Limited, New Delhi, 2000.

Reference Books

- Artin.M, *Algebra*, Prentice Hall of India, New Delhi, 1991.
- Bhattacharya.P.B, Jain.S.K, and Nagpaul.S.R, *Basic Abstract Algebra*, Cambridge University press, New York, 1997.
- Jacobson.N & Freeman.W.H, *Basic Algebra Vol. I&II,* Hindustan publishing Company, New Delhi,1980.

PMAM102 REAL ANALYSIS

Semester	**: I**	**Credit**	**: 4**
Category	**: Core II**	**Hours/Week**	**: 6**
Class & Major	**: I M.SC Mathematics**	**Total Hours**	**: 78**

Objectives

To enable the students

- Introduce functions of bounded variation, Riemann- Stieltjes Integration, Convergence and its interplay between various limiting operations.
- Apply functions of bounded variation, Riemann- Stieltjes Integration, Convergence and its interplay between various limiting operations.

UNIT-I SEQUENCES AND SERIES **16 Hrs**

Double sequences – Double series – Rearrangement theorem for double series- A sufficient condition for equality of iterated series – Multiplication of series – Cesaro summability – Infinite products.

Power series – Multiplication of power series – The Taylor's series generated by a function – Bernstein's theorem - Able's limit theorem – Tauber's theorem.

UNIT-II CONVERGENCE SEQUENCE **16 Hrs**

Point wise convergence of sequences of functions – Examples of sequences of real Valued functions – Definitions of uniform convergence – Uniform convergence and continuity _ The Cauchy condition for uniform convergence – Uniform convergence of infinite series of functions– Uniform convergence and Riemann – Stieltjes integration – Non uniform onvergence and Term -by- term Integration – Uniform convergence differentiation – Sufficient condition for uniform convergence of a series – Mean convergence.

UNIT-III ORTHOGONAL SYSTEM OF FUNCTIONS **16 Hrs**

Introduction – Orthogonal system of functions – the theorem on best approximation – The Fourier Series of a function relative to an orthonormal system – Properties of Fourier Coefficients – The Riesz-Fischer Theorem – The Convergence and representation problem in trigonometric series – The Riemann – Lebesgue Lemma – The Dirichlet Integrals – An Integral representation for the partial sums of Fourier series – Riemann's localization theorem – Sufficient condition for convergence of a Fourier series – Consequence of Fejes theorem – The Weierstrass approximation theorem.

UNIT-IV DIRECTIONAL DERIVATIVE **15 Hrs**

Introduction – The Directional derivative – Directional derivative and continuity – The total derivative - The total derivative expressed in terms of partial derivatives – The Matrix of linear function – The Jacobian Matrix – The Chain rule – Matrix form of chain rule – The mean – value theorem for differentiable functions – A sufficient condition for differentiability condition for equality of mixed partial derivatives – Taylor's theorem forfunctions of R^n to R^1.

UNIT-V IMPLICIT FUNCTION THEOREM **15 Hrs**

Functions with non zero Jacobian determinants – The inverse function theorem – The Implicit function theorem – Exterma real valued function of severable variables – Extremum problems with side conditions.

Text Books

- Barra G. de., *Measure Theory and Integration*, Wiley Eastern Ltd, New Delhi, 1981.
- Tom M.Apostol, *Mathematical Analysis*, Addison – Wesley Publishing Company Inc, New York, 1974.

Reference Books

- Burkill, J.C. *The Lebesgue Integral*, Cambridge University Press, New York, 1951.
- Gelbaum, B.R. and J. Olmsted, *Counter Examples in Analysis*, Holden day, San Francisco , 1964.

PMAM103 ORDINARY DIFFERENTIAL EQUATIONS

Semester	**: I**	**Credit**	**: 4**
Category	**: Core II**	**Hours/Week**	**: 6**
Class & Major	**: I M.SC Mathematics**	**Total Hours**	**: 78**

Objectives

To enable the students

- Develop a strong background on finding solutions to liner differential equations with constant and variable coefficients and also with singular points.
- Apply the existence and uniqueness of the solutions of first order differential equations.
- Understand and develop analytical skills.

UNIT-I SECOND ORDER HOMOGENEOUS EQUATIONS **16 Hrs**

Second order homogeneous equations-Initial value problems-Linear dependence and independence - Wronskian and a formula for Wronskian – Non-homogeneous equation of order two.

UNIT-II HOMOGENEOUS AND NON-HOMOGENEOUS EQUATION **15 Hrs**

Homogeneous and non-homogeneous equation of order n – Initial value problems-Annihilator method to solve non-homogeneous equation- Algebra of constant coefficient operators.

UNIT-III INITIAL VALUE PROBLEMS **16 Hrs**

Initial value problems – Existence and uniqueness theorems – Solutions to solve a non-

homogeneous equation – Wronskian and linear dependence – reduction of the order of a homogeneous equation – homogeneous equation with analysis coefficients – The Legendre equation.

UNIT-IV EULER EQUATION **15 Hrs**

Euler equation – Second order equations with regular singular points – Exceptional cases – Bessel Function.

UNIT-V EXACT EQUATION **16 Hrs**

Equation with variable separated – Exact equation – method of successive approximations – the Lipschitz condition – convergence of the successive approximations and the existence theorem.

Text Book

- Coddington E.A., *An Introduction to Ordinary Differential Equations*, Prentice-Hall of India Ltd., New Delhi, 1987.

Reference Books

- Lebedev. N.N, *Special functions and their applications*, Prentice Hall of India, New Delhi, 1965.
- Reid W.T., *Ordinary Differential Equations*, John Wiley and Sons, New York, 1971
- Raisinghania M.D., *Advanced Differential Equations*, S. Chand & Company Pvt.Ltd ,New Delhi, 2001.

PMAM104 GRAPH THEORY

Semester : I **Credit : 4**
Category : Core IV **Hours/Week : 6**
Class & Major : I M.SC Mathematics **Total Hours : 78**

Objectives:
To enable students

- Develop the concepts of graphs, subgraphs, trees, connectivity, Euler tours, Hamilton cycles, matching, coloring of graphs, independent sets, cliques, vertex coloring, and planar graphs.

UNIT-I GRAPHS **16 Hrs**

Graphs and simple graphs – Graphs Isomorphism – The Incidence and Adjancency Matrices – Subgraphs – Vertex Degrees – Paths and Connection – Cycles – Trees – Cut Edges and Bonds – Cut Vertices.

UNIT-II CONNECTIVITY **16 Hrs**

Connectivity – Blocks – Euler tours – Hamilton Cycles.

UNIT-III MATCHINGS **16 Hrs**

Matchings – Matchings and Coverings in Bipartite Graphs – Edge Chromatic Number – Vizing's Theorem.

UNIT-IV CHROMATIC NUMBER **15 Hrs**

Independent Sets – Ramsey's Theorem – Chromatic Number – Brooks' Theorem – Chromatic Polynomials.

UNIT-V PLANAR GRAPHS **15 Hrs**

Plane and planar graphs – Dual graphs – Euler's Formula –The Five - Colour Theorem and the Four - Colour Conjecture.

Text Book

- Bondy.J.A & Murthy U.S.R., *Graph Theory and Applications*, Macmillan, London, 1976.

Reference Books

- Clark.J & Holton D.A., *A First look at Graph Theory,* Allied Publishers, New Delhi, 1995.
- Gibbsons.A, *Algorithmic Graph Theory*, Cambridge University Press, New York, 1989.
- Wilson.R.J & Watkins J.J., *Graphs: An Introductory Approach*, John Wiley and Sons, New York, 1989.

PMAM201 FIELD THEORY

Semester : I **Credit : 4**
Category : Core V **Hours/Week : 5**
Class & Major : I M.SC Mathematics **Total Hours : 65**

Objectives:

To enable the students

- Understand foundation in various algebraic structures.
- Develop the computational skill in abstract algebra.
- Introduce the general concepts in Abstract Algebra.

UNIT-I EXTENSION FIELD **13 Hrs**

Extension fields – Transcendence of e.

UNIT-II ROOTS OF POLYNOMIALS **13 Hrs**

Roots of Polynomials – More about roots.

UNIT-III GALOIS THEORY **13 Hrs**

Elements of Galois Theory.

UNIT-IV FINITE FIELDS **13 Hrs**

Finite fields – Wedderburn's Theorem on finite division rings.

UNIT-V FROBENIUS THEOREM **13 Hrs**

Solvability by radicals – A theorem of Frobenius – Integral Quaternions and the Four – Square theorem.

Text Book

- Herstein.N. *Topics in Algebra* ,Wiley Eastern Limited, New Delhi, 2000.

Reference Books

- Bhattacharya P.B., Jain S.K., & Nagpaul S.R., *Basic Abstract Algebra* Cambridge University press, New York, 1997.

- Jacobson.N & W.H. Freeman, *Basic Algebra, Vol. I&II* , Hindustan publishing Company, New Delhi, 1980.
- Malik D.S., Mordeson J.N. & Sen M.K., *Fundamental of Abstract Algebra,* Mc Graw Hill, New York, 1997.

PMAM202 MEASURE AND INTEGRATION

Semester : II **Credit : 4**
Category : Core VI **Hours/Week : 5**
Class & Major : I M.SC Mathematics **Total Hours : 65**

Objectives

To enable the students

- Understand basics of knowledge in Lebesgue Measure.
- Acquire indepth knowledge in Multivarible differential calculus.

UNIT-I MEASURE ON THE REAL LINE **13 Hrs**

Lebesgue Outer Measure – Measurable Sets – Regularity – Measurable Functions – Borel and Lebesgue Measurability.

UNIT-II INTEGRATION OF FUNCTIONS OF A REAL VARIABLE **13 Hrs**

Integration of Non negative functions – The General Integral – Riemann and Lebesgue Integrals.

UNIT-III ABSTRACT MEASURE SPACES **13 Hrs**

Measures and outer measures- Completion of a measure- Measure Spaces- Integration with respect to measure. L^p Spaces- Completeness of L^p .

UNIT-IV **13 Hrs**

Signes Measures- Hahn, Jordan Decompositions- The Randon Nikodym theorem- some applications of the Nikodym Theorem.

UNIT-V **13 Hrs**

Measurability in a product space- The Product measure and Fubini's theorem- Lebegue measure in Euclidean space

Text Book

- Barra G. de., *Measure Theory and Integration*, Wiley Eastern Ltd., New Delhi, 1981.

Reference Books

- Natanson.I.P. *Theory of functions of a Real Variable Vol.I & II*, Cambridge University Press, New York, 1960.
- Royden.H.L, *Real Analysis*, Prentice- Hall of India private Limited, New Delhi, 2003.
- Ganapathy Iyer.v, *Mathematical Analysis,* Tata McGraw Hill Publishing Company Ltd, New Delhi, 1977.

PMAM206 PARTIAL DIFFERENTIAL EQUATIONS

Semester : II **Credit : 4**
Category : Core VII **Hours/Week : 5**
Class &Major : I M.Sc Mathematics **Total Hours : 65**

Objectives:
To enable the students

- Understand the physical behavior of the mathematical model.
- Find the solution of higher order partial differential equations.

UNIT - I LINEAR PARTIAL DIFFERENTIAL EQUATIONS 16 Hrs

Formation of PDE -solution of PDE First order – Integral surfaces – Cauchy Problem order equation – Orthogonal surfaces – First order non- linear – Characteristics – Compatible system – Charpit's method. Fundamentals classifications and canonical forms of PDE.

UNIT - II NON-LINEAR FIRST ORDER PDE 13 Hrs

First order non- linear – Characteristics – Compatible system – Charpit's method.

UNIT - III SECOND ORDER PDE 10Hrs

Introduction- classification of second order PDE-Canonical forms - Adjoint operators.

UNIT - IV HYPERBOLIC PDE 13Hrs

Derivation of one- dimensional wave equation -Solution of one- dimensional wave equation by Canonical reduction – IVP – D' Almembert's solution – Vibrating string – Forced Vibration – IVP and BVP for two dimensional wave equation.

UNIT - V ELLIPTIC AND PARABOLIC PDE 13 Hrs

Derivation of Laplace and Poission equation – BVP – Separation of Variables - Dirichlet's Problem and Newmann Problem for a rectangle – Elementary solution of Diffusion equation – Dirac-Delta function – Separation of variables method.

Text Book

- Shankar Rao S., *Introduction to Partial Differential Equations*, 2nd Edition, New Delhi, Prentice Hall of India, 2005.

Reference Books

- Dennemeyer.R, *Introduction to Partial Differential Equations and Boundary* McOwen.R.C, *Partial Differential Equations*, 2nd Edn, New Delhi. Pearson Education, 2005.
- Raisinghania.M.D, *Advanced Differential Equations,* New Delhi, S.Chand & Company Ltd., 2001.
- Sneddon. I.N, *Elements of Partial Differential Equations*, New Delhi, McGraw hill,1983.

PMAM207 CLASSICAL MECHANICS

Semester : II **Credit : 4**
Category : Core VIII **Hours/Week : 5**
Class&Major : I M.Sc Mathematics **Total Hours : 65**

Objectives:
To enable the students

- Develop the structure of classical mechanics and to outline some of its applications in physics .
- Acquire Knowledeg of Lagrange's and Hamilton's Principle.

UNIT - I MECHANICAL SYSTEMS 16 Hrs

Mechanics of a Particle - Mechanics of a System of Particle-Constraints-D'Alembert's Principle and Lagrange's Equations-Simple Applications of the Lagrangian Formulation.

UNIT - II VARATIONAL PRINCIPLES AND LAGRANGE'S EQUATION 10 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 VARATIONAL PRINCIPLES AND LAGRANGE'S EQUATION (CONTD) 13 Hrs

Advantages of Variational Principle Formulation-Conservation Theorems and Symmetry Properties-Energy Function and the Convertion of Energy.

UNIT - IV HAMILTON-JACOBI THEORY 10 Hrs

The Hamilton –Jacobi Equation for Hamilton's Principle Function-The Harmonic oscillator Problem as an example of the Hamilton Jocobi Method - The Hamilton –Jacobi Equation for Hamilton's Characteristic Function-Seperation of Variables in the Hamilton-Jacobi Equation-Ignorable Coordinates and the Kepler Problem.

UNIT - V CANONICAL TRANSFORMATIONS 16 Hrs

The Equations of Canonical Transformations- Examples of Canonical Transformations-The Symplectic Approach Canonical Transformations-Poisson Brackets and Other Canonical Invariants-Equations of Motions,Infinitesimal Canonical Transformations, and Conservation Theorems in the Poisson Brackets Formulation-The Angular Momentum Poisson Brackets Relations-Liouville's Theorem.

Text Book

- Herbert Goldstein, Charles Poole, John Safko, "Classical Mechanics", Addison Wesley, 3rd edition 2000.

Reference Book

- Green Wood.D, "Classical Mechanics"Prentice Hall of India, New Delhi 1985.

PMAM208 OPERATIONS RESEARCH

Semester : II **Credit : 4**
Category : Core IX **Hours/Week : 5**
Class & Major : I M.SC Mathematics **Total Hours : 65**

Objectives

To enable the students

- Acquire Knowledge on queuing systems, Network Schedule, Sensitivity and Decision Analysis.
- Use algorithms for solving problems.

UNIT - I SENSITIVITY ANALYSIS **12 Hrs**

Graphical Sensitivity Analysis - Algebraic Sensitivity Analysis–Right-hand Side of the Constraints - Algebraic Sensitivity Analysis–Objective-Function Coefficients - Sensitivity Analysis with TORA, Excel Solver, and AMPL.

UNIT - II INTEGER LINEAR PROGRAMMING **14 Hrs**

Illustrative Application - Integer Programming Algorithms**:** Branch-and-Bound (B&B) Algorithm Cutting-Plane Algorithm.

UNIT - III CPM and PERT **12 Hrs**

Network Representation - Critical Path Computations - Construction of the Time Schedule - PERT Calculations.

UNIT - IV QUEUING SYSTEMS **16 Hrs**

Generalized Poisson Queuing Model - Specialized Poisson Queues: Steady-State Measures of Performance - Single-Server Models - Multiple-Server Models - Machine Servicing Model–*(M/M/R)* : *(GD/K/K),R<K* - Pollaczek-Khintchine (P-K) Formula.

UNIT - V DECISION ANALYSIS **11 Hrs**

Decision Making under Certainty–Analytic Hierarchy Process (AHP) - Decision Making under Risk - Expected Value Criterion - Variations of the Expected Value Criterion - Decision under Uncertainty.

Text Book

- Hamdy A. Taha, *Operations Research,* Prentice Hall, 2010.

Reference Book

- Kapoor V.K, *Introduction to Operations Research,* Sultan Chand & Sons, New Delhi, 1996.

PMAX 201/PMAX202 MATHEMATICS FOR SCHOOL STUDENT /ELEMENTARY MATHEMATICS

Semester : II **Credit : 1**
Category : Service Learning **Total Hours : 40**

Objectives

To enable the students

- Acquire indepth knowledge about matrices and complex numbers.
- Inculcate innovative teaching methods.
- Apply the technique of differentiation to motion in physics.

UNIT: I MATRICES **8 Hrs**

Introduction to Matrix-Adjoint of the matrix-Inverse of the matrix-Rank of the matrix-Consistency of the linear equations.

Activity: Lecture, Chart presentation

UNIT: II VECTOR ALGEBRA **8 Hrs**

Vectors - Angle between two vectors-scalar product-vector product-product of three vectors-lines and planes.

Activity: Lecture, Chart presentation

UNIT III COMPLEX NUMBERS **8 Hrs**

The Complex number system - Conjugate of the complex numbers-ordered pair of representation-modulus of the complex numbers-De-moivre's theorem and its applications roots of the complex numbers.

Activity: Lecture, Chart presentation.

UNIT: IVANALYTICAL GEOMETRY **8 Hrs**

Conic: parabola-ellipse-hyperbola. Parametric forms of conics.

Activity: Lecture, Model presentation.

UNIT: V DIFFERENTIAL CALCULUS **8 Hrs**

Derivative as measure – Rate of Change – Velocity – Acceleration – Related Rates derivative as a measure of Slope.

Activity: Lecture, Power Point presentation

Reference Books

- Narayanan and Manicavachagom Pillay.T.K,*Algebra VolumeI*, Viswanathan.S Publishers & Printers, Pvt.Ltd. Chennai,1996.
- Narayanan and Manicavachagom Pillay. T.K, *Trignometry* ,Viswanathan.S Publishers & Printers, Pvt.Ltd. Chennai,1994.
- Narayanan and Manicavachagom Pillay. T.K,*Vector Algebra*, Viswanathan.S Publishers & Printers, Pvt.Ltd. Chennai,1997.
- Narayanan and Manicavachagom Pillay.T.K, *Analytical Geomentry of 2D*, Viswanathan.S Publishers & Printers, Pvt.Ltd. Chennai,1993.

Target Group : 12th Students of Government School.

PCAM103 MATHEMATICAL FOUNDATION

Semester : I **Credit : 4**

Category : Core III **Hours/Week : 4**

Class & Major : I MCA **Total Hours : 52**

Objectives

To enable the students

- Explore various tools in solving numerical problems.
- Apply these methods in a computer environment.

UNIT-I LOGIC **10 Hrs**

Logic:introduction – TF statements – connectivities – atomic and compound statements – well formed formulae – tautology – tautology implications and equivalence of a formulae.

UNIT-II REPLACEMENT PROCESS **10 Hrs**

Replacement process – functionally complete sets of connectives and duality law – normals forms – principles of normal forms – theory of inference for predicate calculus – statement involving more than one quantifier.

UNIT-III SYSTEM OF LINEAR EQUATIONS **10 Hrs**

Gauss - Elimination methods - Pivoting-Gauss - Jordan Elimination method –Gauss - Seidal iteration method.

UNIT-IV NUMERICAL DIIFFERENTIATION **10 Hrs**

Numerial Differentiation – Numerical Intergration – Newton's Cotes method – trapezoidal rule – Simpon's rule.

UNIT-V NUMERICAL DIFFERENTIAL EQUATIONS **12 Hrs**

Initial value problem – Euler's method – Runge – kutta method – Boundary value problem.

Text Book

- Termblay.J.P, Manohar.R, *Discrete Mathematical Structures with Applications to Computer science*, Tata Mc Graw Hill Publications Company, Pvt.Ltd, New Delhi, 1997 .

Reference Books

- Sastry.S.S., *Introductory Methods of Numerical Analysis*, Prentice Hall of India Pvt.Ltd, New Delhi, 2000.
- Rajaraman.V, *Computer Oriented Numerical Methods*, Prentice Hall of India Pvt.Ltd, New Delhi, 2000.

PCSM108 THEORETICAL FOUNDATIONS FOR COMPUTERS

Semester : I **Credit : 4**
Category : Core III **Hours/Week : 6**
Class & Major: I- M.Sc Mathematics **Total Hours : 78**

Objectives

To enable the students

- Acquire basic knowledge in Linear System
- Understand the concept of relations and operators.

UNIT-I LOGIC **15 Hrs**

Introduction – TF Statements- Connectivities-Atomic and Compound Statements-Well Formed Formulae-Tautology-Tautology implications and equivalence of a formulae.

UNIT-II RELATIONS AND OPERATORS **15 Hrs**

Relations: Representation of a Relation-Operations on Relation-Equivalence Relation-Closure and Warshall's Algorithm-Partitions and Equivalence Classes-Functions: Function and Operators-One-to-one, Onto Functions, Special types of Functions-Invertible Functions-Composition of Functions.

UNIT-III VECTOR SPACES **16 Hrs**

Vector Spaces and Subspaces-Solving Ax=0 and Ax=b Linear Independence, Basis, and Dimension-linear Transformation.

UNIT-IV ORTHOGONALITY **14 Hrs**

Orthogonal Vectors and Subspaces-Cosines and Projections onto lines-Projections and Least Squares-Orthogonal Bases and Gram-Schmidt.

UNIT-V DETERMINANTS **18 Hrs**

Introduction-Properties of the Determinant-Formulas for the Determinants-Applications of Determinants

Text Book

- Tremblay.J.P., Manohar.R, Discrete Mathematical Structures with Applications to Computer science, Tata Mc Graw Hills Publications Company Pvt. Ltd., Fourth Edition.
- Gilbert Strang, Linear Algebra and its Applications, Cengage Learning, 2006.

PMAE 101 LATEX AND MATLAB

Semester : I **Credit : 4**
Category : NonMajor Elective **Hours/Week : 5**
Class & Major : I PG **Total Hours : 65**
Objectives:
To enable the students

- Introduces documentation in computer
- Develop computer skill.

UNIT I DOCUMENTATION **10 Hrs**

Document layout and organization-Document class- page style- parts of the document- text formatting- TeX and its Offspring- What's different in Latex 2€-Distinguishing Latex 2€ and Basics of Latex file.

UNIT II COMMANDS **15 Hrs**

Commands and environment-commands names and argument- Environments-Contents,-Fine – tuning text- Word Division- Labeling-Referencing- Displayed Text-Changing font- Centering and indenting- Lists-Generalised Lists- theorem-like declaration -Tabulator stops- Boxes.

UNIT III TABLES **15 Hrs**

Tables- printing literal text- Footnodes and marginal notes-Drawing pictures using Latex-Mathematical formulas-Mathematical environment- Main elements of math mode- Mathematical symbols- Addition elements- Fine – tuning Mathematics.

UNIT IV MATLAB **12 Hrs**

Introduction-Basics of MATLAb- Input-Output- File types-Platform dependence-General commands-Interactive Computation: Matrices and Vectors.

UNIT V FUNCTIONS **13 Hrs**

Matrix and Array operation-creating and using Inline functions-Using Built –in functions and On-Line Help-Saving and loading data-Ploting Simple graphs-Basics programming in MATLAB-creating cps files using MATLAB.

Text Books

- Daly P.W, *A Guide to LaTeX* by H.Kopka, Adison Wesley, London,1999.
- Rudra Pratap,*Getting started with MATLAB – A Quick introduction for Scientists and Engineers*, Oxford University Press, New York, 2003.

PMAE102 OPERATIONS RESEARCH

Semester : I **Credit : 4**
Category : NME **Hours/Week : 5**
Class & Major: I PG **Total Hours : 65**
Objectives:
To enable the students

- Introduce various techniques of research.
- Solve real life problems in Business and Management.
- Enlighten on applications in management techniques.

UNIT-I LINEAR PROGRAMMING PROBLEM **13 Hrs**

Mathematical Formulation of the Problem- Graphical Solution Method -General Linear Programming Problem - The Computational Procedure- Use of Artificial Variable Techniques- Big-M Method Simple problems.

UNIT-II TRANSPORTATION PROBLEM **13 Hrs**

General Transportation Problem-The Transportation Table-Loops in Transportation Tables-Solution of a Transportation Problem-Finding an Initial Basic Feasible Solution-Test for Optimality-Degeneracy in Transportation Problem-Transportation Algorithm(MODI Method). Simple problems.

UNIT-III ASSIGNMENTPROBLEM **13 Hrs**

Mathematical Formulation of the problem- the Assignment method- Special Cases in Assignment Problem. Simple problems.

UNIT-IV GAME THEORY **13 Hrs**

Two-person Zero-sum Games- Some Basic Terms- The Maximin - Minimax Principle-Games Without Saddle Points-Mixed Strategies- Graphic Solution of $2 \times n$ and $m \times 2$ Games-

Dominance Property. Simple problems.

UNIT-V NETWORK SCHEDULING BY PERT/CPM 13 Hrs

Network and Basic Components- Logical Sequencing- Rules of Network Construction- Critical Path Analysis- Probability Considerations in PERT- Distinction between PERT and CPM. Simple problems.

Text Book

- Kanti Swaroop,Gupta P.K.and Manmohan, *Operations Research*, Sultan Chand & Sons, New Delhi, 2003.

Reference Books

- Kapoor .V.K, *Introduction to Operations Research*, Sulthan Chand & Sons, New Delhi, 1996.
- Taha.A Handy, *Operations Research-An Introduction*, Prentice hall of India Pvt Ltd, New Delhi, 2000.

PCAM206 APPLIED STATISTICS

Semester : II **Credit : 4**
Category : Core VI **Hours/Week : 5**
Class & Major : I MCA **Total Hours : 65**

Objectives
To enable the students

- Develop problem solving skills in sampling techniques and statistical inference
- Provide basic principles of experimentation and discuss the analysis of data relating to agriculture, biological sciences and industry.

UNIT-I CORRELATION AND REGRESSION 13 Hrs

Correlation Analysis-Karl Pearson's correlation coefficient-rank correlation coefficient-Multiple and partial correlation (3 variables only)-regression analysis-regression equations-methods of least squares -fitting of the curve of the form

i. $Y=ax+b$ ii.$Y=ax^2+bx+c$ iii.$Y=ax^b$ iv.$Y=ae^{bx}$,$Y=ab^x$

UNIT-II PROBABILITY 13 Hrs

Sample space-definitions of events-Axiometic approach to probability-conditional probability-Baye's theorem-random variables-continuous and discrete random variables-distribution function of random variable-characteristics of distribution-mathematical expectation, varience-moment generating function-Chebychev's inequality.

UNIT-III THEORETICAL AND CONTINUOUS DISTRIBUTION 13 Hrs

Bivariate distribution - distribution function-marginal and conditional distributions-discrete distributions-binomial,poisson distribution-continuous distribution-Normal and exponential distribution.

UNIT-IV TESTS OF SIGNIFICANCE 13 Hrs

Tests of significance –Sampling distribution-Standard Error – Hypothesis – Errors in Sampling – Critical region – level of significance - Large sample Tests – Sampling of Attributes –Sampling of

Variables – Small sample tests – Student's t-Test – Test for single mean –Test for difference of means – Dependent and Independent samples –Test for Correlation coefficient –Applications in Medicine- Non parametric test- Chi-square test – Test for population variance, Goodness of fit, Independence of Attributes – F-test for testing equality of population variances.

UNIT-V ANALYSIS OF VARIANCE **13 Hrs**

Analysis of variance – one- way and two- way classifications. Statistical Quality Control- Introduction-types of control chart-x-charts-chart,c-chart,p-chart and its application in industry.

Note: No derivation required Emphasis on concepts and applications.

Text Books

- Gupta S.C. and Kapoor,V.K, *Elements of Mathematics Statistics*, Sultan Chand and Sons, 2006
- Gupta S.P., *Statistical Methods*, Sultan Chand and Sons, 2011.

Reference Books

- Murthy M.N.(1967) " Sampling Theory and Methods", Statistical Publishing Society, Calcutta.
- Robert V. Hogg & Elliot A. Tanis (1983), " Probability and Statistical Inference", Macmillan Publishing Company, New York.
- Mood A.M.,Graybill.F.A. & Boes. D.G., " Introduction to Mathematical Statistics", McGraw Hill, 1974.
- Dr.Parimal Mukhopadhyay, " Applied Statistics", Books abd allied(P) Ltd. 2011.
- Sundar Rao.P.S.S & Richard.J, " Introduction to Biostatistics and Research Methods", PHI Learning Private Ltd., 2009.

PMAE203 DISCRETE MATHEMATICS

Semester : II **Credit : 4**
Category : Non-Major Elective **Hours/Week : 5**
Class & Major : I PG **Total Hours : 65**
Objectives:

To enable the students

- Understand the concepts of Set Theory and Finite Automata.
- Apply these methods in a computer environment.

UNIT-I LOGIC **15 Hrs**

Introduction – TF statements – Connectives – atomic and compound statements – Well formed Formulae.

UNIT-II TAUTOLOGY **15 Hrs**

Tautology – Tautology implications and equivalence of a formulae. Replacement process.

UNIT-III LATTICES AND BOOLEAN ALGEBRA **15 Hrs**

Functionally complete sets of connectives and duality law – normal forms Principles of normal forms –Lattices – Some properties of lattices – Hasse digrams – notations- Boolean algebras – Boolean polynomials.

UNIT-IV GRAPH THEORY **10 Hrs**

Basic concepts – Digraph,Incidence and Degree-Subgraph - Isomorphism.

UNIT-V FINITE AUTOMATA **10 Hrs**

Introduction – Finite automata - Definition of finite automation-representation of finite automation-acceptability of a string by finite automata.

Text Book

- Venkataraman.M.K., Sridharan.N & Chandrasekaran.N., *Discrete Mathematics*, The National publishing company, 2000.

Reference Books

- Sundaresan.V.ganapathy Subramanian.K.S & Ganesan.K *Discrete Mathematics*, A.R.Publications, 1996.
- Tremblay.J.P, Manohar.R, *Discrete Mathematical Structures with Applications to Computer Science*, Tata Mc Graw Hills Publications Company Pvt.Ltd., New Delhi, 1999.

III & IV Evaluation Components of CIA

S.NO	Course code	Course Title	Component III	Component IV
1	PMAM101	Modern Algebra	Poster Presentation	Seminar
2	PMAM102	Real Analysis	Poster Presentation	Seminar
3	PMAM103	ODE	Problem Solving	Seminar
4	PMAM104	Graph Theory	Model Building	Seminar
5	PMAM201	Field Theory	Poster Presentation	Seminar
6	PMAM202	Measure and integration	Problem Solving	Seminar
7	PMAM206	PDE	Problem Solving	Seminar
8	PMAM204	Classical Mechanics	Model Building	Seminar
9	PMAM207	Operation Research	Problem Solving	Seminar

COURSE PROFILE M.Phil (Mathematics)

Semester	Category	Course Code	Course Title	Contact Hrs/ Week	Credit	
					Min	Max
I	Core 1	MMA103	Algebra and Analysis	6	5	5
	Core 2	MMA102	Topology and Differential Geometry	6	5	5
	Core 3	MMA105	Special Area Study Paper	6	5	5
II			Dissertation	30	15	15
▪ **Paper Presentation (minimum one) and /or Publication of articles in Journals (minimum one) is mandatory for submission of Dissertation.**						

MMA103 ALGEBRA AND ANALYSIS

Semester : I **Credit : 5**
Category : Core II **Hours/Week : 6**
Class & Major : M.phil-Mathematics **Total Hours : 78**

Objectives

To enable the students

- Explore the concept of Topology through Manifold Differential geometry etc.
- Develop analyzing skill.

UNIT-I THE RADIAL **15 Hrs**

The Radial of an Algebra – Wakayama's lemma – Jacobson Radial – The Radial of an Artinian Algebras – Artinian Algebras are Noe theorem – Nilpotent Algebras – The Radial of a grouph Algebra – Ideals in artinian Algebras.

UNIT-II TENSOR PRODUCTS **15 Hrs**

Tensor Products of R – modules – Tensor Products of Algebras.

UNIT-III ABSTRACT INTEGRATION **18 Hrs**

The concept of measurability – Simple functions – Elementary properties of measures- Integration of positive functions – Integration of complex functions – the Role played by Sets of measure zero.

UNIT-IV POSITIVE BOREL MEASURES **15 Hrs**

Vector spaces – Topological Preliminaries – The Riesz Representation theorem – Regularity properties of Borel measures – Lebesgue measure - Continiuty properties of Measurable functions.

UNIT-V FOURIER TRANSFORMS **15 Hrs**

The inversion Theorem – The Plancherel Theorem – The Banach algebra L^1

Text Books

- Pierce. R.S., *Treatment as in Associative Algebra*.
- Walter Rudin, *Real & Complex Analysis*, Third Edition, New Delhi Prentice Hall of India Private Limited,1997.

MMA102 TOPOLOGY AND DIFFERENTIAL GEOMETRY

Semester	**: I**	**Credit**	**: 5**
Category	**: Core I**	**Hours/Week**	**: 6**
Class & Major	**: M.Phil-Mathematics**	**Total Hours**	**: 78**

Objectives
To enable the students

- Gain Knowledge in Foundations of Algebra and Analysis for further developments in Research.
- Develop analyzing skill.

UNIT-I FUNDAMENTAL GROUP AND COVERING SPACES **15 Hrs**

Homotography – Fundamental group – Covering spaces

UNIT-II SIMPLICIAL COMPLEXES **15 Hrs**

Geometry of simplicial complexes – Barycentric subdivisions – simplicial approximation Theorem.

UNIT-III **18 Hrs**

Differentiable manifolds –Differential Forms.

UNIT-IV **15 Hrs**

Miscellaneous Facts

UNIT-V **15 Hrs**

De Rham's Theorem

Text Books

- Singer I.M., Thorpe Singer. J. A., *Lecture Notes on Elementary Topology and Geometry*, New York, Thorpe Publishers 1967.

DEPARTMENT OF PHYSICS

Preamble

UG : Course Profile, list of courses offered to other departments and the syllabi of courses offered in the first two semesters along with evaluation components III & IV(with effect from 2015-2018 batch onwards)

PG : Course Profile, list of courses offered to the other departments & syllabi of courses along with evaluation components III & IV(with effect from 2015-2017 batch onwards) are presented in this booklet.

COURSE PROFILE: B.Sc. (Physics)

Semester	Part	Category	Course code	Course Title	Contact Hrs/week	Credit	
						Min	Max
I	I	Language	UTAL105,UTAL106/ UHIL101/UFRL101	Basic Tamil-I/Advanced Tamil I/Hindi/French	4	2	3
	II	English	UENL107,UENL108	Basic English-I/Advanced English-I	5	3	4
	III	Core I	UPHM101	Fundamentals of Physics	2	1	1
	III	Core II	UPHM103	Mechanics	5	5	5
	III	Core III	UPHM104	Thermal and Statistical Physics	4	4	4
	III	Core Practical-I	UPHR101	Mechanics and Thermal Physics Practicals	3	2	2
	III	Allied	UMAA104	Algebra, Differential Calculus and Trigonometry	5	5	5
	IV	Value Education			2	1	1
				TOTAL	**30**	**23**	**25**
II	I	Language	UTAL205,UTAL206 / UHIL201/UFRL201	Basic Tamil-II/Advanced Tamil-II/Hindi/French	4	2	3
	II	English	UENL207,UENL208	Basic English-II/Advanced English-II	5	3	4
	III	Core IV	UPHM202	Properties of Matter and Acoustics	3	3	3
	III	Core V	UIDM201	Material science	4	4	4
	III	Core Practical-II	UPHR202	Properties of Matter and Acoustics Practicals	3	2	2
	III	Allied	UMAA212	Integral Calculus, Laplace Transform and Ordinary Differential equation	5	5	5
	IV	NME	-	-	4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/Physical Education/NCC			-	1	2
				Total	**30**	**23**	**26**
III	I	Language	UTAL305,UTAL306 / UHIL301/UFRL301	Basic Tamil-III/Advanced Tamil-III/Hindi/ French	4	2	3
	II	English	UENL307,UENL308	Basic English-III/Advanced English-III	5	3	4
	III	Core VII	UPHM302	Optics and Laser Physics	5	4	4
	III	Core Practical-III	UPHR302	Optics and Laser Physics Practicals	3	3	3
	III	Allied	UCSA303	Mathematical Programming in C	4	3	3
	III	Allied Practical	UCSA304	Mathematical Programming in C Lab	3	2	2
	IV	NME	-	-	4	2	2
	IV	Value Education	-	-	2	1	1
				TOTAL	**30**	**20**	**22**

Semester	Part	Category	Course Code	Course Title	Contact	Credit

					Hrs/week	Min	Max
IV	I	Language	UTAL405,UTAL406/ UHIL401/UFRL401	Basic Tamil-IV/Advanced Tamil-IV/Hindi/ French	4	2	3
	II	English	UENL407, UENL408	Basic English-IV/Advanced English-IV	5	3	4
	III	Core VIII	UPHM402	Electricity and Magnetism	4	4	4
	III	Core IX	UPHM403/506	Numerical Methods using C	6	5	5
	III	Core Practical-IV	UPHR404	Electricity and Magnetism Practical	3	3	3
	III	Allied	UCHA401/UCHA402	Chemistry-II	3	3	3
	III	Allied Practical	UCHA402/UCHR403	Volumetric and Organic Analysis-I	3	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/Physical Education			-	-	2
				TOTAL	**30**	**23**	**27**
V	III	Core XI	UPHM501	Quantum Mechanics and Relativity	6	5	5
	III	Core XII	UPHM505	Basic Electronics	7	5	5
	III	Core XIII	UPHM507	Basics of Instrumentation	7	5	5
	III	Core Practical-V	UPHR501	Electronics Practical I	3	3	3
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
				TOTAL	**30**	**23**	**23**
VI	III	Core XV	UPHM608	Solid State Physics	5	5	5
	III	Core XVI	UPHM606	Atomic and Molecular Physics	5	5	5
	III	Core XVII	UPHM607	Digital Electronics and Microprocessor	5	4	4
	III	Core XVIII	UPHM603	Nuclear Physics	5	5	5
	III	Core Practical VI	UPHR604	Electronics Practical II	3	3	3
	III	Core Elective	UPHO601/ UPHO602/UPHO603	Nanophysics/ Astrophysics/Spintronics	5	4	4
	III	Viva Voce	UHSC601	Comprehensive Viva Voce	-	1	1
	IV	Soft Skill			2	1	1
	V	Extension Programme/Physical Education			-	-	2
				TOTAL	**30**	**28**	**30**
				GRAND TOTAL	**139**	**140**	**153**

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Hrs/week	Credit	
						Min	Max
V	III	Core XIV	UPHM508	Electrical Appliance (self study) /Mini Project	-	-	1
II	III	Core VI	UPHI201	Summer Internship	-	-	1
IV	III	Core X	UPHI401	Summer Internship	-	-	1

LIST OF COURSES OFFERED TO OTHER DEPARTMENTS

NON-MAJOR ELECTIVES

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit	
						Min	Max
II	IV	Non Major elective	UPHE202	Applied physics	4	2	2
			UPHE203	Biomedical instrumentation			
III	IV	Non Major Elective	UPHE304/ UPHE503	Communication Systems	4	2	2
			UPHE303	Servicing and maintenance of home appliances			

ALLIED

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit	
						Min	Max
I	III	Allied	UPHA102	Allied Physics-I	3	3	4
I	III	Allied	UPHR103	Allied Physics Practical -I	3	2	2
II	III	Allied	UPHA203	Allied Physics-II	3	3	4
II	III	Allied	UPHR203	Allied Physics Practical -II	3	2	2
III	III	Allied	UPHA303	Digital Electronics	4	3	3
IV	III	Allied	UPHA402	Electronics (for Mathematics Major)	4	3	3

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit	
						Min	Max
V	III	Allied Optional	UPHA501	Conservation of Energy	5	4	4
			UPHA502	Laser for medical diagnosis	5	4	4
			UPHA503	Fiber optic communication	5	4	4

INTERDISCIPLINARY

Semester	Part	Category	Course Code	Course Title	Hrs/week	Credit	
						Min	Max
VI	III	Core XVIII	UIDM601	Solid state chemistry	4	4	4

DEPARTMENT OF PHYSICS
COURSE PROFILE: M.Sc(Physics)

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit	
					Min	Max
I	Core I	PPHM101	Mathematical Physics –I	5	4	4
	Core II	PPHM102	Classical Mechanics	5	4	4
	Core III	PPHM103	Advanced Electronics	4	4	4
	Core IV	PPHM104	Electromagnetic Theory	5	4	4
	Core Practical	PPHR101	Physics practical –I	5	-	-
	Library			1	-	-
	NME			5	4	4
			Total	**30**	**20**	**20**
II	Core V	PPHM201	Quantum Mechanics I	6	4	4
	Core VI	PPHM202	Statistical mechanics	5	4	4
	Core VII	PPHM203	Molecular Spectroscopy	5	4	5
	Core Elective -I	PPHM204	Advance in Material Science	3	2	2
	Core Practical I	PPHR101	Physics practical –I	5	6	6
	Library			1	-	-
	NME	PALE201/PALE 301	NET/SET/Competitive Exam	5	4	4
			Total	**30**	**24**	**25**
III	Core IX	PPHM301	Quantum Mechanics II	6	5	5
	Core X	PPHM302	Solid State Physics I	5	5	5
	Core XI	PPHM303	Microprocessor and Microcontroller	5	4	4
	Core Elective-II	PPHM304	Laser and nonlinear optics	4	3	3
	Project	PPHP301		2		
	Core Practical- II	PPHR301	Physics practical –II	5	-	-
	Library			1	-	-
	Value Education			2	1	1
			Total	**30**	**18**	**18**
IV	Core XII	PPHM401	Mathematical Physics-II	5	4	4
	Core XIII	PPHM402	Nuclear and Particle Physics	4	4	4
	Core XIV	PPHM403	Solid State Physics-II	5	5	5
	Core Elective	PPHM404	Crystal growth/Nano Physics	4	2	2
	Core Practical-II	PPHR301	Physics Practical-II	5	6	6
	Project	PPHP401		4	6	6
	Library			1	-	-
	Value Education			2	1	1
			TOTAL	**30**	**28**	**28**
			GRAND TOTAL	**120**	**90**	**91**

LIST OF COURSES OFFERED TO OTHER DEPARTMENTS
NON-MAJOR ELECTIVES

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit	
					Min	Max
I	Non Major elective	PPHE101	Nanoscience	5	4	4

EXTRA CREDIT EARNING

Semester	Category	Course Code	Course Title	Hrs/Week	Credits	
					Min	Max
II	Core-VIII	PPHI201	Summer Internship	-	-	1

UPHM101 – FUNDAMENTALS OF PHYSICS

Semester : I **Credit : 1**
Category : Core I **Hours/Weeks : 2**
Class & Major : I B.Sc Physics **Total Hours : 26**

Objectives:
To enable the students

- Understand the basic concepts of physics.
- Apply the concepts and solve the basic problems in optics, thermodynamics and electronics.

UNIT – I FORCE AND MOTION **05 Hrs**

Newton's laws and basic problem- gravitation force- Appling Newton's law-Conservation of momentum and its applications- Racket problulision- friction-Properties of friction.

UNIT – II OPTICS **05 Hrs**

Reflection – Refraction - Interference – Polarisation – Diffraction – Lens – Mirror - Basic problem – Laser- Optical pumping-Population inversion- Ruby laser.

UNIT – III WAVES **06 Hrs**

Waves and particles - Types of waves-Waves motion-Speed of waves-Longitudinal and Transverse wave-Principles of superposition – Interfernce- standing waves- basic problems.

UNIT – IV THERMAL PHYSICS **05 Hrs**

Laws of thermodynamics- Measuring temperature- Thermal expansion- Heat capacity- specific heat- Molar specific heat-Heat transfer mechanism- Thermal conductive-Black body radiation -wiens law-Stephens law radiation- Newton law of cooling.

UNIT – V BASIC ELECTRONICS **05 Hrs**

Semi conductor diode-p-n junction diode- Zener diode-Photo conductor- capacitor-Transistor-semiconductor- conductor-insulator- Half wave rectifier- Full wave rectifier.

Text Books

- David Halliday and Robert Resnick, *Fundamentals of Physics*, Wiley, 10th edition, 2013.
- Peter.Y, *Fundamentals of semiconductor*, newage publishers, 2007.
- Roger J Blinstoyle, *Physics of particles, Matter and the Universe*, Institute of Physics Publishing, Bristol 1997.

Reference Books

- John Allen ,*Inside Science*, - BBC Books, 1988.
- John J Merill, W Kenneth Hamblin, James, *Physical Science Fundamentals*, NewYork, 1982.

UPHM103 MECHANICS

Semester : I **Credit : 5**
Category : Core II **Hours/week : 5**
Class & major : I B.Sc Physics **Total hours : 65**

Objectives:
To enable the students

- Understand the dynamics of rigid bodies and moment of inertia
- Acquire the knowledge on different types of motion and gravitation
- Understand the basics of classical mechanics and its applications

UNIT – I LAWS OF MOTION **13 Hrs**

Newton's laws of motion-conservation of energy-conservation forces-conservation of linear momentum-center of mass – angular momentum – conservation of angular momentum – relation between torque and angular momentum. Rocket motion – principle- theory – velocity of the rocket at any instant – rocket propulsion system – multi stage rocket – shape of the rocket – artificial satellites.

UNIT – II GRAVITATION **15 Hrs**

Kepler's law – Newton's law of gravitation - determination of G by Boy's method – density of earth – mass of the earth and sun – gravitational field – intensity of the field – gravitational potential – potential energy – inertial and gravitational masses – escape and orbital velocity – acceleration due to gravity – value of 'g' at the poles and at the equator – variation of 'g' with latitude, altitude &depth. Compound pendulum – radius of gyration – determination of 'g' by compound pendulum.

UNIT – III CIRCULAR MOTION **13Hrs**

Angular displacement – angular velocity – relation between linear velocity and angular velocity – acceleration in uniform circular motion – centripetal force and centrifugal force – applications – condition for skidding and overturning of a car taking a turn – motion in horizontal circle – friction present on the road – motion in vertical circle – centrifuge.

UNIT – IV MOMENT OF INERTIA **10 Hrs**

Rigid body – moment of inertia – parallel axes theorem – perpendicular axes theorem. Moment of inertia of a thin rod, solid cylinder, and solid sphere – hollow sphere with external and internal radii – kinetic energy of rotation.

UNIT – V LAGRANGIAN AND HAMILTONIAN MECHANICS **14 Hrs**

Mechanics of a system of particle – degrees of freedom – constrains – generalated coordinates – principles of virtual work – D' Alembert's principle – derivation of Lagrange's equation of motion – applications of Lagrange's equation to simple pendulum and linear harmonic oscillator – Hamiltonian function 'H' – Hamiltonian equation – physical significance of 'H' – applications of Hamiltonian equations to simple pendulum and linear harmonic oscillator.

Text Books

- Murugeshan.R, *Mechanics and Mathematical Physics*, S. Chand & company lid, New Delhi, 2008
- Brijlal, subramaniam, *Properties of matter*, Eurasia publishing house, New Delhi, 1993.
- M. Narayanamoorthy, *Mechanics and properties of matter*, national publishing house, new delhi, 2002.

Reference Books

- Halliday D, Resnick, walker.J *Fundamentals of physics*, willey, 6th edition, new York, 2006.
- Richard p. feyman, R .B .Leighton & Mathew sands, *feyman lecture on physics series*, vol. 1,2 & 3, narosa publishing, 8th reprint, new delhi, 1995.
- D.S. Mathur, *Mechanics*, S.Chand & Company ltd, new delhi, 2005.
- Halliday D, Resnick, walker.J *fundamentals of physics*, willey, 6th edition, new York, 2006.

UPHM104 THERMAL AND STATISTICAL PHYSICS

Semester	**: I**	**Credit**	**: 4**
Category	**: Core III**	**Hours/Week**	**: 4**
Class & major	**: I B.Sc Physics**	**Total hours**	**: 52**

Objectives:
To enable the students

- Understand the basics principles of heat, measurement and laws of thermodynamics
- Acquire knowledge of Maxwell's thermodynamic relations and low temperature application.
- Understand the concepts of statistical physics and its applications.

UNIT – I THERMOMETRY 11Hrs

Definition of temperature – platinum resistance thermometer – construction & working – thermistor – specific heat capacity – Dulong and Petit's law – calorimeter – specific heat of a gas – relation between specific heat of a gas – Mayer's expression – jolly's differential steam calorimeter for finding C_V - callendar and Barne's continuous flow method – basis of kinetic theory – Maxwell's laws of velocity of distribution – experimental verification of Maxwell Boltzmann distribution – degrees of freedom – mean free path.

UNIT – II TRANSMISSION OF HEAT 10Hrs

Introduction – coefficient of thermal conductivity – Lee's disc method – convection – applications of convection – central heating system – thermopile – radiation – thermal radiation – Black body – Stefan's law- experimental verification of Stefan's law- distribution of energy in black body spectrum – Wien's law – Rayleigh – jeans law – Newton's law of cooling – experimental verification of Newton's law of cooling – Planck's radiation law – solar constant – temperature of the sun – Angstrom's pyrheliometer.

UNIT – III THERMODYNAMICS 10Hrs

Thermodynamics system – zeroth, first, second and third laws of thermodynamics – isothermal and adiabatic process – reversible and irreversible process – heat engine – efficiency of a Carnot's engine – Carnot's cycle - Carnot's Theorem. Entropy – temperature – entropy diagram – Maxwell's thermodynamic relations – Clapeyron's latent heat equation.

UNIT – IV LIQUEFACTION OF GASES AND SUPER CONDUCTIVITY 10Hrs

Introduction – cooling by adiabatic expression – joule – Thomson expression – liquefaction of gases – principle of regenerative cooling – liquefaction of Helium – He I & II- peculiar properties of He II. Adiabatic demagnetization – superconductivity – Meissner effect –applications.

UNIT – V STATISTICAL PHYSICS 11 Hrs

Introduction – micro and macro states – thermodynamic probability – ensembles – derivation of Maxwell – Boltzmann distribution law – application of M-B law to ideal gas – identical particles – derivation of Bose-Einstein distribution law – application of B-E statistics – derivation of Fermi-Dirac distribution law – applications of F-D statistics – comparison of three statistics.

Text Books

- Mathur.D.S, *Heat and Thermodynamics*, S.Chand & company ltd, New Delhi, 2010.
- Brijlal, subramaniam, P.S. Hemne, *Heat Thermodynamics and Statistical Physics*, S Chand & company ltd, new delhi, 2010.
- R.Murugesan, Krithika Sivaprasath.S, *Thermal Physics*, S.Chand & company ltd, New Delhi, 2008.

Reference Books

- P.K.Chakrabati, *Theory and experiments on thermal Physics*, new central book agency (P) ltd, Kolkata, 2006.
- Rajam.J.B and Arora.C.L, *Heat and Thermodynamics*, S.Chand & company ltd, New Delhi, 2004.
- Sathyaprakash and Agarwal.C, *Statistical Mechanics*, Himalayan publication house, Bombay, 1980.
- Richard P. Feynman, R. B. Leighton & Mathew sands, Feynman lectures on physics series, vol. 1, 2 & 3, Narosa publishing, 8th reprint, New Delhi, 1995.

UPHR101 MECHANICS AND THERMAL PHYSICS PRACTICAL

Semester	**: I**	**Credit**	**: 2**
Category	**: Core Practical-I**	**Hours/Week**	**: 3**
Class & major	**: I B.Sc Physics**	**Total Hours**	**: 39**

Objectives:

To enable the students

- Understand the theory and experiment the concept.
- Understand the techniques of handling equipments
- Make error free measurements and error analysis

1. Compound pendulum-acceleration due to gravity ‘g’ and radius of gyration
2. Bifilar pendulum-verification of M.I theorem
3. Specific heat capacity – newton’s law of cooling
4. Lee’s disc – thermal conductivity of card board
5. Specific heat of a liquid – verification of newton’s law of cooling
6. Thermistor – temperature coefficient ‘’a’’ – multimeter
7. Thermocouple – temperature coefficient ‘’a’’ – multimeter
8. P.O box – temperature coefficient of thermistor

Optional

1. Sonometer – measurement sun radiation
2. Bifilar pendulum – Determination of earth’s gravitation field

3. Measurement of Stefan's constant
4. Measurement of 'g' by falling plate

Text books

- Srinivasan.M.N.,Balasubramanian S.Ranganathan R., *The Text book of Practical Physics,* Sulthan Chand & sons, New Delhi, 2006.
- Ouseph.C.C., Rangarajan G., *A Text book of practical of Physics Part – I,* S.Vishvanathan publisher, 1990.

Reference book

- Gupta.S.L, Kumar.V, *Practical Physics*, pragathi prakashan, 25th edition, 2002.

UPHM202 PROPERTIES OF MATTER AND ACOUSTICS

Semester : II **Credit : 3**
Category : Core IV **Hours/Week : 3**
Class & Major : I B.Sc Physics **Total Hours : 39**

Objectives
To enable the students

- Understand the basics of elasticity and its importance in beams and griders
- Familiarize the concepts of surface tension, viscosity and their applications
- Introduce the concepts of diffusion, bernoulli's theorem and their applications
- Understand the different types of vibration of sound, ultrasonic and their applications

UNIT – I ELASTICITY **8 Hrs**

Introduction – stress, strain,hook's law – types of elasticity – poisson's ratio – workdone due to strain – relation between the elastic moduli – torsion – torsional oscillations of a body – rigidity modulus by torsion pendulum – bending of beams – expression for the bending moment – cantilever – uniform bending – pin and microscope – non uniform bending – scale and telescope.

UNIT – II SURFACE TENSION **8 Hrs**

Introduction – explanation of surface tension in kinetic theory – surface energy – angle of contact – express pressure inside a liquid drop and soap bubble – variation of surface tension with temperature – drop weight method of determination the S.T of a liquid – interfacial tension-experiment to determine the interfacial tension between water and kerosene.

UNIT – III VISCOSITY **7 Hrs**

Introduction – streamline and turbulent flow – determination of critical velocity – poiseuill's formula – correction – poiseuill's method for determination coefficient of a liquid – terminal velocity – stoke's formula – stoke's method for determination the coefficient of viscosity of a liquid – variation of viscosity with temperature and pressure – friction and lubrication.

UNIT – IV DIFFUSION AND HYDRODYNAMICS 7 Hrs

Diffusion: introduction – fick's law of diffusion – analogy with heat conduction – experimental determination of coefficient of diffusion.Hydrodynamics:equation of continuity – energy of the liquid – bernoulli's theorem – proof – applications of bernoulli's theorem – venturimeter – pitot's tube.

UNIT – V ACOUSTICS 9 Hrs

Forced vibrations – damped vibrations – resonance – intensity of sound – noise pollution – transverse vibration of a stretched string – expression for the velocity of transverse vibration of a stretched string – expression for the transverse vibration of a stretched string – laws of vibration of strings-A.C.freuency measurement using sonometer.Ultrasonics-production of ultrasonics wavws-use of ultrasonics-NDT-SONAR-reverbation-Sabine's formula –absorption coefficient-acoustics of buildings-factors affecting sound distribution in an auditorium.

Text Books

- Murugeshan.R, Kiruthiga Sivaprasath, *Properties of Matter and Acoustics*, S.Chand and Company Ltd,New Delhi,2010.
- Brijlal,Subramanian, *Properties of Matter*,Eurasia Publishing House,New Delhi,1993.
- R.Murugeshan,A textbook of Sound, S.Chand and Company Ltd,New Delhi,2008.

Reference Books

- Halliday D.Resnick,Walker.J, *Fundamentals of Physics*, Wiley,6th Edition, New York,2006
- Richard P.Feymann, R.B.Leighton and Mathews Sands,*Feymann Lectures on Physics Series*,Vol 1,2 &3,Narosa Publishing,8threprint,New Delhi,1995.
- Murugeshan.R,*Waves and Oscillations* ,S.Chand and Company Ltd,New Delhi,205.

UIDM201 MATERIAL SCIENCE

Semester : II **Credit : 4**
Category : Core V **Hours/Weeks : 4**
Class & Major : I B.Sc Physics **Total Hours : 52**

Objectives:
To enable the students:

- Gain knowledge in advanced functional materials.
- Understand the applications of nanotechnology and nanomaterial's.

UNIT – I IONIC CONDUCTIVITY AND SOLID ELECTROLYTES 13Hrs

Types of ionic crystals-alkali halides-silver chloride-alkali earth flouvider-simple stoichiometric oxides. Types of ionic conductors-halide ion conductors-oxide ion conductors-solid electrolytes-applications of solid electrolytes. Electrochemical cell-principles-Batteries, sensors and fuel cells-crystal defects. Electronic properties and band theory; metal, semiconductors-Inorganic solids-colour, magnetic and optical properties, luminescence.

UNIT – II MAGNETIC MATERIALS 13Hrs

Introduction-types of magnetic materials-diamagnetism-paramagnetism, ferromagnetism. Ferrites: Preparation and their applications in micro wave-floppy disk-magnetic bibble memory and

applications. Insulating materials: classification on the basis of temperature –Blymer insulating materaials and ceramic insulating materials. Ferro electric materials:examples-applications of ferro electries.

UNIT – III MODERN ENGINEERING METARIALS 13Hrs

Metallic glasses-Introduction-composition, properties and applications. Shape memory alloys: Introduction-Examples-application of SMA-Advantages and Disadvantages. Biomaterials: Introduction-metals and alloys in biomaterials-ceramic biomaterials, composite biomaterials.

UNIT – IV NANOPHASE MATERIALS 13Hrs

Introduction-techniques for synthesis of nanophase materials-sol-gel synthesis-electrode position-inert gas condensation-mechanical alloying-properties of nanophase materials-applications of nanophase materials, composite materials: introduction-types.

UNIT – V NANOMATERIAL 13Hrs

Introduction-importance-various stages of nanotechnology-nanotube technology-nanoparticles-fullerenes-nanodendrimers-nanopore channels,fibres and scaffolds-CVD diamond technology-FCVA technology and its applications-nanoimaging techniques.

Text Books

- Raghavan V.R.,*Material Science and Engineering*,Printice Hall India Ltd.,2001.
- Pradeep.T, Nano: *The Essentials in Understanding Nanoscience and anotechnology*,Tata McGraw Hill, New Delhi, 2007.

Reference Book

- Suhas Bhattacharya, *A text book of nanoscience and nanotechnology*, Wisdom press 2013.

UPHR202 PROPERTIES OF MATTER AND ACOUSTICS PRACTICAL

Semester : II **Credit : 2**
Category : Core Practical II **Hours/Weeks : 3**
Class & Major : I B.Sc Physics **Total Hours : 39**

Objectives:
To enable the students

- Understand the theory of the application of subject knowledge
- Understand the techniques of handling equipments
- Make error free measurements and error analysis

1. Young's Modulus-Cantilever Depression Using Scale and Telescope
2. Young's Modulus-Uniform Bending-Scale and Telescope
3. Young's Modulus-Non Uniform Bending-Pin and Microscope
4. Rigidity Modulus –Torsion Pendulum-(with and without masses)
5. SurfaceTension-Capillary rise method-(Radius using Vernier Microscope)

6. Surface Tension and Interfacial Tension-S.T by Drop Weight Method
7. Co-efficient of Viscosity of a Liquid-Constant Pressure Head
8. Sonometer-Frequency of Tuning Fork

Optional

1. Young's Modulus-Uniform Bending-Koenig's Method
2. Rigidity Modulus- Static Torsion
3. Co-efficient of Viscosity of a Liquid-Stokes Method
4. Sonometer - A.C. Frequency-Steel and Brass Wire

Text Books

- Srinivasan M.N.,Balasubramanian S.,Ranaganathan R.,*The Text Book of Practical Physics*,Sultan Chand and Sons,New Delhi.2006
- OusephC.C.,Ranagarajan G.,*A textbook of Practical Physics Part-I*,S.Viswanathan Publisher.1990

Reference Book

- S.L.Gupta and V.Kumar, *Practical Physics*. Pragathi Prakashan.25th edition,2002.

UPHA102 ALLIED PHYSICS – I

Semester: I	**Credit : 3**
Category: Allied I	**Hrs/Week : 3**
Class & Major:I B.Sc Chemistry	**Total Hours : 39**

Objectives:

To enable the students

- Gain knowledge of basics of particle dynamics and properties of matter.
- Understand diffraction and polarization of light waves.
- Acquire knowledge on crystal diffraction.

UNIT I PARTICLE DYNAMICS 7Hrs

Displacement, velocity and acceleration – distance-time graph – velocity-time graph – projectile motion – uniform circular motion – tangential acceleration in circular motion – relative velocity and acceleration.

UNIT II GRAVITATION 7Hrs

Kepler's laws - Newton's law of gravitation – 'g' and measurement – earth-moon system - earth satellites – parking orbit – earth density – mass of the sun – gravitational potential – velocity of escape – satellite potential and kinetic energy.

UNIT III PROPERTIES OF MATTER 9Hrs

Elastic properties: Elastic limit – Hooke's law – moduli of elasticity – Poission's ratio – relation between q,n,k – force in a bar due to contraction or expansion – energy stored in a wire – rigidity modulus – torsion in a wire – static torsion and torsional oscillations method.

Viscosity and surface tension: Newton's formula – Stoke's formula – Poiseuille's flow – molecular theory of surface tension – excess pressure over curved surface – spherical and cylindrical drops – surface energy – capillary rise – Quincke's method for mercury.

UNIT IV OPTICS **9Hrs**

Diffraction: Fresnel and Fraunhoffer diffractions – Fraunhoffer diffraction at a single slit - diffraction at multiple slits - plane diffraction grating – determination of wavelength of a spectral line of a Hg lamp.

Polarisation: Double refraction of crystals – geometry of Nicol prism – Huygen's theory – polaroid – circular and elliptical polarization – quarter and half wave plates – production and analysis of polarized beams – optical activity.

UNIT V CRYSTAL PHYSICS **7Hrs**

Crystal structures: Introduction – crystal lattice – unit cell – classification of crystals – Bravais lattice in three dimensions –crystal planes and Miller indices – simple crystal structures.

Crystal diffraction: Bragg's law – experimental X-ray diffraction methods - Laue method – rotating crystal method – powder method.

TEXT BOOKS:

- M.Narayanamurthy and N.Nagararathnam, Dynamics, national publishing House, New Delhi, 2004.
- R.Murugesan, Kiruthiga sivaprasath, Modern Physics, S.Chand & Company, new Delhi, 2006.

REFERENCE BOOKS

- D.Halliday and R.Resnick , fundamentals of Physics, Wiley, 6th edition New York, 2006.
- Brijlal, N. Subramaniam, A Text book of optics, S. Chand & company Ltd, New Delhi, 2008.

UPHR103 ALLIED PHYSICS PRACTICAL – I

Semester	**: I**	**Credit**	**: 2**
Category	**: Allied practical I**	**Hours/week**	**: 3**
Class & major: I.B.Sc chemistry		**Total hours**	**: 39**

Objectives:

To enable the students

- Understand the theory of the application of subject knowledge in practical
- Understand the techniques of handling equipments
- Make error free measurements and error analysis

1. Young's Modulus by stretching – Vernier Microscope
2. Rigidity Modulus – Torsion Pendulum
3. Surface Tension and Interfacial Tension – Method of Drops
4. Surface Tension – Capillary Rise
5. Viscosity – Capillary Flow
6. Specific Heat of Liquid – Newton's law of cooling
7. Sonometer - Verification of Laws of Vibration

8. Compound Bar Pendulum – Determination of 'g' and Radius of Gyration

Optional

1. Specific Heat of Liquid – Electrical Heating

TEXT BOOKS

- Srinivasan M.N., Balasubramanium S., Ranganathan R., the text book of practical physics, Sultan Chand & Sons, New Delhi, 2006
- Ouseph C.C., Rangarajan G., A text book of practical physics part – I, S. Vishwanathan Publisher, 1990.

REFERENCE BOOKS

- S.L. Gupta and V. Kumar, Practical physics, Pragathi Prakashan, 25th edition, 2002.

UPHA102 ALLIED PHYSICS – II

Semester : II **Credit : 3**
Category : Allied II **Hrs/Week : 3**
Class & Major:I B.Sc Chemistry **Total Hours : 39**

Objectives:

To enable the students

- Be aware of semiconductor devices and their working principle.
- Study the basic number system, digital gates, flip flops, counters and registers.
- Acquire the knowledge of atom model, quantum numbers and periodic table.
- Understand the properties of nucleus and nuclear reactions.

UNIT I-SEMICONDUCTOR DEVICES **8Hrs**

Semiconductor- intrinsic and extrinsic semiconductor - fermilevel-mechanism of current conduction-PN-junction diode- zener diode-LED-Solar cell. Transistor: construction-mechanism of amplification- current components- modes of operation-transistor amplifier

UNIT-II DIGITAL ELECTRONICS **7Hrs**

Number system- binary –octal-hexadecimal-digital gates-Boolean Algebra – K-map-RS-flip flop-JK- flip flop- shift register- full and half adder-binary counter-modulus counter-decade counter

UNIT-III ATOMIC PHYSICS **8Hrs**

Atomic Physics: Bohr's atom model- hydrogen spectrum-fine structure splitting- sodium doublet-quantum numbers- paulis exclusion principle-periodic table.

X-ray and photoelectric effect: Production of X- ray – continuous and characteristics – X-ray spectra – industrial and medical applications of X-rays. Law of photoelectric emission-Einstein's photoelectric equation- Millikan's experiment-photoelectric cells (emissive, electric and voltaic) –Photo multiplier tubes.

UNIT-IV NUCLEAR PHYSICS **7Hrs**

General properties of nuclei: Nuclear mass and binding energy –BE/A versus Acurve-nuclear spin and magnetic moment- mass, half life and spin of neutron-semi empirical mass formula-nuclear models and elementary particles – nuclear reactions: cross section- nuclear fission- liquid drop model- nuclear forces-elementary particles: classification- quarks and lepton

UNIT-V MECHANICALWAVES **9Hrs**

Waves in strings and pipes: velocity of a transverse wave along a stretched string – velocity of sound in gases- Newton's formula for velocity of sound-effect of temperature, pressure, humidity and density of medium on sound

Ultrasonic and acoustics: Ultrasonics - piezo electric effect-detection of ultrasonics- applications-reverberation time and sabine's law- measurement of noise – reduction and sound insulations

TEXT BOOKS

- Brijlal and Subramanyam,Electricity and Magnetism,Ratan Prakashan Mandir Publisher,1995
- A.B.Gupta and Dipak Ghosh,Atomic and Nuclear Physics,Books and allied (sp) Ltd.Calcutta, 2007.
- H.S.Mani and Mehta, Introduction to Modern Physics , G.K Publication ,Affiliated East-West Press Ltd,New Delhi,1998

REFERENCE BOOKS

- Richard P.Feynman,R.B.Leighton & Mathew Sands,Feynman Lectures on Physics Series,Vol. 1,2 &3,Narosa Publishing,8th reprint,New Delhi,2005.
- R.Khanna and R.S.Bedi, A text Book of Sound,Atma Ram and Sons,New Delhi 1985.

UPHR202 ALLIED PHYSICS PRACTICAL – II

Semester : II **Credit : 2**
Category : Allied practical II **Hours/week : 3**
Class & major: I.B.Sc chemistry **Total hours : 39**

Objectives:

To enable the students

- Understand the theory of the application of subject knowledge in practical
- Understand the techniques of handling equipments
- Make error free measurements and error analysis

1.Determination of Young's Modulus(Non-Uniform Bending)-Pin and Microscope
2.Determination of Rigidity Modulus (Pointer Method)-Static Torsion
3.Determination of Focal Length-Concave and Convex Lenses
4.Determination of thickness of wire-Air Wedge
5.Universal Building Block-NAND Gates
6.Determination of Wavelengths(Grating)-Hg Spectrum
7.LCR Parallel Resonant Circuit
8.Characteristics of Zener diode

Optional

1.Construction of Half and Full Adders-Digital Gates

2.Determination of Velocity of Sound Waves-Melde's String

TEXT BOOKS

- Srinivasan M.N., Balasubramanium S., Ranganathan R., the text book of practical physics, Sultan Chand & Sons, New Delhi, 2006
- Ouseph C.C., Rangarajan G., A text book of practical physics part – I, S. Vishwanathan Publisher, 1990.

REFERENCE BOOK

- S.L. Gupta and V. Kumar, Practical physics, Pragathi Prakashan, 25th edition, 2002.

UPHE202 APPLIED PHYSICS

Semester: II **Credit :4**
Category: Non major elective **Hours/week: 4**
Class&Major:I UG **Total Hours: 52**

Objectives

- To acquire the knowledge of Semiconductors
- To gain the knowledge of IC fabrication
- To understand the basics of Laser.

UNIT- I SPINTRONICS 11Hrs

Spintronics-introduction-metals based spintronic devices-applications-semiconductor- based spintronic devices -applications-spin pumping-spin transfer.

UNIT-II PHOTONICS 10 Hrs

Photonics-introduction-photo detectors-p-n photo diode-avalanche photo diode-photo transistors-photo conductive detectors.

UNIT- III SEMICONDUCTORS 11Hrs

Semiconductors-carrier scattering and mobility-drift current and conductivity-thermistors and piezo resistors- thermoelectric effect.

UNIT-IV LASER AND ITS APPLICATION 10Hrs

LED- laser- optical pumping- population inversion- Ruby laser-CO_2 laser-He-Ne laser-photoconductors- solar radiation-thin film solar cell-superconductivity.

UNIT-V BASIC ELECTRONICS 10Hrs

IC fabrication- Fabrication of BJT,FET, monolithic diodes, contacts IC resistors and capacitors, IC packaging, characteristic of IC components.

Text Books

- Charles Kittel, *Solid State Physics*,Wiley Eastern Ltd., 2003.

- Murugeshan R., *Optics & Spectroscopy*, New Delhi, S.Chand& co, 2006.

Reference Book

- Shur M., *Physics of Semi Conductor Devices*, PHI Publication, 2001.

UPHE203 BIOMEDICAL INSTRUMENTATION

Semester: II **Credit : 2**
Category: Non Major Elective **Hours/ week : 4**
Class& Major: 1 UG **Total Hours :52**

Objectives

To enable students

- Understand the mechanism of laser radiation with bodily tissue.
- Review the properties of laser and light delivery systems in medicinal applications
- Study the effects of radiation on various living cells and lethal dose levels
- Understand the principle and applications of photo, nuclear and nano medicine

UNIT-I TECHNIQUES 9Hrs

Organs of a body-charges produced in body-ECG, EEG, EMG, ERG (Principle, working and applications)-MRI

UNIT-II ULTRA SOUND IMAGING 9Hrs

Transducers - properties of the ultrasound beam - interaction of the beam with the patient - acoustic impedance - scanning modes- Doppler ultra sound and flow imaging.

UNIT-III X-RAY IMAGING AND X-RAY CT 10Hrs

X-ray tubes and the generation of x-rays-interaction of x-rays with the beam with the patient-image receptors-x-ray computed tomography (CT)-2-D and 3-D imaging –filtered back projection.

UNIT- IV NUCLEAR RADIATIONS AND NUCLEAR MEDICINE 13 Hrs

Basic principle and applications of radiotherapy-tom therapy-dose effect-diagnostic use of radioisotopes-nuclear medicine-basic principles-diagnostics use of isotopes-general principles and procedures of organ scanning-cardiac imaging-thyroid scanning-blood volume determination by isotope method-photo medicine-synthesis of vitamin D in early and late coetaneous effects – phototherapy-photo chemotherapy-exposure level, hazards and maximum permissible exposures-nano medicine and applications.

UNIT-V LASER IN MEDICINE 11 Hrs

Characteristicsof laser radiation-laser speckle-biological effects-laser safety management-medical laser and delivery systems-technology of medical lasers-radiation characteristics- delivery systems (fiber optics, endoscopy and imaging) - medical application-laser surgery and microsurgery – photomechanical applications in ophthalmology-photodynamic therapy.

Evaluation: III and IV components of CIA

Semester	Category	Course Code	Course Title	Component-III	Component-IV
	Core I	UPHM101	Fundamentals of Physics	Assignment	Seminar
I	Core II	UPHM103	Mechanics	Seminar - Power Point Presentation	Working Models
	Core III	UPHM104	Thermal and Statistical Physics	Poster Presentation	Simple Heat experiments(Model display)
	Allied	UPHA102	Allied Physics – I	Assignment	Poster presentation
II	Core IV	UPHM202	Properties of Matter & Acoustics	Assignment(Collection of real time examples of elasticity)	Seminar(Statistical analysis(Noise pollution))
	Core V	UIDM201	Material science	Poster Presentation	Oral Presentation
	Allied	UPHA203	Allied Physics– II	Seminar	PPT
	Non major elective	UPHE202	Applied Physics	Seminar	PPT
		UPHE203	Biomedical Instrumentation	Assignment	Poster Presentation

PPHM101 MATHEMATICAL PHYSICS-I

Semester : I **Credit : 4**
Category : Core I **Hours/Weeks : 5**
Class & Major : I M.Sc Physics **Total Hours : 65**

Objectives:
To enable the students

- Understand the various mathematical technique and concept.
- Apply the mathematical technique to solve the physical problems.

UNIT – I VECTOR ANALYSIS **13 Hrs**

Concept of vector and scalar fields – Gradient, divergence, curl and Laplacian – Vector identities – Line integral, surface integral and volume integral – Gauss theorem, Green's Theorem, Stoke's theorem and applications – Orthogonal curvilinear coordinates – Expression for gradient, divergence, curl and Laplacian in cylindrical and spherical co-ordinates - Definitions – Linear independence of vectors – Schmidt's orthogonalisation process – Schwartz inequality.

UNIT – II COMPLEX ANALYSIS **12 Hrs**

Functions of complex variables – Differentiability - Cauchy-Riemann conditions – Complex integration – Cauchy's integral theorem and integral formula – Taylor's and Laurent's series – Residues and singularities - Cauchy's residue theorem – Evaluation of definite integrals. -Derivatives of analytic functions -calculus of residues.

UNIT – III FOURIER SERIES AND LAPLACE TRANSFORMS 13Hrs

Fourier Series-Dirichlet‟s Theorem-Change of Interval-Complex Form-Fourier Series in the Interval (0, ∞) - Uses of Fourier Series.-Laplace Transform-Definition-Properties-Translation Property-Inverse Laplace Transform-Properties, example problems.

UNIT – IV PARTIAL DIFFERENTIAL EQUATIONS 14Hrs

Homogeneous and non-homogeneous equations of first and second order partial differential equations separation of variables technique-solution by Fourier series-use of double Fourier series. Applications: (1) One dimensional wave equation (2) one dimensional heat flow equation (separation of variables and use of Fourier series) (3) two dimensional Laplace's equation in Cartesian coordinate (separation of variables and double Fourier series.)

UNIT – V SPECIAL FUNCTIONS 13 Hrs

Sturm-Liouville problem – orthogonal functions - Legendre, Associated Legendre, Bessel, Laugerre and Hermite differential equations: series solution – Rodriguez formula – Generating functions – Orthogonality relations – Important recurrence relations- Gamma and Beta functions.

Text Books

- Erwin Kreyzig, *Advanced engineering mathematics,* publishers-John Wiley & Sons, Inc, 8th edition, 2005.
- Michael Tinkham, *Group theory and Quantum mechanics,* Tata McGraw-Hill Co. Ltd, TMH edition,1974.
- Joshi A.W., *Group theory for physicists* Wiley Eastern Limited, 2nd Edition,1997.
- M.R.Spiegel., *Theory and Problems of Fourier analysis* , Schaum's outline series,2000.

Reference Books

- Murray R. Spiegel, *Theory and Problems of Fourier Analysis with Applications to Boundary Value Problems,* Mchraw Hill Book Company, 2000.
- Sankara Rao K., *Introduction to Partial Differential Equations,* Prentice Hall of India, 2nd Edition, 2005.
- Greenberg M. D, *Advanced engineering mathematics,* publishers-pearson education (singapore) pvt. Ltd, 2nd edition, 2002.

PPHM102 CLASSICAL MECHANICS

Semester : I **Credit : 4**
Category : Core II **Hours/Weeks : 5**
Class & Major : I M.Sc Physics **Total Hours : 65**

Objectives:
To enable the students

- Understand the Lagrangian and Hamiltonian formulations and its application
- Apply the classical formulation to solve two body problems
- Introduce the rigid bodies dynamics and relativistic mechanics

UNIT – I FUNDAMENTAL PRINCIPLES AND MATHEMATICAL FORMULATION **13 Hrs**

Mechanics of a particle and system of particles – Conservation laws – Constraints – Generalized coordinates – D' Alembert's principle and Lagrange's equation – Hamilton's principle – Lagrange's equation of motion – conservation theorems and symmetry properties – Motion under central force : General features.

UNIT – II LAGRANGIAN AND HAMILTONIAN FORMULATIONS **13 Hrs**

Hamilton's variational principle - Lagrange's equations of motion –Conservation theorems and symmetry properties – Cyclic coordinates - Application of Lagrange's equation; Linear harmonic oscillator, particle moving under a central force, Atwood's machine - Hamilton's equations of motion - Application of Hamiltonian's equations of motion; Particle moving in an electromagnetic field - Phase space - Principle of least action Lagrange and Poisson brackets – Hamilton – Jacobi method – Action angle variables – Kepler problem in action – angle variables.

UNIT – III TWO-BODY CENTRAL FORCE PROBLEMS **12 Hrs**

Equations of motion and first integrals – The equivalent one – dimensional problem and classification of orbits – The Keplar problem – Inverse square law of force, the Laplace Runge-Lanz Vector – Scattering in a central force field – Scattering in laboratory and centre of mass frames.

UNIT - IV RIGID BODY DYNAMICS AND OSCILLATORY MOTION **13 Hrs**

Euler angles – Moments and Products of Inertia – Euler's equations – symmetrical top – applications – theory of small oscillations and normal modes – frequencies of free vibration and normal coordinates – Linear triatomic molecule.

UNIT - V RELATIVISTIC MECHANICS **14 Hrs**

Algebra of tensors – quotient law – fundamental tensor – Cartesian tensors – four vectors in special theory of relativity – Lorentz transformations in real four dimensional spaces, Covariant four dimensional formulations – force and energy equations in relativistic mechanics – Lagrangian and Hamiltonian formulation of relativistic mechanics.

Text Books

- Goldstein H., Poole C., Safko J., *Classical Mechanics,* Addison Wesley, New Delhi, 2002.
- Upathaya J. C., Classical mechanics,*Mimalgya publishing house,* Mumbai,2005.
- Gupta, Kumar, Sharma, *Classical Mechanics,* 22nd Edition, Pragati Bhawan, Meerut, 2006.

Reference Book

- Rana N.C. and Joag P.S., *Classical Mechanics*, Tata McGraw Hill, New Delhi, 1991.

PPHM103 ADVANCED ELECTRONICS

Semester : I **Credit : 4**
Category : Core III **Hours/Weeks : 4**
Class & Major : I M.Sc Physics **Total Hours : 52**

Objectives:
To enable the students

- Understand the basic functions of OP-AMP and its applications.
- Introduce the various principles of analog, digital electronics and digital systems.

UNIT – I OPERATIONAL AMPLIFIERS **13 Hrs**

Ideal Op-Amp-inverting, non-inverting, logarithmic, summing and difference amplifiers-integrator - differentiator- comparator-CMRR – Op-Amp Applications- Solving simultaneous and differential equations-weighted resistor and R-2R D/A converters-parallel, counter and successive approximation A/D converters.

UNIT – II UJTS AND THYRISTORS **14 Hrs**

Operational Principle of UJT- Characteristics- Relaxation Oscillator-Rate Effect; SCR: V-I Characteristics – Gate-Triggering Characteristics; DIAC and TRIAC; Thyristors: Basic Parameters-Current Controllable Devices- Thyristors in Series and Parallel; Applications of Thyristors- Pulse Generator, Bistable Multivibrator, Half and Full Wave Controlled Rectifier, TRIAC based AC power control, SCR based Crowbar Protection; Gate Turn-Off Thyristors; Programmable UJT.

UNIT – III DIGITAL INTEGRATED CIRCUITS **12 Hrs**

7400 TTL- TTL Parameters; TTL-MOSFET - CMOS FET - Three State TTL Devices; External drive for TTL Loads; TTL Driving External Loads-74C00 CMOS- CMOS Characteristics-TTL to CMOS Interface- CMOS to TTL interface- Current Tracers.

UNIT – IV ANALOG INTEGRATED CIRCUITS **13 Hr**

Electronic Analog Computation- Active Filters- Butterworth Filter - High/Low Pass Filter-Band Pass Filter-Band Reject Filter- Delay Equalizer- Switched Capacitor Filters; Comparators- Sample and Hold Circuits- Waveform Generators- Square Wave Generator-Pulse Generator-Triangle wave Generator-Sawtooth Generator- Regenerative Comparator- Schmitt Trigger.

UNIT-V INTEGRATED CIRCUITS AS DIGITAL SYSTEM **13 Hrs**

Binary Adders- Half / Full Adder- - MSI Adder-Serial/Parallel Operation-Decoder/Demultiplexer- BCD to Decimal Decoder-4-to-16 line Demultiplexer- Data Selector/Multiplexer:16-to-1 Multiplexer; Encoder; ROM:Code Converters-Programming the ROM-Applications- RAM:Linear Selection-Coincident Selection-Basic RAM Elements-Bipolar RAM-Static and Dynamic MOS RAM- Ladder Type D/A Converter-Multiplying D/A Converter;

Text Books

- Chattopadhyay S., *Text Book of Electronics*, New Central Book Agency P.Ltd., Kolkata, 2006.
- Malvino A.P., D.P. Leach, *Digital Principles and Applications*, Tata McGraw-Hill, Publishing Co., New Delhi, 2005.

Reference Books

- Bhattacharya A.B., *Electronics Principles and Applications*, New Central Book Agency P.Ltd., Kolkata, 2007
- Jacob Millman, Christos C Halkins and Chetan Parikh, *Integrated Electronics Analog and Digital Circuits and Systems* , 2nd Edition, Tata McGraw Hill Educatio Private Limited, New Delhi, 2010.
- Anil K. Maini and VarshaAgarwal, *Electronic Devices and Circuits*, Wiley India Pvt. Ltd. New Delhi, 2009.

PPHM104 ELECTROMAGNETIC THEORY

Semester : I **Credit : 4**
Category : Core IV **Hours/Weeks : 5**
Class & Major : I M.Sc Physics **Total Hours : 65**

Objectives:
To enable the students

- Understand the law and their applications associated with electrostatics and magneto statics.
- Study the laws associated with electromagnetic and its applications.
- Understand the electromagnetic waves propagation in different media.

UNIT – I ELECTROSTATICS 13 Hrs

Coloumb's law- electric field- Continuous charge distribution- Gauss Law and its application – Electric potential-Poisson & Laplace equations- boundary value problems- Dielectrics-Polarization and Displacement vectors-Boundary conditions-Dielectric sphere in a uniform field- Molecular polarisability and electric susceptibility

UNIT – II MAGNETOSTATICS 12 Hrs

Biot-Savart's law-Divergence and curl of magnetic induction-magnetic vector potential-Ampere's circuital law-Ampere's law in magnetized materials-Effect of magnetic field in atomic orbits –Magnetic field inside matter-Linear and nonlinear media-Magnetic susceptibility and permeability

UNIT – III ELECTRODYNAMICS 14 Hrs

Electromotive force-Ohms law- faradays law-Electromagnetic induction- Maxwell's equations in free space and linear isotropic media- -Magnetic charge-Maxwell equations in matter- Boundary conditions- Conservation laws – Conservation of energy – Poynting's theorem - conservation of

momentum-Scalar and vector potentials- Gauge invariance-Dynamics of charged particles in static and uniform electromagnetic fields.

UNIT – IV WAVE PROPAGATION **13 Hrs**

Electromagnetic waves in free space- Reflection and refraction, Fresnel's law, interference, coherence, and diffraction non conducting medium-conducting medium-skin depth-reflection and transmission at dielectric boundaries-polarization-Guided waves-Wave guides-Propagation of waves in a rectangular wave guide-inhomogeneous wave equation and retarded potentials-Radiation- from moving charges and dipoles and retarded potentials.

UNIT – V APPLICATIONS – PLASMA PHYSICS **13 Hrs**

Plasma – Plasma criteria – plasma oscillations-plasma behavior in a magnetic field- Dispersion relations in plasma. Debye shielding problem- plasma confinement in a magnetic field- pinch effect-magneto hydrodynamic waves- Alfven waves

Text Books

- David J. Griffiths, *Introduction to Electrodynamics*, Prentice Hall of India, New Delhi, 1995.
- Laud B.B., *Electromagnetics*, New Age International Pvt., Ltd., New Delhi, 2005.
- Chopra and Agarwal, *Electromagnetic theory*, Kadernath and Ramnath & Co. Meerut,2005.
- Sathya Prakash, *Electromagnetic Theory and Electrodynamics*, Kadernath Ramnath & Co., Meerut, 2007.

Reference Books

- Jackson J.D., *Classical Electrodynamics*, Wiley Eastern, 1998.
- Balmain K.G., *Electromagnetic Waves and Radiating System*, Prentice Hall of India, 1995.
- John R. Reitz, Fredric.J, Milford and Robert Christy.W, *Foundations of Electromagnetic Theory* , Narosa Publishing House, Pvt., Ltd.
- Edward C. Jordan, Keith G. Balmain, *Electromagnetic waves and Radiating system*, Second Edition, Prentice Hall of India, New Delhi, 2001.

PPHM201 QUANTUM MECHANICS I

Semester : II **Credit : 4**
Category : Core V **Hours/Weeks : 6**
Class & Major: I M.Sc Physics **Total Hours : 78**

Objectives

To enable the students

- Understand basic idea of Dirac formalism to Quantum Mechanics.
- To study the angular momentum concept, scattering of fundamental particles
- To acquire knowledge about relativistic wave equation.

UNIT – I SCHRÖDINGER EQUATION AND GENERAL FORMULATION 14 Hrs

Schrödinger Equation – Physical meaning and conditions on the wave function – Expectation values and Ehrenfest's theorem – Hermitian operators and their properties – Commutator relations - Uncertainty relation - Bra and ket vectors - Hilbert space – Schrödinger, Heisenberg and interaction pictures. Linear Vector Space- Linear Operator- Eigen Functions and Eigen values- Postulates of Quantum Mechanics- Simultaneous Measurability of Observables - Dirac's Notation- Equations of Motion; Schrodinger, Heisenberg and Dirac representation- momentum representation.

UNIT – II QUANTUM MECHANICS IN THREE DIMENSION 14 Hrs

Schrodinger equation in spherical co-ordination- Separation of variable-Angular equation- Hydrogen Atom- Radial Wave equation- Spectrum of Hydrogen.

UNIT - III ANGULAR MOMENTUM 15 Hrs

The angular momentum operator – eigenvalues and eigen functions of L_2 – The commutation relations – angular momentum and rotations – ladder operators – the constants C+ and C- - angular momentum matrices corresponding to j = ½ and j = ½ - Pauli spin matrices – Pauli wave function and Pauli equation – addition of angular momenta – Clebsh – Gordan Coefficients – concept of isospin.

UNIT – IV APPROXIMATION METHODS 15 Hrs

Time independent perturbation theory: Non-degenerate and degenerate perturbation theories - Stark effect – WKB Approximation- Application to tunneling problem and quantization rules. Time dependent perturbation theory: Harmonic Perturbation - Transition probability.

UNIT – V RELATIVISTIC WAVE EQUATIONS 15 Hrs

The Klein – Gordan equation – the Dirac Equation – Dirac's a and b matrices – the continuity equation – the free particle solutions– the hole theory – spin of the Dirac electron – magnetic dipole moment of the electron – the velocity operator – expectation value of the velocity – relativistic invariance of Dirac equation.

Text Books

- Griffths, *Quantum Mechanics*, 2nd edition, Dorling Kindersley India (Pvt), New Delhi, 2005.
- Ghatak and S. Lokanathan, *Quantum Mechanics*, Macmillam India Ltd., New Delhi, 2005.
- Devanathan V., *Quantum Mechanics*, Narosa Publishing House, New Delhi, 2006.

Reference Book

- Ajoy Ghatak, Lokanathan S., *Quantum Mechanics*, 5th Edition,Macmillan Publishers India ltd, 2013.

PPHM202 STATISTICAL MECHANICS

Semester : II **Credit : 4**
Category : Core VI **Hours/Weeks : 5**
Class & Major : I M.Sc Physics **Total Hours : 65**

Objectives:
To enable to the students

- Understand the principles of classical and quantum statistical mechanics
- Apply statistical methods to compute the various parameters of molecules.

UNIT – I INTRODUCTION **15 Hrs**

Phase Space-Ensemble-Ensemble average-Liouville Theorem-Equation of motion- Equal-a priori-probability-Statistical equilibrium-Micro canonical ensemble-Entropy of an ideal Boltzmann gas using micro canonical ensemble-Gibb's paradox- MB, BE and FD statistics-various distributions using micro canonical ensemble.

UNIT - II CANONICAL AND GRAND CANONICAL ENSEMBLES **16 Hrs**

Entropy of a system in contact with a heat reservoir-Ideal gas in canonical ensemble-Maxwell velocity distribution-Equipartition of energy-photons. Grand canonical ensemble-Ideal gas in grand canonical ensemble-Canonical partition function-Harmonic oscillator in canonical ensemble and grand canonical ensemble.

UNIT – III BOSE-EINSTEIN STATISTICS **14 Hrs**

Bose-Einstein distribution-Bose-Einstein condensation- Thermodynamic properties of an ideal BE gas-Liquid Helium-Landau spectrum of Phonons and Rotons- Helium 4 and Helium 3 mixtures-Superfluid phases of Helium 3.

UNIT – IV FERMI-DIRAC STATISTICS **15 Hrs**

Fermi-Dirac distribution-degeneracy-Thermionic emission-White dwarfs-Nuclear matter-Quantum Hall effect-Specific heat of an electron gas-One-dimensional metal- Effect of Periodic structures.

UNIT - V FLUCTUATIONS **15 Hrs**

Introduction-mean square deviation-Fluctuations in ensembles-Concentration fluctuations in quantum statistics-One dimensional random walk-Brownian motion-Fourier analysis of a random function-Electrical noise.

Text Books

- Agarwal .B.K. and Melvin Eisner, *Statistical mechanics*, New Age International Limited, 2nd edition, 2003.
- Bhattacharjee, *statistical mechanics*, Allied Publishers limited,1996.
- Pathria R. K. and Paul D. Beale, *Statistical Mechanics*, Butterworth-Heinemann print 3rd Edition, New Delhi, 2011 .

Reference Books

- Donald A. McQuarrie, Statistical Mechanics , Viva Books Private limited, 2003.
- Silvio.R.A Salinas, Introduction to statistical physics, Springer, 2004.

PPHM203 MOLECULAR SPECTROSCOPY

Semester : II **Credit : 4**
Category : Core VII **Hours/Weeks : 5**
Class & Major : I M.Sc Physics **Total Hours : 65**
Objectives:
To enable the students

- Acquire the knowledge of electromagnetic radiation interaction with atoms and molecules and study the different types of spectra
- To apply these techniques in finding the molecular structure, bond angles, bond length etc.

UNIT – I MICROWAVE SPECTROSCOPY 13 Hrs

Rotation of molecules-Rotational spectra-Rigid and non-rigid diatomic rotator-Intensity of spectral lines-Isotopic substitution-Poly atomic molecules (Linear and symmetric top)-Hyperfine structure and quadrupole effects-Inversion spectrum of ammonia-Chemical analysis by microwave spectroscopy-Techniques and instrumentation.

UNIT – II VIBRATIONAL SPECTROSCOPY 15 Hrs

Infrared spectroscopy-Vibration of molecules-Diatomic vibrating rotator-vibrational rotational spectrum-Interactions of rotations and vibrations-Influence of rotation on the vibrational spectrum of linear and symmetric top and poly atomic molecules-Analysis by infrared techniques-Instrumentation-FTIR spectroscopy -Raman spectroscopy: Classical and quantum mechanical picture of Raman effect-Polarizability-Pure rotational Raman spectrum-Vibrational Raman Spectrum-Raman activity of vibrations of CO_2 and H_2ORule of mutual exclusion-Overtones and combination-Rotational fine structure-Depolarization ratio- Vibrations of spherical top molecule-structural determination from IR and Raman spectroscopytechniques and instrumentation-FT Raman Spectroscopy

UNIT – III ELECTRONIC SPECTROSCOPY 12 Hrs

Electronic spectra-Frank-Condon principle-Dissociation energy and dissociation products-Fortrat diagram-predissociation-shapes of some molecular orbits-Chemical analysis by electronic spectroscopy-Techniques and instrumentation-Mass spectroscopy-ESR spectroscopy-Introduction-techniques and instrumentation-Double resonance

UNIT – IV NUCLEAR RESONANCE SPECTROSCOPY 13 Hrs

Nuclear magnetic resonance spectroscopy-Introduction-Interaction of spin and magnetic field-population of energy levels-Larmor precession-Relaxation times-Chemical shift and its measurement-Coupling constant-coupling between several nuclei-quadrupole effects-C^{13} NMR spectroscopy Mossbauer spectroscopy: Principle-instrumentation-Effect of electric and magnetic fields.

UNIT - V SURFACE SPECTROSCOPY 13 Hrs

Electron energy loss spectroscopy (EELS)-Reflection absorption spectroscopy (RAIRS)-Photoelectron spectroscopy (PES); XPES, UPES-Auger electron spectroscopy (AES) X-ray Fluorescence spectroscopy (XRF)-SIMS.

Text Book

- Colin N. Banwell and Elaine M. *Fundamentals of Molecular Spectroscopy* (5th Edition Tata McGraw-Hill Publishing Company limited), 2013.

Reference Book

- Jack D.Graybeal, *Molecular Spectroscopy*, Mc Graw Hill Education, 2014

PPHM204 ADVANCES IN MATERIAL SCIENCE

Semester : II **Credit : 2**
Category : Core elective -I **Hours/Weeks : 3**
Class & Major : I M.Sc Physics **Total Hours : 39**

Objectives:
To enable the students:

- Acquire knowledge about nature of bonding and crystallography
- Understand the properties of materials

UNIT – I MATERIALS AND CHEMICAL BONDING 09 Hrs

Classification of engineering materials - levels of structure - structure-property relationship in materials stability and metastability - Bond energy - bond type and bond length - Ionic and covalent bonding secondary bonding - variation in bonding character and properties.

UNIT – II ELEMENTARY CRYSTALLOGRAPHY 08 Hrs

Space lattice - basis - unit cell - Bravais lattice - Miller indices - symmetry elements of a:crystalline solid - symmetry groups - X-ray diffraction and Bragg's law - powder method. Crystal imperfections - point imperfections - geometry of dislocation -edge and screw dislocation -Burger's vector.

UNIT – III MECHANICAL BEHAVIOUR OF MATERIALS 08 Hrs

Elastic behaviour - atomic model of elastic behaviour -Young's modulus - Poisson's ratio – Shear modulus - bulk modulus -The modulus as a parameter in design - rubber like elasticity. Plastic deformation - the tensile stress-strain curve.

UNIT – IV PHASE TRANSFORMATION 07 Hrs

Time scale for phase changes- Nucleation and growth- Nucleation kinetics- Growth and overall transformation kinetics- Transformation in steel- Precipitation processes- solidification and crystallization- Glass transition.

UNIT – V MAGNETIC MATERIALS AND DIELECTRIC MATERIALS 07 Hrs

Terminology and classification - magnetic moments due to electron spin - ferro magnetism the domain structure - soft and hard magnetic materials. Polarization electronic, ionic, orientation and space charge polarization - temperature and frequency effects - electric breakdown - ferroelectric materials.

Text Book

- Raghavan V- *Materials Science and Engineering A first course, 5th Edition.*, Presences Hall of India (pact) ltd , 2013.

Reference Book

- Kittel C., *Introduction to Solid State Physics*, 8th Edition, Wiley Student Edition,2012.

PPHE101 – NANOSCIENCE

Semester : I **Credit : 4**
Category : Non-Major Elective **Hours/Weeks : 5**
Class & Major : I PG **Total Hours : 65**

Objectives

To enable the students

- Understand the principles and techniques of nanoscience and technology
- To acquire knowledge on the methods of synthesis, characterization techniques and applications.

UNIT – I FUNDAMENTALS OF NANOSCALE SCIENCE 13Hrs

Introduction-nano and nature-background to nanotechnology-scientific revolutions opportunities at the nanoscale-time and length scale in structures-energy landscapes basic intermolecular forces inter dynamic aspects of intermolecular forces

UNIT – II CLASSIFICATION OF NANOPARTICLES AND ITS PROPERTIES 14Hrs

Metal Nanoparticles: Size control of metal nanoparticles, Structural, Surface, electronic and optical properties. Semiconductor Nanoparticles: solid state phase transformation, Excitons, Quantum confinement effect, Semiconductor quantum dots (SQDs), Correlation of properties with size, Quantum Well, Quantum Wires, Supper lattices band and Band offsets, Quantum dot lasers.

UNIT – III SYNTHESIS OF NANOMATERIALS 12Hrs

Wet Chemical Synthesis for Nanomaterials: Chemical and co-precipitation, Sol fundamentals-sol-gel synthesis of metal oxides, Micro emulsions or reverse micelles, Solvothermal, Microwave heating synthesis, Sonochemical synthesis, Electrochemical synthesis, Photochemical synthesis, Langmuir Blodgett (LB) technique.

UNIT - IV CHARACTERIZATION TECHNIQUES 13Hrs

Powder X-Ray Diffraction, Energy dispersive X-ray (EDX), X-ray photoelectron spectroscopy (XPS),Scanning electron microscope (SEM), Transmission electron microscope (TEM), Scanning tunneling microscope (STM), Atomic force microscope (AFM), UV-Visible absorption.

UNIT – V APPLICATIONS OF NANOMATERIALS AND NANOCOMPOSITES 13Hrs

Nanosensors based on optical properties and quantum size effects: Sensors based on physical properties-Electrochemical sensors, Sensors for aerospace, defence and Biosensors. Energy: Solar cells, LEDs and Photovoltaic device applications.

Text Books

- Viswanathan B., *Structure and properties of solid state materials* Oxford: Alpha Science International, 2nd Edition 2006.
- Pradeep T., *Nano the essentials*,Tata McGraw-Hill publishing company limited 2007.

Reference Books

- Schmidt G., Wiley Weinheim, *Nanoparticles: from theory to application*,2004.
- Sulabha K.Kulkarni, *Nanotechnology principle and practices*,Capital Publishing Company, India,2007.

PRACTICALS
PPHR101 PHYSICS PRACTICAL - I (GENERAL & ELECTRONICS)

Semester : I&II **Credit : 6**
Category : Core practical-I **Hours/Week : 5+5**
Class & Major : I M.Sc Physics

A. GENERAL EXPERIMENTS

1 Determination of Young's modulus and poisson's ratio by Elliptical fringes method
2 Determination of Young's modulus and poisson's by Hyperbolic fringes method
3 Determination of Plancks constant
4 Determination of Stefans constant
5 Determination of wavelength and thickness of a film by using Michelson Interferometer
6 Identification of prominent lines by spectrum photography – Copper spectrum
7 Identification of prominent lines by spectrum photography – Iron spectrum
8 Determination of Hall Effect.
9 Dielectric of velocity of sound wave and compressibility of liquid using ultrasonic interferometer
10 Determination of Laser beam parameter.

OPTIONAL

1 Determination of i-i' curve using spectrometer.
2 Determination of wavelength of monochromatic source using biprism.
3 Determination of refractive index of liquids using biprism (by scale & telescope method).

B. ELECTRONICS EXPERIMENTS

1 Design and study of monostable multivibrator and Schmitt trigger
2 Design and study of Wein bridge Oscillator (Op-amp)
3 Design and study of phase shift Oscillator (Op-amp)
4 IC 555 timer – schmitt trigger
5 IC 555 Timer Astable multivibrator
6 Operational amplifier wave generator
7 OP-Amps phase shift oscillator.
8 Digital to Analog converter.
9 Solving simultaneous equation using IC 741
10 Op-Amp Design of active filter.

OPTIONAL

1. Common source amplifier using FET
2. Construction of an Instrumentation amplifier
3. BCD to seven segment display using 7447 .
4. AC to DC converter using Power Supply
5. Single wave and Multi-wave rectifier

Text Book

- Srinivasan.M.N.,Balasubramanian.S.,Ranaganathan.R., *The Text Book of Practical Physics*, Sultan Chand and Sons,New Delhi.2006.

Reference Book

- S.L.Gupta and V.Kumar,Practical Physics.Pragathi Prakashan.25th edition,2002.

PPHR102 PHYSICS PRACTICAL -II

Semester : III & IV **Credit : 6**
Category : Core practical-II **Hours/Week : 5+5**
Class & Major : II M.Sc Physics

MICROPROCESSOR AND MICROCONTROLLER

1. Selection of largest element of an array.
2. Selection of smallest element of an array.
3. Square of a single byte Hex number.
4. Square root.
5. Ascending order.
6. Descending order.
7. Arithmetic progression.
8. Clock program.
9. Code conversion.

10. ADC interface.
11. Interfacing of 8255.
12. Digital to Analog conversion.
13. Continuous Anticlockwise Rot-Stepper Motor.
14. Rotation through required angle.
15. Keyboard Interface.
16. Study of seven segment display.
17. Timer interface
18. Parallel interface
19. Microprocessor 8085 – solving equation.
20. Microprocessor 8085 – waveform generation

OPTIONAL

1. Temperature conversion- 8085.
2. Traffic control system using microprocessor.
3. Microprocessor 8085- Interface (A/D counter).

Text Books

- Ghosh P. K., Sridhar P. R., *Introduction to Microprocessors for Engineers and Scientists*, Prentice- Hall of India, New Delhi, 2nd Edition,2001.
- Yu-Cheng Liu, Glenn A. Gibson, *Microcomputer Systems: 8086/8088 Family*, Prentice-Hall of India, New Delhi, II Edition,1994.

Reference Book

- Barry B. Brey, *The Intel Microprocessors 8086/8088, 80186, 80286, 80386 and 80486*, Prentice-Hall of India, New' Delhi, III Edition,1995.
- Brian W. Kernighan, Dennis M. Ritchie, *The C Programming Language*, Prentice-Hall of India, New Delhi, 2nd Edition,1993.

Evaluation: III and IV components of CIA-PG

Semester	Category	Course Code	Course Title	Component-III	Component-IV
I	Core I	PPHM101	Mathematical Physics	Seminar - Power Point Presentation	Problem solving
	Core II	PPHM102	Classical Mechanics	Poster Presentation	Assignment
	Core III	PPHM103	Advanced Electronics	Poster Presentation	Simple experiments(Model display)
	Core IV	PPHM104	Electromagnetic Theory	Assignment	Poster presentation
	NME	PPHE101	Nanoscience	Assignment	Seminar

II	Core I	PPHM201	Quantum Mechanics I	Assignment	PPT
	Core II	PPHM202	Molecular Spectroscopy	Poster Presentation	Model display
	Core III	PPHM203	Statistical mechanics	Seminar	Seminar(Statistical analysis(Noise pollution))
	Core Elective	PPHM204	Advances in Material Science	Journal review	Oral presentation

DEPARTMENT OF COMPUTER SCIENCE

PREAMBLE

UG : Course Profile, list of courses offered to other departments and the syllabi of courses in the first two semesters along with evaluation components III & IV (With effect from 2015-18 batch onwards),

PG : Course Profile, list of courses offered to other departments and the syllabi of courses in the first two semesters along with evaluation components III & IV (With effect from 2015-17 batch onwards) and

M.Phil : Course Profile, list of courses offered to other departments and the syllabi of courses in the first two semesters along with evaluation components III & IV (With effect from 2015-16 batch onwards) are presented in the booklet.

COURSE PROFILE B.Sc. (Computer Science)

Semester	Part	Category	Course Code	Course Title	Contact Hrs/Week	Credit	
						Min	Max
I	I	Language	UTAL105 / UTAL106/ UHIL101 / UFRL101	Basic Tamil-I/ Advanced Tamil–I/ Hindi-I /French-I	4	2	3
	II	English	UENL105 / UENL106	Basic English-I/ Advanced English-I	5	3	4
	III	Core Practical I	UCSR106	Computer Operations	2	1	1
	III	Core I	UCSM104 / UCAM105	Programming in C	5	4	4
	III	Core II	UCSM105	Information Technology	4	3	3
	III	Core Practical II	UCSR107 / UCAR103	Programming in C- Lab	3	3	3
	III	Allied I		Statistical Methods	5	4	4
	IV	Value Education			2	1	1
Total					**30**	**21**	**23**
II	I	Language	UTAL205/UTAL206/ UHIL201/UFRL201	Basic Tamil-II/ Advanced Tamil–II/ Hindi-II/French-II	4	2	3
	II	English	UENL205/ UENL206	Basic English-II/ Advanced English-II	5	3	4
	III	Core III	UCSM205/ UCAM204	Data Structures and Algorithms	3	3	3
	III	Core IV	UCSM204/ UCAM203	Object Oriented Programming using C++	4	4	4
	III	Core Practical III	UCSR204/ UCAR203	Object Oriented Programming and Data Structures and algorithm using C++ - Lab	3	3	3
	III	Allied II	UMAA210	Mathematics for Computer Science	5	4	4
	IV	Non Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme / Physical Education			-	1	2
				Total	**30**	**23**	**26**
III	I	Language	UTAL305/UTAL306/ UHIL301/UFRL301	Basic Tamil-III / Advanced Tamil–III/Hindi-III / French-III	4	2	3
	II	English	UENL305/ UENL306	Basic English-III / Advanced English-III	5	3	4
	III	Core V	UCSM303/UCAM307	Java Programming	5	4	4
	III	Core Practical IV	UCSR305/UCAR303	Java Programming-Lab	4	3	3
	III	Allied III	UPHA303	Digital Electronics	3	3	3
	III	Allied Practical	UPHR304	Digital Electronics – Practical	3	2	2
	IV	Non-Major Elective			4	2	2
	IV	Value Education			2	1	1
				Total	**30**	**20**	**22**

Semester	Part	Category	Course Code	Course Title	Contact Hrs/Week	Credit	
						Min	Max
IV	I	Language	UTAL405 / UTAL406 / UHIL401 / UFRL401	Tamil/Hindi/French	4	2	3
	II	English	UENL405 / UENL406	English	5	3	4
	III	Core VI	UCSM404	Internet Programming	4	4	4
	III	Core VII	UCSM402 / UCAM404	Data Base Management System	5	4	4
	III	Core VIII	UCSM405 / UCAM405	Data Communication Network	4	3	3
	III	Core Practical V	UCSR408	Internet Programming – Lab	3	3	3
	III	Core Practical VI	UCSR404 / UCAR402	Data Base Management System – Lab	3	3	3
	IV	Soft skill			2	1	1
	V	Extension Programme / Physical Education			-	-	2
Total					**30**	**23**	**27**
V	III	Core IX	UCSM508	Web Programming	5	5	5
	III	Core X	UCSM506	Operating System	6	5	5
	III	Core XI	UCSM507/ UCAM504	Software Engineering	5	5	5
	III	Core Practical VII	UCSR507	Web Programming – Lab	4	3	3
	III	Core Practical VIII	UCSR505	Operating System – Lab	3	3	3
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
Total					**30**	**26**	**26**
VI	III	Core XII	UCSM609 / UCAM606	Microprocessor and its Applications	5	4	4
	III	Core XIII	UCSM608/ UCAM608	Computer Graphics	4	4	4
	III	Core Practical IX	UCSR605	Android Application Development	4	4	4
	III	Core Practical X	UCSR604 / UCAR602	Microprocessor and its Applications – Lab	5	4	4
	III	Core Project	UCSP601	Project	5	5	5
	III	Major-Elective	UCSO606/ UCSO607	Network Security / Mobile Technologies	5	4	4
	III	Viva – Voce	UCSC601	Comprehensive Viva Voce	-	1	1
	V	Extension Programme / Physical Education			-	-	2
	IV	Soft skill			2	1	1
Total					**30**	**27**	**29**
Grand Total					**180**	**140**	**153**

EXTRA CREDIT EARNING PROVISION

Semester	Category	Course Code	Course Title	Hrs/week	Credit	
					Min	Max
II	Core	UCSI201	Summer Internship / Working Model	-	-	1
IV	Core	UCSI401	Summer Internship	-	-	1

ALLIED COURSES OFFERED TO OTHER DEPARTMENTS

Class & Major	Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credit
BCom with Computer Applications	I	Allied	UCSA103	PC Software	3	3
	I	Allied Practical	UCSR108	PC Software – Lab	3	2
	II	Allied	UCSA203	Programming in C	2	2
	II	Allied Practical	UCSR205	Programming in C - Lab	3	2
	III	Allied	UCSA303	Multimedia	3	3
	III	Allied Practical	UCSR306	Multimedia – lab	3	2
	IV	Allied	UCSA403	Database Management System	3	3
	IV	Allied Practical	UCSR405	Database Management System - Lab	3	2
	V	Allied	UCSA508	Web Designing	3	3
	V	Allied Practical	UCSR506	Web Designing - Lab	3	2
BBA, B.Com and Econonics	IV	Allied	UCSA405	Computer Applications in Business	3	3
	IV	Allied Practical	UCSR409	Computer Applications in Business – Lab	3	2
III BA Tamil	V	Allied	UCSA505	தமிர் கணினி	3T + 2P	5
Maths	III	Allied	UCSA304	Mathematical Programming using C	3	3
	III	Allied Practical	UCSR306	Mathematical Programming using C – Lab	3	2
	V	Allied	UCSA507	Object Oriented Programming using Java	3	3
	V	Allied Practical	UCSR508	Object Oriented Programming using Java - Lab	3	2
Physics	III	Allied	UCSA304	Mathematical Programming using C	3	3
	III	Allied Practical	UCSR306	Mathematical Programming using C – Lab	3	2

ALLIED OPTIONAL

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
V	III	Allied Optional	UCSA504	Digital Logic Fundamentals	3T+2P	5
			UCSA510	Web Programming	3T+2P	5

NON-MAJOR ELECTIVES

Semester	Part	Category	Course Code	Course Title	Contact Hrs/week	Credit
II	IV	Non Major Elective	UCSE202	Office Automation	2T+2P	2
			UCSE204	Office Package	4P	2
			UCSE205	Multimedia Techniques	4P	2
III			UCSE302	Programming in C	2T+2P	2
			UCSE304/ UCAE304	HTML Programming	4P	2
IV			UCSE402	Programming in C++	2T +2P	2
			UCSE403	Multimedia and its Applications	2T+2P	2
			UCSE404/ UCSE502	Visual Programming	2T +2P	2
			UCSE405/ UCSE503	Web Designing	2T+2P	2

UCSR106 COMPUTER OPERATIONS

Semester : I **Credit : 1**
Category : Core Practical II **Hours/Week : 2**
Class & Major : I B.Sc Computer Science **Total Hours : 26**

Objectives:

To enable the students

- Obtain knowledge in basics of Hardware Management.
- Document preparation and worksheet handling.
- Develop presentation skill in PowerPoint presentation.

Hardware Management **10 Hrs**

1. Installation of a Software
2. Installation of Device Drivers
3. Operating System Installation.
4. Managing a Projector
5. Managing a Scanner.
6. Basics of Networking.

Word **6 Hrs**

1. Create a word document and manipulating text and to work with tables.
2. Mail Merge

Excel **5 Hrs**

1. Working with Chart and Pivot Table
2. Working with Mathematical, Statistical and String Functions, Date and Time.

PowerPoint **5 Hrs**

1. Working with Slide Layout and Slide Master
2. Setting Transition & Animation and creating effects in the slide.

UCSM104 PROGRAMMING IN C

Semester	**: I**	**Credit**	**: 4**
Category	**: Core I**	**Hours/Week**	**: 5**
Class & Major	**: I B.Sc Computer Science**	**Total Hours**	**: 65**

Objectives:

To enable the students

- Understand the concepts of structured Programming.
- Acquire Knowledge on control structures, arrays, Functions, pointers
- Solve Logical problems using C language.

UNIT – I INTRODUCTION **12 Hrs**

Overview of C: History- Basic Structure of C programs – Executing C program – C Tokens – Operators and expressions – Managing Input and Output operations.

UNIT – II DECISION MAKING AND ARRAYS **13 Hrs**

Decision making and branching – Decision Making and looping. Arrays: One Dimensional Array – Two Dimensional Array – Multi dimensional Array.

UNIT – III STRING **10 Hrs**

Character Array and String: Declaring, Initializing, Reading and writing. String: Arithmetic operation on characters – String Functions.

UNIT – IV USER DEFINED FUNCTIONS **14 Hrs**

Definition – Types of Functions – Function Declaration and Call – Categories of Functions – Nesting of Functions – Recursions – Passing Arrays and String to Functions – Structures and Union in C.

UNIT – V POINTERS **16 Hrs**

Introduction to pointers – Pointers Expression – Pointers and Array – Pointers and String – Array of Pointers – Pointers to Functions – Pointers to structure – File management: Reading and writing files – appending file – Preprocessor.

Text Books

- E. Bala Gurusamy, *Programming in ANSI C*, 6th Edition, Tata McGraw-Hill, New Delhi, 2012.

Reference books

- Herbert Schildt.H, *C: The Complete Reference*, 4th Edition, Tata McGraw-Hill Edition, New Delhi, 2000.

- Byron S. Gottfried, *Programming with C*, 4th Edition, Tata McGraw Hill Edition, New Delhi, 2006.
- Brian W. Kernighan and Dennis M.Ritchie, *The C Programming Language*, 2nd Edition, Prentice hall of India Pvt.ltd, New Delhi, 2005.

E-Resources

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/lecture-notes/
- http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures/2
- http://www.powershow.com/view/d7c5Y2Y2N/OBJECT_ORIENTED_PROGRAMMING_powerpoint_ppt_presentation

UCSM105 INFORMATION TECHNOLOGY

Semester	**: I**	**Credit**	**: 3**
Category	**: Core II**	**Hours/Week**	**: 4**
Class & Major	**: I B.Sc Computer Science**	**Total Hours**	**: 52**

Objectives:

To enable the students

- Obtain basic knowledge about computer classification & anatomy.
- Understand the concepts of Input, Output, CPU and Memory.
- Acquire knowledge about Hardware, Software and Networks.

UNIT - I INTRODUCTION TO COMPUTERS **10 Hrs**

Introduction- Characteristics of Computer –Classification of Computers –Uses of Computers- Classification of Digital computer Systems- Anatomy of a digital computer.

UNIT - II CENTRAL PROCESSING UNIT AND MEMORY **10 Hrs**

Introduction – CPU – Memory – Memory organization – Random access memory – Read Only Memory – Registers – Memory – Clock speed – Bus – Cache memory .

UNIT - III INPUT AND OUTPUT DEVICES **10 Hrs**

Introduction – Keyboard – Mouse – Trackball –Scanner – Game Controller – Bar code Reader – Web cam – OCR. Output devices: Monitor – Video Standards – Printer - Plotter – Multimedia Projector-Sound card and speakers.

UNIT - IV SOFTWARE **11 Hrs**

Introduction to computer software – Hardware and software interactions – classification of software. Telecommunication: Introduction – Analog and digital signals – Modulation and its types.

UNIT - V COMPUTER NETWORKS **11 Hrs**

Introduction of computer networks - Overview of a network - Communications processes - Communications Medias - Types of Network - Topology.

Text Book

- Alexis Leon and Mathews Leon, *Fundamentals of Information Technology*, 2nd Edition, Vikas Publishing house private limited, New Delhi, 2009.

Reference Book

- Bansal, *Fundamentals of Information Technology*, First Edition, APH Publishing, New Delhi, 2002.

UCSR105 / UCAR103 PROGRAMMING IN C – LAB

Semester : I **Credit : 3**
Category : Core Practical I **Hours/Week : 3**
Class & Major : I B.Sc Computer Science **Total Hours : 39**

Objectives:
To enable the students

- Design, build, execute and debug C programs.
- Develop programs by using control structures, arrays, functions.

I. Looping **4 Hrs**

1. Pascal Triangle

II. Arithmetic and Trigonometric Operations **12 Hrs**

1. Solve Quadratic Equations.
2. Find the largest and smallest number.
3. Perform the operations with the operands.
4. Find the NPR and NCR

III. Arrays and functions. **20 Hrs**

1. Sorting and Searching
2. Perform the operation of Matrix Manipulation.
   a. Addition and Subtraction. b. Multiplication
3. Perform the operation Recursive and Non-Recursive functions to find
   a. Factorial
   b. Fibonacci
4. Perform the String manipulation(without using string function)
   a. Concatenation
   b. Palindrome Checking
   c. Count the No.of vowels, consonants, characters and white spaces in a line

IV. Working with Structure **3 Hrs**

1. Generate mark sheet processing for set of students using Structure

UCSM205 DATA STRUCTURES AND ALGORITHMS

Semester : II **Credit : 3**
Category : Core III **Hours/week : 3**
Class & Major : I B.Sc Computer Science **Total Hours : 39**

Objectives:
To enable the students

- Acquire the knowledge about Data Structures and Algorithms concepts

- Understand and Implement the different Data Structures.
- Analyze the Time and Space Complexity.

UNIT – I FUNDAMENTAL CONCEPTS 7 Hrs

Introduction to Data Structures - Data – Data Object- Abstract Data Types (ADT) and Data Structure – Categories of Data Structures – Introduction to Algorithm – Algorithm Design Tools – Pseudo Code – Program Development: Analysis, Design, Coding, Testing and Verification

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UNIT - II LINEAR STRUCTURES USING SEQUENTIAL ORGANISATION 7 Hrs

Concept of Sequential Organization – Array as ADT – Storage Representation of Arrays – The Data Object Polynomial – Sparse Matrices – Programming Problems.

UNIT – III STACKS AND QUEUES 9 Hrs

Fundamentals – Operations on a Stack – Representation of a Stack using Arrays – Implementation of Stack using Arrays – Applications of Stack: Balancing Symbol, Postfix Expression and Infix to Postfix Conversion – Recursion – Queue Fundamentals – Operations on a Queue – Representation of a Queue using Arrays – Circular Queues – Applications of Queue: OS job scheduling, Palindrome Checker and Undo-Redo Operations in software applications.

UNIT – IV ALGORITHM AND ANALYSIS 7 Hrs

Time Complexity – Asymptotic Notations Big 'O', 'Ω' and Θ Notations – Space Complexity – Analysis of Searching and Sorting Algorithms – Algorithmic Strategies.

UNIT – V SORTING AND SEARCHING 9 Hrs

Introduction – Searching Techniques - Linear Search - Binary Search – Sorting Techniques – Bubble Sort – Selection Sort – Insertion Sort – Quick Sort – Merge Sort – Heap Sort – Radix Sort – Comparative Study.

Text Book

- Shirish S. Sanen and Neeta A. Deshpande, *Data Structures and Algorithms,* First Edition, Technical Publications, Pune, 2006.

Reference Books

- Horowitz, S. Sahini and Tinesh Mehta, *Fundamentals of Data Structures using C++*, 8th Reprint, Galgotia Pub.Pvt., New Delhi, 2008.
- E. Balagurusamy, *Object-Oriented Programming with C++*, Third Edition, Tata Mc Graw- Hill Publishing, New Delhi, 2007.

UCSM204 OBJECT ORIENTED PROGRAMMING USING C++

Semester	**: II**	**Credits**	**: 4**
Category	**: Core IV**	**Hours/Week**	**: 4**
Class & Major	**: I B.Sc Computer Science**	**Total/Hours**	**: 52**

Objectives:

To enable the students

- Understand the concepts of object oriented programming
- Acquire knowledge on Exception handling and file system
- Develop programming skills on OOPs concept

UNIT –I OVERVIEW OF C++ **10 Hrs**

Basic concept of Object Oriented Programming- C++ Fundamentals – C++ Keywords – General form of a C++ Program – Classes and Objects.

UNIT –II ARRAYS **11 Hrs**

Arrays of Objects – Pointers: Pointers to Objects – Type checking C++ Pointers – This Pointer – Pointers to Derived Type and Class Members – References – Dynamic Allocation Operators: Initializing – Allocating Arrays and Objects – Function Overloading – Copy Constructors and Default Arguments.

UNIT –III OOPS **10 Hrs**

Operator Overloading – Inheritance – Virtual Function and Polymorphism

UNIT –IV TEMPLATES **11 Hrs**

Generic Function – Applying Generic function – Generic Classes – Power of Templates – Exception Handling: Fundamentals – Derived class Exceptions – Exception handling option – terminate(), unexpected(), uncaught_exception() Functions.

UNIT –V C++ I/O SYSTEM BASICS **10 Hrs**

C++Stream Classes – Formatted I/O – Overloading << and >> Operators – C++ File I/O: Opening and Closing a File – Reading and Writing text file – Unformatted and Binary I/O.

Text Book

- Herbert Schildt, *The Complete Reference C++*, 5th edition, Tata McGraw-Hill Publishing, New Delhi, 2015.

Reference Books

- E. Balagurusamy, *Object-Oriented Programming with C++*, Third Edition, Tata Mc Graw-Hill publishing, New Delhi, 2013.
- Robert Lafore, *Object-Oriented Programming in Microsoft C++*, Galgotia Publications, New Delhi, 2002.
- Herbert Schildt, *Teach yourself C++*, Third Edition, Tata McGraw Hill Publications, 2014.

E-Resources

- http://www.faadooengineers.com/threads/3146-Object-Oriented-Programming-With-C-%28E-Balaguruswami%29
- http://www.idiap.ch/~fleuret/files/Francois_Fleuret_-_C++_Lecture_Notes.pdf
- https://books.google.co.in/books/about/Object_oriented_programming_with_C++.html?id=Zkn_ogWiHyEC&hl=en

UCSR204 OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES USING C++

Semester	**: I**	**Credits**	**: 2**
Category	**: Core practical III**	**Hours/Week**	**: 3**
Class & Major	**: I B.Sc Computer Science**	**Total/Hours**	**:39**

Objectives:

To enable the students

- Understand and implement OOPS concepts
- Develop, compile and run simple to moderately complex C++ programs and Data Structures concepts.
- Implement data structures concepts using C++

C++ PROGRAMS **20 Hrs**

1. Function and Operator overloading.
2. Inheritance (Single, Multiple, Hybrid, Hierarchal, Multilevel)
3. Polymorphism
4. Abstract Classes
5. Interface

DATA STRUCTURES **19 Hrs**

1. Stack using Array and Pointers.
2. Queue using Array and Pointers.
3. Linear and Binary Search.
4. Merge Sort
5. Quick Sort.

UCSA103 PC SOFTWARE

Semester : I **Credit : 3**
Category : Allied **Hours/Week : 3**
Class & Major : I B.Com(CA) **Total Hours : 39**
Objectives:
To enable the students

- Understand the basics of Computer
- Acquire knowledge on MS Office application software
- Develop own applications using MS Office

UNIT – I COMPUTER BASICS **8 Hrs**

Introduction – Evolution, Generation & Classification of Computers – Computer system – Application of computers. Input devices, output devices, storage devices.

UNIT – II MS WORD and MS POWERPOINT **8 Hrs**

Working with Word 2013 Documents – Working with Text, Tables – Checking Spelling and Grammar – Adding Graphics – Printing a Document. MS Power point 2013: Working with Powerpoint 2013 – Working with different views – Designing Presentation – Printing in Powerpoint.

UNIT – III MS EXCEL and MS ACCESS **8 Hrs**

Working with Excel 2013 Workbook – Working with Worksheet – Formulas & Function – Inserting Charts – Printing in Excel. MS Access 2013: Starting Access – Tables – Queries – Forms – Reports.

UNIT - IV INFORMATION TECHNOLOGY **7 Hrs**

Information – Technology – IT- Role of IT – IT & Internet – Careers in IT Industry.

UNIT – V INTERNET **8 Hrs**

Evolution – Basic Internet Terms – Getting connected to Internet – Applications – Data over Internet. Internet Tools: Web Browser – Browsing Internet – Email – Search Engines – Instant Messaging. E-commerce – Electronic Data Interchange (EDI) – Mobile Communication – Bluetooth – Global Positioning System.

Text Book

- ITL ESL, *Introduction to Information Technology*, First Edition, Pearson Education, New Delhi, 2006.

Reference Book

- Sanjay Saxena, *A First course in Computers*, Second Edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2008.

E-Resources

- https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
- http://www.w3schools.com/html/
- https://www.youtube.com/watch?v=n1cQPwZwTs4
- https://www.youtube.com/watch?v=2tc98DHlXh4

UCSR108 PC SOFTWARE - LAB

Semester : I **Credit : 2**
Category : Allied Practical **Hours/Week : 3**
Class & Major : I B.Com(CA) **Total Hours : 39**

Objectives:
To enable the students

- Impart knowledge in document preparation.
- Create tables in MS Excel and data base in MS Access
- Design presentations with animation effects

I MS WORD **9 Hrs**

1. Text Manipulation and Formatting, usage of Spell check, Find and Replace, Numbering & Bulleting
2. Picture Insertion & Alignment.
3. Creation of Tables & formatting tables.

II MS EXCEL **9 Hrs**

1. Creation of Worksheet & Aligning, editing Data in cell, Borders around cell, Inserting & deleting Rows & Columns, Change of column width & row Width.
2. Excel Function(Mathematical, Date, Time etc.,)
3. Creation of Charts & controlling the Appearance of Chart

III MS POWERPOINT **6 Hrs**

1. Working with Clip-Arts and pictures.
2. Applying Transition & animation Effects with Slide show

IV MS ACCESS **9 Hrs**

1. Creating a Table, Setting a Primary Key, Adding & Deleting Records.
2. Working with Queries

V INTERNET **6 Hrs**

1. Working with Search engine in Internet

2. Create E-mail Id and send a mail to your friend

UCSA203 PROGRAMMING IN C

Semester : II **Credit : 3**

Category : Allied **Hours/Week : 3**

Class & Major : I B.Com(CA) **Total Hours : 39**

Objectives:

To enable the students

- Understand the concepts of structured Programming.
- Acquire Knowledge on control structures, arrays, Functions, pointers
- Solve Logical problems using C language.

UNIT- I OVERVIEW OF C **8 Hrs**

Importance of C - C program structure - sample C program - executing C program. Constants - Variables and Data Types - Character set - C tokens - keywords and identifiers – constants – variables - data types - declaration of variables - Assigning values to variables.

Operators – Expression - Arithmetic - Relational - Logical - Assignment - Increment - Decrement – Conditional - bitwise and special operators - Arithmetic expressions - Operator precedence - Type conversions.

UNIT- II DECISION MAKING AND BRANCHING **7 Hrs**

Decision making with If - Simple IF - IF ELSE - nested IF ELSE - ELSE IF ladder – switch - GOTO statement.

Decision Making and Looping: While - Do-While – For - Jumps in loops.

UNIT- III ARRAYS, CHARACTER ARRAY AND STRINGS **8 Hrs**

Declaration and accessing of one & two-dimensional arrays - initializing two-dimensional arrays - multidimensional arrays.

Declaring and Initializing String Variables – Reading Strings from terminal – Writing strings to screen – Putting strings together – Comparison of two strings – String handling functions.

UNIT- IV USER DEFINED FUNCTIONS **8 Hrs**

The form of C functions - Return values and types - calling a function - categories of functions - Nested functions – Recursion - functions with arrays - call by value - call by reference.

UNIT- V STRUCTURES, UNIONS AND POINTERS **8 Hrs**

Defining - giving values to members - initialization and comparison of structure variables - arrays of structure - structures and functions – unions – pointers.

Text Book

- E. Bala Gurusamy, *Programming in ANSI C*, 6th Edition, Tata McGraw-Hill, New Delhi, 2012.

Reference Books

- Ashok N. Kamthane, *Programming in ANSI C and Turbo C*, 3rd Edition, Pearson Education, New Delhi, 2006.
- Yashavant Kanetkar.Y, *Let us C*, 10th Edition, BPB Publication, New Delhi, 2010.

E-Resources

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical programming-in-c-january-iap-2010/lecture-notes/
- http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures/2
- http://www.powershow.com/view/d7c5Y2Y2N/OBJECT_ORIENTED_PROGRAMMING_powerpoint_ppt_presentation

UCSR205 PROGRAMMING IN C – LAB

Semester : II **Credit : 2**
Category : Allied Practical **Hours/Week : 3**
Class & Major : I B.Com(CA) **Total Hours : 39**

Objectives:
To enable the students

- Implement basic concepts of the C programming language.
- Design, build, execute and debug C applications.

Lab Exercises **39 Hrs**

1. Write a C program to input any 2 numbers and manipulate all arithmetic operations
2. Write a C program to convert Celsius to Fahrenheit and Fahrenheit to Celsius.
3. Write a C program to check whether a given year is leap year or not.
4. Reverse a string & check for palindrome.
5. Fibonacci series.
6. Write a C program to input a number and print whether that number is prime or not
7. Write a C program to perform matrix addition & matrix Subtraction
8. Write a C program to perform matrix multiplication.
9. Write a C program to search a number from the given set of numbers.
10. Write a C program to input a set of numbers and arrange it in ascending order
11. Write a C program to calculate NCR & NPR value using recursion
12. Write a Mark Sheet Processing using Structures in C.

UCSE204 OFFICE PACKAGE

Semester : II **Credits : 2**
Category : Non-Major Elective **Hours/Week: 4P**
Class & Major : I UG **Total Hours : 52P**

Objectives:
To enable the students

- Impart knowledge in document preparation.
- Create tables in MS Excel and data base in MS Access
- Design presentations with animation effects

I BASICS **10 Hrs**

1. Draw a Free hand drawing using all the options in MS Paint
2. Creation of files and folders in Windows operating system

3. Create E-mail Id and send a mail to your friend.
4. Create folder in mail and change the settings

II WORD PROCESSING **11 Hrs**

5. Text Manipulation and Formatting, usage of Spell check, Find and Replace, Numbering & Bulleting
6. Picture Insertion & Alignment, Header & footer
7. Creation of Tables & formatting tables.
8. Creation of mail merge.

III SPREADSHEET **11 Hrs**

9. Creation of Worksheet & Aligning, editing Data in cell, Borders around cell, Inserting, deleting Rows & Columns, Change of column width & row Width.
10. Excel Function(Mathematical, Date, Time etc.,)
11. Create MS-Excel sheet implementing SUM, AVG, COUNT, MAX,MIN Function
12. Creation of Charts & controlling the Appearance of Chart.
13. Pivot Table.

IV POWERPOINT **10 Hrs**

14. Creating, saving, closing Presentation, changing slide Layout.
15. Inserting & working with Clip-Arts.
16. Applying Transition & animation Effects with Slide show.

V ACCESS **10 Hrs**

17. Creating a Table, Setting a Primary Key, Adding & Deleting Records.
18. Working with Queries.
19. Creating Simple Forms & Reports.

UCSE205 MULTIMEDIA TECHNIQUES

Semester : II **Credits : 2**
Category : Non-Major Elective **Hours/Week: 4P**
Class & Major : I UG **Total Hours : 52P**

Objectives:

To enable the students

- Gain knowledge in Photoshop
- Create Photoshop Applications
- Develop 2D projects

I. Photo Effects: **11 Hrs**

1. Discoloring the image
2. Changing cloth texture and pattern
3. Changing background
4. Applying soft light effect
5. Background with sunspot

II. Photo Retouching: **10 Hrs**

6. Color Correction
7. Blending image
8. Smooth skin effect
9. Adding blur effect to background
10. Sparkle star effect

III. Text Effects: **11 Hrs**

11. Creating metallic text effect
12. Create shining effect
13. Create digital banner using text
14. Create website header
15. Create glass effect

IV. Texturing: **10 Hrs**

16. Create brick wall texture
17. Create smoking effect
18. Create torn paper edge effect
19. Create wood texture
20. Create Twirl / Swirl effect

V. 3D Effects: **10 Hrs**

21. 3D Ball
22. Embossed image
23. Glowing image
24. Ice image effect
25. Create simple banner using logo

III AND IV EVALUATION COMPONENTS OF CIA

S. No	Course Code	Course Title	Component III	Component IV
1	UCSM104/UCAM105	Programming in C	Debugging	Problem Solving
2	UCSM105	Information Technology	Assignment	Presentation
3	UCSM205/UCAM204	Data Structures and Algorithms	Assignment	Problem Solving
4	UCSM204/UCAM203	Object Oriented Programming using C++	Debugging	Problem Solving
5	UCSA103	PC Software	Assignment	Presentation
6	UCSA203	Programming in C	Debugging	Problem Solving
7	UCSE204	Office Package	Assignment	Presentation
8	UCSE205	Multimedia Techniques	Animation Video	Project

COURSE PROFILE: M.Sc. (Computer Science)

Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credit	
					Min	Max
I	Core I	PCSM108	Theoretical foundations for computers	5	4	4
	Core II	PCSM109	Open source Technologies	5	5	5
	Core III	PCSM110	Advanced Java Programming	5	4	4
	Core Practical I	PCSR104	Advanced Java Programming - Lab	5	3	3
	Core Practical II	PCSR105	Open source Technologies - Lab	4	3	3
	Non Major Elective			5	4	4
	Core		Library	1	-	-
			Total	**30**	**23**	**23**
II	Core IV	PCSM206	Compiler Design	4	4	4
	Core V	PCSM209	Web Programming	4	3	**3**
	Core VI	PCSM210	Design and Analysis of Algorithms	4	3	**3**
	Core VII	PCSM208	Research Methodology	4	3	3
	Core VIII	PCSM211	Software Testing	4	3	**3**
	Core Practical III	PCSR205	Web Programming - Lab	4	3	**3**
	Non Major Elective	PALE201/ PALE301	Preparatory Course for NET/SET	5	4	4
	Service Learning	PCSX201/ PCAX201	Introduction To Information Technology	-	1	1
	Core		Library	1	-	-
			Total	**30**	**24**	**24**
III	Core IX	PCSM308	Cloud Computing (Recent Trend in Computer Science)	4	4	4
	Core X	PCSM309	TCP / IP Networks	4	3	3
	Core XI	PCSM310	Service Oriented Architecture	4	4	4
	Core XII	PCSM311	Big Data Analytics	4	4	4
	Core Practical IV	PCSR304	Cloud Computing – Lab	5	3	3
	Core Practical V	PCSR305	Big Data Analytics - Lab	4	3	3
	Core Practical VI	PCSR302	Mini Project	2	2	2
	Value Education	PWSV301	Women's (Studies)	2	2	2
	Core		Library	1	-	-
			Total	**30**	**25**	**25**
IV	Core XII	PCSM403	Network Security	6	5	5
	Core XIII	PCSM404	NET/SET for Computer Science	4	3	3
	Core Project I	PCSP402	Project	17	8	8
	Value Education	PWSV401	Women's Studies	2	2	2
	Core		Library	1	-	-
			Total	**30**	**18**	**18**
			Grand Total	**120**	**90**	**90**

COURSES OFFERED TO OTHER DEPARTMENTS

Course	Semester	Category	Course Code	Course Title	Contact Hrs/Week	Credit
M.Sc Tamil	IV	Major Elective	PTAM403	fzpdp gad;ghl;oay;	5	3
M.Sc Bio Informatics	I	Core III	PBIM103	Introduction to Computer Programming	6	4
	I	Core Practical I	PBIR102	Introduction to Computer Programming- Lab	6	4
	II	Core VI	PBIM203	Computer Programming in Perl and CGI	5	4
	II	Core Practical II	PBIR201	Computer Programming in Perl and CGI- Lab	4	2
	IV	Core XII	PBIM401	Database Management Systems	5	5

NON-MAJOR ELECTIVES - PG

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit
I	Non Major Elective	PCSE101	Web designing tools	3T+2P	4
		PCSE102	Object Oriented Programming	3T+2P	4
		PCSE204	Worksheet Analysis	3T+2P	4

PCSM109 OPEN SOURCE TECHNOLOGIES

Semester : I **Credit : 5**
Category : Core III **Hours/Week : 5**
Class &Major : I M.Sc Computer Science **Total Hours : 65**

Objectives:

To enable the students

- Gain knowledge about Open Source Technologies.
- Develop programming skills onLinux system, Apache.
- Design web page using MySql and PHP.

UNIT –I OPENSOURCE **12 Hrs**

Introduction: Open Source – Open Source vs. Commercial Software – What isLinux? - Free Software – Where I can use Linux? Linux Kernel – Linux Distributions

UNIT - II LINUX **12 Hrs**

Introduction: Linux Essential Commands – Filesystem Concept - Standard Files- The Linux Security Model - Vi Editor - Partitions creation - Shell Introduction- String Processing - Investigating and Man aging Processes - Network Clients -Installing Application

UNIT –III APACHE **16 Hrs**

Introduction - Apache Explained - Starting, Stopping, and Restarting Apache -Modifying the Default Configuration - Securing Apache - Set User and Group -Consider Allowing Access to Local Documentation - Don't Allow public_htmlWeb sites - Apache control with .htacces

UNIT –IV MySQL **10 Hrs**

Introduction to MY SQL - The Show Databases and Table - The USE command- Create Database and Tables - Describe Table - Select, Insert, Update andDelete statement - Administrative detail - Table Joins - Loading andDumping a Database.

UNIT – V PHP **15 Hrs** PHP

Introduction- General Syntactic Characteristics - PHP Scripting - Commenting your code - Primitives, Operations and Expressions – PHP Variables - Operations and Expressions Control Statement - Array – Functions - Basic Form Processing - File and Folder Access - Cookies - Sessions - Database Access with PHP - MySQL - MySQL Functions - Inserting Records - Selecting Records - Deleting Records - Update Records.

Text Book

- James Lee and Brent Ware, *Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP*, Dorling Kindersley(India) Pvt. Ltd, 2008

Reference Book

- Eric Rosebrock, Eric Filson,*Setting up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together"*, Published by John Wiley and Sons, 2004.

PCSM110 ADVANCED JAVA PROGRAMMING

Semester : I **Credit : 4**
Category : Core I **Hours/Week : 5**
Class &Major: I M.Sc. Computer Science **Total Hours : 65**

Objectives:

To enable the students

- Understand the concepts of Java
- Develop programs using JDBC
- Design own Webpage.

UNIT –I FUNDAMENTALS OF JAVA **13 Hrs**

Introduction to java - Features of java - Access Controls - Static and fixed methods - Inner classes - String class - Inheritance - Overriding Methods - Using Super class - Abstract classes - Packages - Interfaces - Exception Handling –Multithreading .

UNIT –II APPLETS IN JAVA **13 Hrs**

Enumerations - Auto boxing – Annotations - I/O - Serialization – Applets – Generics - Handling String –String Buffer - Primitive type wrappers.

UNIT - III JAVA BEAN &DATABASE **13 Hrs**

What is Java Bean – Creating Applets the use Java Beans - Creating a Java Bean - Creating a Bean Manifest File - Creating a Bean JAR File – Using a New Bean – Adding Controls to Beans – Giving a Bean Methods - Giving a Bean an Icon – Creating a BeanInfo Class - Talking to Database: What does JDBC does- JDBC vs ODBC and other APIs-Two tier and three tier models-Types of JDBC drives-Java soft framework-The Essential JDBC programme-Using a prepared statement object-The interactive SOL tool- Using tables.

UNIT - IV RMI & SERVLET **13 Hrs**

RMI – Client/Server Architecture – Limitations of RMI – A Model RMI Transaction – Writing an RMI Server – Designing a remote Interface – Overview of servlets – Servlet Life Cycle – HTTP Specific Servlet – Servlet Configuration.

UNIT –V JSP **13 Hrs**

Understanding the need for JSP - Evaluating the benefits of JSP - Comparing JSP to other technologies - Avoiding JSP misconceptions - Installing JSP pages - Surveying JSP syntax - Static vs. dynamic text - Dynamic code and good JSP design - The importance of packages for JSP helper/utility classes - JSP expressions - JSP scriptlets - JSP declarations.

Text Books

- Herbert Schildt, *The Complete Reference: Java 2*, Eighth Edition, Tata McGraw Hill, New Delhi, 2011.
- *Java 6 Programming Black Book*, New Edition, DreamtechPress,New Delhi, 2009.
- Marty Hall and Larry Brown,*Core Servlets and JavaServer Pages: Volume 1: Core Technologies*, Second Edition, New Delhi, 2004

Reference Books

- Deitel, *Java How to Program*, 5th Edition, Prentice Hall, New Delhi, 2004.
- Keyur shah, *Gateway to Java Programmer Sun Certification*, First Edition, Tata McGraw Hill,New Delhi, 2002.
- Patrick Naughton and Herbert Schildt *The complete Reference Java* 2 Fifth Edition
- Joshua Bloch, *Effective Java*, Second Edition, Sun micro system.

E- Resource

- https://books.google.co.in/books?ei=XCmVVZX5JY29ugSmv4GABQ&id=NEa5P9rq6RAC&dq=%E2%80%A2+Herbert+Schildt%2C+The+Complete+Reference%3A+Java+eighth+edition&focus=searchwithinvolume&q=table+of+contents#v=onepage&q=contents&f=false
- http://catalogue.pearsoned.co.uk/educator/product/Core-Servlets-and-JavaServer-Pages-Volume-1-Core-Technologies/9780130092298.page#sthash.TcflG1Kv.dpuf

PCSR104 ADVANCED JAVA PROGRAMMING - LAB

Semester : I **Credit : 3**
Category : Core Practical I **Hours/Week : 5**
Class &Major : I M.Sc Computer Science **Total Hours : 65**

Objectives:

To enable the students

- Acquire knowledge on web oriented programming.

- Develop Java Application program and Applet program**.**
- Design own Webpage.

PROGRAMS

1. Inheritance, Polymorphism and Abstract class.
2. Interface and Packages.
3. Synchronization in Multithreading.
4. Payroll Processing using JDBC(CRUD Operation using Statement).
5. Stock Management System using JDBC (CRUD Operation using PreparedStatement).
6. Program to illustrate the use of Remote Method Invocation.
7. Online Shopping using Servlet Programming (Cookies).
8. Bus Ticket Reservation using Servlet Programming (Session).
9. Human Resource Management System using JSP.
10. Banking Information System using JSP.

PCSR105OPEN SOURCE TECHNOLOGIES –LAB

Semester	**: I**	**Credit**	**: 3**
Category	**: Core Practical II**	**Hours/Week**	**: 4**
Class &Major	**: I M.Sc Computer Science**	**Total Hours**	**: 52**

Objectives:

To enable the students

- Gain knowledge about Open Source Technologies.
- Develop programming skills onLinux system, Apache.
- Design web page using MySql and PHP.

Lab Exercise:

1. Write a server side PHP program that displays marks, total, grade of astudent in tabular format by accepting user inputs for name, number andmarks from a HTML form.
2. Write a PHP program that adds products that are selected from a web page to a shopping cart.
3. Write a PHP program to access the data stored in a Mysql table.
4. Write a PHP program interface to create a database and to insert a table intoit.

   i). Write a PHP program using classes to create a table.

   ii). Write a PHP program to upload a file to the server.
5. Write a PHP program to create a directory, and to read contents from thedirectory.
6. Write a shell program to find the details of a user session.
7. Write a shell program to change the extension of a given file.
8. Create a Mysql table and execute queries to read, add, remove and modify arecord from that table.

PCSM206 COMPILER DESIGN

Semester : II **Credit : 4**
Category : Core IV **Hours/Week : 4**
Class &Major: I M.Sc Computer Science **Total Hours : 52**
Objectives:
To enable the students

- Learn the basic functions of compiler design.
- Study the principles and concepts of Analysis and type checking
- Understood the syntax analysis and run time environments contents.

UNIT –I INTRODUCTION TO COMPILERS **10 Hrs**

Compilers – Analysis of source program – The Phases of compilers – Cousins of Compilers – The grouping of phases – A simple one-pass compiler Overview – Syntax Definition – Syntax-directed translation – Parsing – Lexical analysis.

UNIT –II SYMBOL TABLE **12 Hrs**

The role of lexical analyzer – Finite Automata – DFA – Conversion of an NFA into a DFA – Conversion of an NFA from a Regular Expression - From a regular expression to an NFA – Design of a Lexical Analyzer Generator – Optimization of DFA – based pattern matchers.

UNIT - III SYNTAX ANALYSIS **10Hrs**

The role of a parser – Context Free Grammar – Top-down parsing – Bottom-up parsing – Operator – LR Parsers – Precedence parsing. Syntax-directed translation: Syntax – directed definitions – Construction of Syntax trees – Bottom-up evaluation of S-attributed definitions – Top-down translation – Recursive evaluators

UNIT - IV TYPE CHECKING **10 Hrs**

Type system – Specification of a simple Type Checker – Type conversions – An algorithm for unification. Run-time environments-Storage Organization-Storage -Allocation Strategies – Symbol Tables – Dynamic Storage allocation techniques.

UNIT –V INTERMEDIATE CODE GENERATION **10 Hrs**

Intermediate languages – Declarations – Back patching – Procedure Calls. Code Generation: A simple code generator – the Dag representation of basic blocks – Peephole optimization – Code Generator generators. Code Optimization: Introduction – Principal sources of optimization – Optimization of basic blocks.

Text Books

- Alfred V.Aho, Ravi Sethi, Jeffery D.Ullman, *Compilers, Principles and Techniques and Tools*, Addison-Wesley, New Delhi, 1999.
- John J. Donovan, *System Programming*, Tata McGraw Hill Publishers, New Delhi, 1991.

Reference Books

- ChattopadhyaySanthanu, *Compiler Design*, PHI, New Delhi, 2006.
- Holub Allen, *Compilers in C*, PHI, New Delhi, 1997.

PCSM209 WEB PROGRAMMING

Semester : II **Credit : 3**
Category : Core V **Hours/Week : 4**
Class &Major : I M.Sc Computer Science **Total Hours : 52**
Objectives:
To enable the students

- Gain knowledge about .Net frame work
- Apply concepts on Server Side Scripting.
- Develop Web Applications.

UNIT –I C# PROGRAMMING **11 Hrs**

An Overview of .NET Assemblies - Understanding the Common Type System, Common Language Specification, Common Language Runtime - The Platform-Independent Nature of .NET - The Role of the .NET Framework 4.5 SDK - Building .NET Applications Using Notepad++, SharpDevelop, Visual C# Express, Visual Studio - The System.Console Class - System Data Types and C# Keywords - Working with String Data - Narrowing and Widening Data Type Conversions - Understanding Implicitly Typed Local Variables - C# Iteration Constructs - Decision Constructs and the Relational/Equality Operators - Methods and Parameter Modifiers - C# Arrays, the enum Type, the Structure Type, Value Types and Reference Types, C# Nullable Types - Encapsulation.

UNIT - II INHERITANCE AND POLYMORPHISM **10 Hrs**

The Basic Mechanics of Inheritance - The Second Pillar of OOP: The Details of Inheritance - Programming for Containment/Delegation - The Third Pillar of OOP: C#'s Polymorphic Support - Understanding Base Class/Derived Class Casting Rules - The Master Parent Class: System.Object - Understanding Structured Exception Handling - Working with Interfaces - Collections and Generics.

UNIT –III ADO.NET **11 Hrs**

Definition of ADO.NET - ADO.NET Data Providers - ADO.NET Namespaces - Abstracting Data Providers Using Interfaces - Creating the AutoLot Database - The ADO.NET Data Provider Factory Model - the Connected Layer of ADO.NET - Working with Data Readers - Database Transactions - Disconnected Layer of ADO.NET - Role of the DataSet - Working with DataColumns, DataRows,DataTables&Data Adapters - The Entity Framework. Understanding the Role of Entity Framework-Building and Analyzing Your First EDM-Programming Against the Conceptual Model-AutoLotDAL Version Four, Now with Entities-Data Binding Entities to Windows Forms GUls-Going Forward with .NET Data-Access APls

UNIT –IV ASP.NET **10 Hrs**

Visual Studio – Designing a Web Page – Exploring the Anatomy of a web Form – Essentials of HTML – Writing Code – Debugging – Web Form Fundamentals – Web Controls – Error Handling, Logging and Tracking – State Management – Validation Controls – Rich Controls.

UNIT –V MASTER PAGES & THEMES **10 Hrs**

User Controls and Graphics - Styles, Themes, and Master Pages - Website Navigation - ADO.NET Fundamentals - Data Binding - The Data Controls.

Text Books

- Andrew Troelsen,*Pro C# 5.0 and the .NET 4.5 Framework,*Sixth Edition, Apress, New York, 2012.
- Matthew MacDonald,*Beginning ASP.NET 4.5 in C#,*Apress, New York, 2012.

Reference Book

- David. S. Platt, *Introducing Microsoft. Net*, Third Edition, Microsoft Press, New Delhi, 2003.
- .NET 4.5 Programming 6-in-1, Black Book, DreamTech Press Kogent solutions, 2012
- Chris Bates, *Web Programming Building Internet Applications,* Second edition,New delhi,2008
- A.P.Rajshekhar,.*NET Framework 4.5 Expert Programming Cookbook*, Packt Publication, 2013

PCSM210DESIGN AND ANALYSIS OF ALGORITHMS

Semester : III **Credit : 4**
Category : Core VIII **Hours/Week : 4**
Class &Major : I M.Sc Computer Science **Total Hours : 52**

Objectives:

To enable the students

- Understandthe concept of Algorithm.
- Solve problems on Greedy and backtracking
- Analysis the algorithm.

UNIT –I INTRODUCTION **10 Hrs**

Introduction – Algorithm – Specification – Performance Analysis – Divide and Conquer – General Method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick sort.

UNIT –II GREEDY ALGORITHMS **11 Hrs**

The Greedy Method – General Method – Knapsack problem – Tree Vertex Splitting Dynamic Programming – General Method – Multistage Graphs – All pairs shortest path – Single – Source Shortest paths – The Traveling Salesperson problem – Flow Shop Scheduling.

UNIT –III TREES AND GRAPHS **10 Hrs**

Basic traversal and Search techniques – Binary Trees – Graphs – Connected Components and Spanning trees – Biconnected Components.

UNIT –IV PROBLEM SOLVING ALGORITHMS **10 Hrs**

Backtracking – General Method – 8 Queens Problem – Graph Coloring – Branch and Bound Method – 0/1 Knap sack Problem.

UNIT –VNP HARD AND NP COMPLETE PROBLEM **11 Hrs**

Basic Concepts – Cooke's Theorem – NP Hard Problem – Clique Decision Problem – Job Shop Scheduling – Code Generation with Common Sub Expressions – Approximation Algorithms – Introduction – Absolute Approximations – E-Approximations.

Text Book

- Ellis Horowitz, SartajSahni&SanguthevarRajasekaran, *Computer Algorithms,* Galgotia Publications Pvt. Ltd., 2002.

Reference Books

- Sara Baase& Allen Van Gelde, *Computer Algorithms, Introduction to Design and Analysis,* Third Edition, New Delhi, Pearson education, 2002.
- Aho, Hoproft and Ullman, *The Design and Analysis of Computer Algorithms,* New Delhi, Pearson Education, 2001.
- Basu S.K., *Design Methods and Analysis of Algorithms,* PHI, 2006.

PCSM208 RESEARCH METHODOLOGY

Semester : II **Credit : 3**
Category : Core VII **Hours/Week : 4**
Class &Major:I M.Sc Computer Science **Total Hours : 52**

Objectives:

To enable the students

- Understand the concepts of Research Methodology.
- Acquired knowledge on use-case models, object analysis, testing and quality assurance.
- Gain Practical Knowledge in MATLAB.

UNIT –I INTRODUCTION TO RESEARCH **12 Hrs**

Meaning of Research-Objectives of Research- Motivation of Research-Types of Research-Research approaches-Significance of Research-Research Methods versus Methodology-Research and Scientific Methods-Importance of Knowing How Research is Done-Research Process-Criteria of Good Research-Problems encountered by Researchers in India. Defining the Research Problem Methodology: What is a Research Problem? Selecting the problem-Necessary of defining the Problem- Techniques involved in defining a problem-an Illustration conclusion.

UNIT - II CASE TOOLS **9 Hrs**

System Development – Object Basics – Development Cycle – Methodologies – Patterns – Frameworks –UML- Diagrams –Class Diagram – Use-Case Diagram UML Dynamic Modeling – Object Analysis - Object Relations – Attributes – Methods - Class and object responsibilities.

UNIT –III TESTING **9 Hrs**

Quality Assurance tests – Testing Strategies - Object oriented on testing – Tests cases -Test Plans - Continuous testing - Debugging Principles - System Usability - Measuring user satisfaction - Case studies.

UNIT - IV MATLAB **10 Hrs**

MATLAB Introduction – Definition - Symbolic Calculation – Basics of MATLAB – Interactive Computation – Metric and Vectors – Matrix and Array Operation – Character Strings.

UNIT –V MATLAB FUNCTIONS **12 Hrs**

Command line function – Using Build –in Function –Saving and Loading Data – Programming in MATLAB: Scripts and Function – Script Files – Function files – Language specific features – Advanced data Object – Publishing Reports

Text Books

- Kothari. C.R, *Research methodology -Methods & Techniques*, Wiley Eastern Limited, 1991.

- Ali Bahrami, *Object Oriented Systems Development*, Tata McGraw Hill International Edition, 1999.
- Rudrapratap, *Getting started with MATLAB*,Oxford University Press, ,2010

Reference Book

- Grady Booch, *Object Oriented Systems Development*, Second Edition, Pearson Education, New Delhi, 2007.

PCSM211 SOFTWARE TESTING

Semester : III **Credit : 4**
Category : Core VIII **Hours/Week : 3**
Class &Major: I M.Sc Computer Science **Total Hours : 39**

Objectives:

To enable the students

- Acquire the knowledge in software Testing.
- Gain knowledge in Quality assurance& Control.
- Analyze the quality of the project

UNIT- I SOFTWARE TESTING TECHNIQUES 8 Hrs

Software Testing Fundamentals, Psychology of testing - Testing economics, White box testing techniques, Black box testing techniques -Weyuker's adequacy axioms.

UNIT – II SOFTWARE TESTING STRATEGIES 8 Hrs

SDLC and Testing, Strategic Approach to Software Testing, Unit Testing, Integration Testing, validation Testing, System Testing, The art of debugging, Testing Maturity Models TMM and TMMI.

UNIT – III TESTING OBJECT ORIENTED SOFTWARE 8 Hrs

Challenges - Differences from testing non-OO Software - Class testing strategies - Class Modality - State-based Testing - Message Sequence Specification, Difference between design based and code testing, Interdependency Testing Models in OO software.

UNIT IV QUALITY CONTROL 8 Hrs

Introduction to Quality and Quality Control - Evolution of Quality Control – Quality assurance - Quality circles and Quality improvement teams - Benefits of Quality control- Quality and Reliability - Quality costs - Measuring Quality costs - Total Quality Management, Quality Metric Models - McCall s model, FURPS model and ISO 9126 model.

UNIT V 7 Hrs

CMM Model and its stages - Introduction to PCMM, CMMI and Six Sigma concepts. Introduction to ISO 9000, ISO 9000 Part3 for software Quality.

Text Books

- Roger S. Pressman, *Software Engineering*. A Practitioners Approach , Seven Edition, 2012.
- William E.Perry, *Effective Methods for Software Testing (2nd Edition)* , John Wiley & Sons, 2000.
- Robert V.Binder, *Testing Object-Oriented Systems: Models Patterns and Tools* , Addison Wesley, 2000.

Reference Book

- GlenfordJ.Myers, *"The Art of Software Testing "*, John Wiley & Sons, 1997.

PCSR205 WEB PROGRAMMING LAB

Semester : II **Credit : 3**
Category : Core Practical III **Hours/Week : 5**
Class &Major:I M.Sc Computer Science **Total Hours : 65**

Objectives:
To enable the students

- Acquirepractical skills in C# programming and designing simple web application.
- Gain knowledge about Server Side Scripting.
- Develop Web Applications using ADO.NET

Lab Exercise:

1. Encapsulation Inheritance and Polymorphism.
2. Abstract Class and Inheritance.
3. File Handling and User Defined Exception.
4. Connected Architecture.
5. Disconnected Architecture.
6. Entity Framework.
7. Validation Controls and Rich Controls
8. Navigation Controls and State Management
9. Master Page and Themes
10. Data Controls

PCSX201/ PCAX201 INTRODUCTION TO INFORMATION TECHNOLOGY

Semester: II **Credit : 1**
Category: Service Learning **Total Hours: 40**
Class & Major :I M. Sc Computer Science

Objectives:
To enable the students

- Develop the service attitude.
- Develop primary school teaching skills.
- Inculcate interpersonal communicational skills.

UNIT - I:INTRODUCTION TO COMPUTER **5 Hrs**

Introduction to Computer–CPU Parts - Hardware and Software - Input Devices-Output Devices - Storage Devices - Operating System– How to Operate the Computer – Types of Computer.

Activities: Animation session for computer parts – Handling Mouse.

UNIT - II: MS WORD & EXCEL **10 Hrs**

MS WORD:MS Word Creation -Formatting the document – Tables.

MS EXCEL: Creation – Formulas – Commands – Working with worksheets – Creating a Chart – Data Sort – Functions.

Activities: To open & create MS-Word Document, To format & Align the document, To create the table, To insert Chart, Pictures, Header & Footer - Excel sheet creation and opening, Charts, clipart, pictures insertion, Using different formulas, Basic calculations are implemented using tools. Scientific calculator used for complex calculations.

UNIT - III:MS POWERPOINT &APPLICATION SOFTWARE 8 Hrs

MS Paint – Toolbar and their icons – Navigation in Power Point – Slide show – Custom Animation.

Application Software – Ms paint - Notepad, Calculator

Activities: Slide Presentation - Painting and coloring, Using tools in MS Paint, To open & create notepad, Font formatting & Align the document.

UNIT - IV: MS PROJECT 5 Hrs

Tasks – links – constraints –resources –assignments –costs –formatting views.

Activities: To create project file

UNIT -V: INTERNET CONCEPTS 12 Hrs

Network and its types – Search Engine- E mail concepts-Creating mail ID-Sending & Receiving mails- Formatting mails- Attaching files – Blogs, Group Mails, Metasearch Engines – Java Applet.

Activities:

To create E-Mail Id, Sending and receiving messages, to attach files.

Text Books

- Sanjay Saxena, *A First course in computer*, Vikas Publications, New Delhi,2000.
- Thomas A.Powell, *Complete Reference HTML*, 4th Edition, Tata Mc Graw Hill, New Delhi,2000.

Reference Books

- William Stalling, *Data and Computer Communication*, PHI, New Delhi, 2001.
- Ram.B, *Computer fundamentals*, 3th Edition New Age Publications, New Delhi, 2002.
- www.stylusinc.net/ms project tutorial /project management. Shtml.

Target Group: VI to VIII (Govt School students)
Component III and IV

S.No.	Course code	Course title	Component III	Component IV
1	PCSM109	Open source Technologies	Problem solving	Seminar
2	PCSM110	Advanced Java Programming	Problem solving	Seminar
3	PCSM206	Compiler Design	Case Study	Seminar
4	PCSM208	Research Methodology	Case Study	Seminar
5	PCSM209	Web Programming	Problem solving	Seminar
6	PCSM210	Design and Analysis of Algorithms	Case Study	Seminar
7	PCSM211	Software Testing	Case Study	Seminar

COURSE PROFILE M.Phil (COMPUTER SCIENCE)

Semester	Category	Course Code	Course Title	Contact Hrs/week	Credit	
					Min.	Max
I	Core paper I	MCSM105	Research Methodology	6	5	5
	Core Paper II	MCSM106	Advanced Topics in Computer Science	6	5	5
	Core paper III	MCSM107	Special Area Study	6	5	5
II	Core paper IV	MCSD201	Dissertation and Viva-voce	30	15	15

MCSM105 RESEARCH METHODOLOGY

Semester : I **Credit : 5**
Category : Core I **Hours/Week : 6**
Class & Major : M.Phil Computer Science **Total Hours : 78**

Objectives:
To enable the students

- Understand the basic knowledge and concepts required for research and thesis writing.
- Gain knowledge on Operation research.
- Analyse topics in Computer Science such as logics, relation and functions.

UNIT I RESEARCH METHODOLOGY 16 Hrs

Introduction to Research: Meaning of Research – Objectives of Research – Motivation in Research – Types of Research – Research Approaches – Significance of Research – Research Methods versus Methodology – Research and Scientific Method – Importance of knowing how research is done – Research Process – Criteria of Good Research – Defining the Research Problem – Selecting the Problem – Necessity – Techniques involved in defining a problem – Research Design – Meaning – Need – Features of Good Design-Important concepts relating to research design – different research designs.

UNIT II DATA COLLECTION AND REPORT WRITING 15 Hrs

Report Writing: Significance of Report writing- Different steps in writing report – Layout of Research report- Types of reports – Mechanics of writing a research report- Precautions for writing research reports.

Data Collection: Collection of Primary data- Observation method –interview method- Collection of data through questionnaires- Collection of data through schedules- Collection of secondary data- selection of appropriate method for data collection.

UNIT III GRAPH THEORY 16 Hrs

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler Graphs – Hamiltonian Paths and Circuits – Trees – Properties of trees –

Distance and Centers in Tree – Rooted and Binary Trees - Incidence matrix – Sub matrices – Circuit Matrix – Path Matrix – Adjacency Matrix – Chromatic Number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four Color Problem – Directed Graphs – Types of Directed Graphs – Digraphs and Binary Relations – Directed Paths and Connectedness – Euler Graphs – Adjacency Matrix of a Digraph.

UNIT - IV BASIC OF OPERATIONS RESEARCH 16 Hrs

Development of Operations Research – Definition of Operations Research – Applications of Various OR Techniques – Models in OR – Classification Schemes of Models – Characteristics of a Good Model – Advantages of a Model – Limitations of a Model – Constructing the Model – Approximations in OP Models – Types of Mathematical Models – Queuing Models: Introduction – Elements of a Queuing System –Operating Characteristics of a Queue system – Waiting Time and Idle Time cost – Transient and Steady States of the System – Kendall's Notation for representing Queuing Models – Model I Single channel Poisson Arrivals with exponential Service Times, Infinite - population(M/M/1):(FCFS/∞/∞) – Explanatory note on the queuing formulae.

UNIT – V RELATIONS AND FUNCTIONS 15 Hrs

Relation Properties – Matrix and Graph – Graph Notations for relations - Partition and covering – Equivalence Relation – Compatibility Relations- Partial Ordering – Functions – Components- Composition of Functions –Inverse Functions – Binary and n-ary Operations.

Text Books

- Kothari. C.R, *Research methodology -Methods & Techniques*, 3rd edition, New Age International Publishers, 2009.
- Narsingh Deo, *Graph Theory with Applications to Engineering and Computer Science*, PHL Learning Private Limited, New Delhi, 2011.
- Er.Prem Kumar gupta, Dr. D.S. Hira *Problems in Operations Research* , S.Chand & Company Ltd., New Delhi, 2009.
- Dr.Venkatraman M.K, *Discrete Mathematics*, National Publishing Company, Chennai, 2003.

Reference Books

- Panneerselvam.R, *Research Methodology*,PHI Learning, 2nd edition, 2014.
- W.D.Wallis, *A Beginners Guide to Graph theory*, Birkhauser Boston Publications, 2nd edition, Newyork, 2007.

MCSM106 ADVANCED TOPICS IN COMPUTER SCIENCE

Semester : I **Credit : 5**
Category : Core II **Hours/Week : 6**
Class & Major : M.Phil Computer Science **Total Hours : 78**

Objectives:
To enable the students

- Understand the concepts of knowledge engineering in Cloud Computing.
- Implement the Data mining and Image processing.

- Gain deep knowledge on advance topics in Computer Science.

UNIT – I KNOWLEDGE ENGINEERING **16 Hrs**

Introduction-Definitions - Cognition and Knowledge Management - Data, Information, and Knowledge - Types of Knowledge - Expert Knowledge. Knowledge Codification - Codification Tools and Procedures – Knowledge Developers Skill Set - Knowledge Transfer - Transfer Methods - Role of the Internet in Knowledge Transfer - Knowledge Transfer in the E-World - E-Business – KM Tools :- Personal KM Tools, What next – from GUI to CIM, Software – Knowledge Technologies :- State of Technology, KM Gets Unconventional, Application is the Key, Content management, Technology components of KM, ERP and BPR, Meta-data Architecture.

UNIT – II CLOUD COMPUTING **16 Hrs**

Introduction – Cloud computing basics – overview – Applications – Intranets and the cloud – First Movers in the Cloud- Organization and cloud computing- Benefits – Limitations – Security Concerns – Regular Issues - Business case for going to the cloud. – Cloud Computing Services – applications in Business – Deleting your datacenter – Hardware and Infrastructure.

UNIT – III MOBILE ADHOC NETWORK **16 Hrs**

Introduction To Wireless Networks: Global systems for mobile communications(GSM)-General packet radio service(GPRS) – Personal Communications Services (PCSs) –Wireless LANs (WLANS) – Universal Mobile Telecommunication Systems(UTMS) – ADHOC WIRELESS NETWORKS : Introduction – Heterogeneity in Mobile Devices – Wireless sensor Networks – Traffic Profiles – Types of Ad HOC Mobile Communications – Types of Mobile Host Movements – Challenges – Wireless Application Protocol (WAP): The WAP Forum – The WAP Service Model – The WAP Protocol Architecture – The WWW Programming Model – The WAP Programming Model.

UNIT - IV DATA MINING **15 Hrs**

Introduction – Motivations – Importance – DM Functionalities – DM vs KDD – Data Mining Applications - Data Preprocessing –Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation – Association Rule Mining: MBA Analysis – The Apriori Algorithm – Improving the Efficiency of Apriori - Constraint-Based Association Mining - Classification and Prediction – Issues – Decision Tree Induction – Bayesian – Rule-Based – Lazy Learners – Other Classification Methods – Prediction – Cluster Analysis – Types – Partition Methods – Outlier Analysis.

UNIT – V DIGITAL IMAGE PROCESSING **15 Hrs**

Introduction - Digital image representation – Fundamental steps and components in Digital Image Processing. Digital Image Fundamentals: Elements of visual perception, sensing and acquisition. Sampling and Quantization – Basic relationship between pixels - Intensity Transformations and Spatial Filtering: Intensity Transformations – Basic Intensity Transformation Functions – Histogram Processing – Fundamentals of Spatial Filtering. Filtering in the Frequency Domain.

Text Books

- Anthony T.Velte, Toby J.Velte Robert elsenpeter, *Cloud Computing –A Practical approach,* . Tata McGraw Hill Publications, New Delhi, 2010.

- Jiawei Han and Micheline Kamber, *Data Mining Concepts and Techniques*, Third Edition, Elsevier, Morgan Kaufmann Publishers, 2011.
- Rafael C.Gonzalez & Richard E. Woods, *Digital Image Processing*, Forth Edition, PHI Learning Private Limited, New Delhi, 2012
- Chai K Toh, *Ad Hoc Mobile Wireless Networks: Protocols and Systems*, Pearson Education limited, 1st Edition, 2001.
- Guus Schreiber et al., *"Knowledge Engineering and Management",*Universities Press Private Limited, FirstEdition, Hyderabad, 2003.

Reference Books

- Barrie sosinsky, Cloud Computing Bible, Wiley publishing Inc., New Delhi, 2011.
- Anil K. Jain, *Fundamentals of Digital Image Processing*, Second Edition, Prentice-Hall of India Private Limited, New Delhi, 2011.
- Aler Berson, Stephen J.Smith, *Data Warehousing Data Mining OLAP*, Tata McGraw Hill Publications, 2009.
- Subir kumar sarkar, T.G.Basavaraju,C.Puttamadappa,*Ad hoc Mobile wireless Networks,* AUERBACH Publications, 1st edition, US 2007.
- Elias M.Awad, Hassan M.Ghaziri, "*Knowledge Management*", Pearson Education Second Edition, 2008.

E-Reference

- Knowledge Engineering - http://www.ksi.edu/seke/hand.html

M.Phil III & IV EVALUATION COMPONENTS OF CIA

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core I	MCSM105	Research Methodology	Term Paper	Seminar
	Core II	MCSM106	Advanced Topics in Computer Science	Term Paper	Seminar
	Core III	MCSM107	Special Area Study	Term Paper	Seminar

DEPARTMENT OF COMPUTER APPLICATIONS & ISM

PREAMBLE

UG: Course profile, list of courses offered to other departments and the syllabi of courses in the first two semesters along with evaluation components III & IV (with effect from 2015-2018 batch onwards,)and

PG: Course profile, list of courses offered to the other departments and the syllabi of courses in the first two semesters along with evaluation components III & IV (with Effect from 2015-2018 batch onwards)

are presented in the booklet.

COURSE PROFILE: BCA

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit	
						Min	Max
I	I	Language	UTAL105/UTAL106/ UHIL101/UFRL101	Basic Tamil-I/Advanced Tamil-I/ Hindi-I/French-I	4	2	3
	II	English	UENL105/UENL106	Basic English-I/Advanced English-I	5	3	4
	III	Core I	UCAM105/UCSM104	Programming in C	5	4	4
	III	Core II	UCAM106	Digital logic computer design	4	3	3
	III	Core Practical I	UCAR103/UISR103	Introduction to Computer Applications	2	1	1
	III	Core Practical II	UCAR103/UCSR105	Programming in C- Practical	3	3	3
	III	Allied I	UMAA108	Mathematical Methods-I	5	4	4
	IV	Value Education			2	1	1
Total					**30**	**21**	**23**
II	I	Language	UTAL205/UTAL206/ UHIL201/UFRL201	Basic Tamil-I/Advanced Tamil-I/ Hindi-I/French-I	4	2	3
	II	English	UENL205/UENL206	Basic English-I/Advanced English-I	5	3	4
	III	Core III	UCAM203/UCSM204	Object oriented Programming using C++	4	4	4
	III	Core IV	UCAM204/UCSM205	Data Structure and Algorithms	3	3	3
	III	Core Practical III	UCAR203/UCSR204	Object oriented Programming and data structures using C++ Practical	3	3	3
	III	Allied II	UMAA208	Mathematical Methods-II	5	4	4
	IV	Non Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education			-	1	2
Total					**30**	**23**	**26**
III	III	Core V	UCAM307/UCSM302	Java Programming	5	4	4
	III	Core VI	UCAM308	MIS and ERP	5	3	3
	III	Core VII	UCAM309	Web User Interface Design	5	5	5
	III	Core Practical IV	UCAR303/UCSR303	Java Programming Practical	4	3	3
	III	Allied III	UCOA303	Financial Accounting	5	5	5
	IV	Non-Major Elective			4	2	2

	IV	Value Education			2	1	1
				Total	**30**	**23**	**23**
IV	III	Core VIII	UCAM404/UCSM405	Database Management System	5	4	4
	III	Core IX	UCAM403	Object oriented analysis & Design	4	3	3
	III	Core X	UCAM405/UCSM406	Data communication Networks	4	4	4
	III	Core XI	UCAM406	Data mining and ware housing	4	3	3
	III	Core Practical IV	UCAR402/UCSR404	Database Management System - Practical	3	3	3
	III	Core Practical VI	UCAR403	Case Tools Lab	3	3	3
	III	Allied IV	UCOA403/UCOR403	Accounting Package	5	5	5
	IV	Soft skill			2	1	1
	V	Extension Programme/ Physical Education			-	-	2
				Total	**30**	**26**	**28**
V	III	Core XII	UCAM501	Visual Programming	4	3	3
	III	Core XIII	UCAM504/UCSM507	Software Engineering	5	5	5
	III	Core XIV	UCAM505	Web Programming	4	2	2
	III	Core XV	UCAM506	Multimedia	4	3	3
	III	Core XVI	UCAR504	Visual Programming-practical	3	2	2
	III	Core Practical VII	UCAR505	Web Programming Lab	3	2	2
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
				Total	**30**	**22**	**22**
VI	III	Core XVI	UCAM606	Operating Systems	5	4	4
	III	Core XVII	UCAM607	Software testing	6	4	4
	III	Core XVIII	UCAM608/UCSM609	Computer Graphics	4	4	4
	III	Core Practical VIII	UCAR602	Operating Systems lab	3	3	3
	III	Core Project	UCAP601	Project Work	5	4	4
	III	Major-Elective	UCAO605/UCAO604	Big Data Analysis/ Cloud Computing	5	4	4
	III	Viva-Voce	UCAC601	Comprehensive Viva Voce	-	1	1
	IV	Soft skill			2	1	1
	V	Extension Programme/ Physical Education			-	-	2
				Total	**30**	**25**	**27**
				Grand Total	**180**	**140**	**149**

Extra Credit Earning Provision

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit
II	IV	NME	UCAE205	Desktop Publishing	4	2
			UCAE206	PC Hardware Troubleshooting	4	2
III	IV		UCAE305	Internet Applications	4	2
			UCAE306	Web Tools	4	2

NON-MAJOR ELECTIVE-UG

Semester	Part	Category	Course Code	Course Title	Contact / Week	Credit	
						Min	Max
II	III	Summer Internship	UCAI201	Summer Internship	-	-	1
III	III	Self study paper	UIDM301	Working Model	-	-	1
IV	III	Summer Internship	UCAI401	Summer internship	-	-	1
V	III	Self study paper	UIDM501	Self study paper	-	-	1

ALLIED OPTIONAL-UG

Semester	Part	Category	Course Code	Course Title	Contact Week	Credit
V	III	Allied Optional	UCAA503	E-Commerce	3T + 2P	4
V	III	Allied Optional	UCAA504	Web Technology	3T + 2P	4

UCAM105/UCSM104 PROGRAMMING IN C

Semester : I **Credit : 4**
Category : Core I **Hours/Week : 5**
Class & Major : I BCA **Total Hours : 65**

Objectives:

To enable the students

- Understand the concepts of structured Programming.
- Acquire Knowledge on control structures, arrays, Functions, pointers
- Solve Logical problems using C language.

UNIT – I INTRODUCTION **12 Hrs**

Overview of C: History- Basic Structure of C programs – Executing C program – C Tokens – Operators and expressions – Managing Input and Output operations.

UNIT – II DECISION MAKING **13 Hrs**

Decision making and branching – Decision Making and looping

UNIT – III ARRAYS **14 Hrs**

Arrays: One Dimensional Array – Two Dimensional Array – Multi dimensional Array. Character Array and String: Declaring, Initializing, Reading and writing. String: Arithmetic operation on characters – String Functions.

UNIT – IV FUNCTIONS **14 Hrs**

User Defined Functions: Definition – Types of Functions – Function Declaration and Call – Categories of Functions – Nesting of Functions – Recursions – Passing Arrays and String to Functions – Structures and Union in C.

UNIT – V POINTERS **12 Hrs**

Pointers: Introduction to pointers – Pointers Expression – Pointers and Array – Pointers and String – Array of Pointers – Pointers to Functions – Pointers to structure – File management: Reading and writing files – appending file – Preprocessor.

Text Books

- E. Bala Gurusamy, *Programming in ANSI C*, 6th Edition, Tata McGraw-Hill, New Delhi, 2012.

Reference books

- Herbert Schildt.H, *C: The Complete Reference*, 4th Edition, Tata McGraw-Hill Edition, New Delhi, 2000.
- Byron S. Gottfried, *Programming with C*, 4th Edition, Tata McGraw Hill Edition, New Delhi, 2006.
- Brian W. Kernighan and Dennis M.Ritchie, *The C Programming Language*, 2nd Edition, Prentice hall of India Pvt.ltd, New Delhi, 2005.

E-Resources

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-087-practical-programming-in-c-january-iap-2010/lecture-notes/
- http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures/2
- http://www.powershow.com/view/d7c5Y2Y2N/OBJECT_ORIENTED_PROGRAMMING_powerpoint_ppt_presentation

UCAM106 DIGITAL LOGIC COMPUTER DESIGN

Semester : I **Credits : 3**
Category : Core II **Hours/Week : 4**
Class & Major : I BCA **Total/Hours : 52**

Objectives:
To enable the students

- Understand the concepts of logic fundamentals.
- Learn the systematic way of processors.
- Inculcate Knowledge on digital concepts.

UNIT-I INTRODUCTION **10 Hrs**

Number systems - Conversion from one number system to another - compliments - Binary codes - Binary logic - Logic gates - Truth tables.

UNIT-II AXIOMS **12 Hrs**

Boolean Algebra - Axioms - Truth table simplification of Boolean function - map method (upto 5 Variables) - Mc-Clausky tabulation method.

UNIT-III REGISTERS **10 Hrs**

Sequential logic - RS, JK,D and T Flip flops - Registers -Shift Registers - Counters - Ripple Counters - Synchronous Counter - Design of Counters.

UNIT-IV MULTIPLEXERS **10 Hrs**

Adders - Subtractors - Decoders - Encoders - Multiplexer - Demultiplexer - Design of Circuits using decoders/Multiplexers - ROM - PLA - Designing circuits using ROMIPLA.

UNIT-V DESIGNS **10 Hrs**

Design of ALU -. Design of Status Register - Design of accumulator - Introduction to Computer Design.

Text Book

- M.M. Mano, Digital Logic and Computer Design, Prentice Hall of India, 2006.

Reference Book

- T.C.Bartee, 'Computer Architecture and logical Design', McGraw Hill, 2009.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

UCAR103/UISR103 INTRODUCTION TO COMPUTER APPLICATIONS

Semester : I	**Credits : 2**
Category : Core practical I	**Hours/Week : 2**
Class & Major : I BCA	**Total/Hours : 26**

Objectives:

To enable the students

- Develop students with the knowledge of document preparation, excel calculation and PowerPoint presentation.

MSWORD **07 Hrs**

1. Text Manipulations.
2. Usage of Numbering, Bullets, Footer and Headers.
3. Usage of Spell check, and Find & Replace.
4. Text Formatting.
5. Picture insertion and alignment.
6. Creation of documents, using templates.
7. Creation templates.
8. Mail Merge Concepts.
9. Copying Text & Pictures from Excel.
10. Saving and creating pdf documents

MS – EXCEL **07 Hrs**

11. Cell Editing.
12. Usage of Formulae and Built-in Functions.
13. File Manipulations.
14. Data Sorting (both number and alphabets).
15. Worksheet Preparation.
16. Drawing Graphs.
17. Usage of Auto Formatting.

POWER POINT **07 Hrs**

18. Inserting Clip arts and Pictures.
19. Frame movements of the above.
20. Insertion of new slides.
21. Preparation of Organization Charts.

22. Presentation using Wizards.
23. Usage of design templates.

INTERNET **05 Hrs**

24. Creating Mails
25. Search Engines
26. Uploading and downloading

UCSR105 / UCAR103 PROGRAMMING IN C - LAB

(Replaces the syllabus UCSR101 Programming in C found in the Academic council booklet -I)

Semester : I **Credit : 3**
Category : Core Practical II **Hours/Week : 3**
Class & Major : I BCA **Total Hours : 39**

Objectives:

To enable the students

- Design, build, execute and debug C programs.
- Develop programs by using control structures, arrays, functions,

I. Looping **4 Hrs**

1.Pascal Triangle

II.Arithmetic and Trigonometric Operations **12 Hrs**

1. Solve Quadratic Equations.
2. Find the largest and smallest number.
3. Perform the operations with the operands.
4. Find the NPR and NCR

III.Arrays and functions. **20 Hrs**

1. Sorting and Searching
2. Perform the operation of Matrix Manipulation.
   b. Addition and Subtraction. b. Multiplication
3. Perform the operation Recursive and Non-Recursive functions to find
   c. Factorial
   d. Fibonacci
4. Perform the String manipulation(without using string function)
   d. Concatenation
   e. Palindrome Checking
   f. Count the no.of vowels, consonants, characters and white spaces in a line

IV.Working with Structure **3 Hrs**

1. Generate mark sheet processing for set of students using Structure

UCAM203/UCSM204 OBJECT ORIENTED PROGRAMMING USING C++

Semester : II **Credits : 4**
Category : Core III **Hours/Week : 4**
Class & Major : I BCA **Total/Hours : 52**
Objectives:
To enable the students

- Understand the concepts of object oriented programming
- Acquire knowledge on Exception handling and file system
- Develop programming skills on OOPs concept

UNIT –I OVERVIEW OF C++ **10 Hrs**

Basic concept of Object Oriented Programming- C++ Fundamentals – C++ Keywords – General form of a C++ Program – Classes and Objects.

UNIT –II ARRAYS **11 Hrs**

Arrays of Objects – Pointers: Pointers to Objects – Type checking C++ Pointers – This Pointer – Pointers to Derived Type and Class Members – References – Dynamic Allocation Operators: Initializing – Allocating Arrays and Objects – Function Overloading – Copy Constructors and Default Arguments.

UNIT –III OOPS **10 Hrs**

Operator Overloading – Inheritance – Virtual Function and Polymorphism

UNIT –IV TEMPLATES **11 Hrs**

Generic Function – Applying Generic function – Generic Classes – Power of Templates – Exception Handling: Fundamentals – Derived class Exceptions – Exception handling option – terminate(), unexpected(), uncaught_exception() Functions.

UNIT –V C++ I/O SYSTEM BASICS **10 Hrs**

C++Stream Classes – Formatted I/O – Overloading << and >> Operators – C++ File I/O: Opening and Closing a File – Reading and Writing text file – Unformatted and Binary I/O.

Text Book

- Herbert Schildt, *The Complete Reference C++*, 5th edition, Tata McGraw-Hill Publishing, New Delhi, 2015.

Reference Books

- E. Balagurusamy, *Object-Oriented Programming with C++*, Third Edition, Tata Mc Graw-Hill publishing, New Delhi, 2013.
- Robert Lafore, *Object-Oriented Programming in Microsoft C++*, Galgotia Publications, New Delhi, 2002.
- Herbert Schildt, *Teach yourself C++*, Third Edition, Tata McGraw Hill Publications, 2014.

E-Resources

- http://www.faadooengineers.com/threads/3146-Object-Oriented-Programming-With-C-%28E-Balaguruswami%29
- http://www.idiap.ch/~fleuret/files/Francois_Fleuret_-_C++_Lecture_Notes.pdf

- https://books.google.co.in/books/about/Object_oriented_programming_with_C++.html?id=Zkn_ogWiHyEC&hl=en

UCAM204/UCSM203 DATA STRUCTURES AND ALGORITHMS

Semester : II **Credits : 3**
Category : Core IV **Hours/Week : 3**
Class & Major : I BCA **Total/Hours : 36**

Objectives:

To enable the students

- Acquire the knowledge about Data Structures and Algorithms concepts
- Create a Data Structure using Array, Stack and Queues.
- Analyze the Time and Space Complexity.

UNIT- I FUNDAMENTAL CONCEPTS 8 Hrs

Introduction to Data Structures - Data – Data Object- Abstract Data Types (ADT) and Data Structure – Categories of Data Structures – Introduction to Algorithm – Algorithm Design Tools – Pseudo Code – Program Development: Analysis, Design, Coding, Testing and Verification.

UNIT- II LINEAR STRUCTURES USING SEQUENTIAL ORGANISATION 7 Hrs

Concept of Sequential Organization – Array as ADT – Storage Representation of Arrays – The Data Object Polynomial – Sparse Matrices – Programming Problems.

UNIT- III STACKS AND QUEUES 7 Hrs

Fundamentals – Operations on a Stack – Representation of a Stack using Arrays – Implementation of Stack using Arrays – Applications of Stack – Recursion – Queue Fundamentals – Operations on a Queue – Representation of a Queue using Arrays – Circular Queues – Applications of Queue – Double Ended Queue – Representation of Multiple Queues using Single Array – To Reverse a Queue using a Stack – Priority Queue.

UNIT-IV SORTING AND SEARCHING 7 Hrs

Introduction – Searching Techniques - Linear Search - Binary Search – Sorting Techniques – Bubble Sort – Selection Sort – Insertion Sort – Quick Sort – Merge Sort – Heap Sort – Radix Sort – Comparative Study.

UNIT-V ALGORITHM AND ANALYSIS 7 Hrs

Time Complexity – Asymptotic Notations Big ‘O’, ‘Ω’ and Θ Notations – Space Complexity – Analysis of Searching and Sorting Algorithms – Algorithmic Strategies.

Text Book

- Shirish S. Sane, Neeta A. Deshpande, *Data Structures and Algorithms*, First Edition, Technical Publications, Pune, 2006.

Reference Books

- Horowitz, S. Sahini and Tinesh Mehta, *Fundamentals of Data Structures using C++*, 8th Reprint, Galgotia Pub.Pvt., New Delhi, 2008.
- E. Balagurusamy, *Object-Oriented Programming with C++*, Third Edition, Tata Mc Graw- Hill Publishing, New Delhi, 2007.

UCAR203/UCSR204 OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES USING C++

Semester	**: II**	**Credits**	**: 3**
Category	**: Core Practical III**	**Hours/Week**	**: 3**
Class & Major	**: I BCA**	**Total/Hours**	**: 39**

Objectives:

To enable the students

- Understand and implement OOPS concepts
- Develop, compile and run simple to moderately complex C++ programs and Data Structures concepts.
- Implement data structures concepts using C++

C++ PROGRAMS

6. Class, Object, Array and Array Pointer.
7. Function and Operator overloading.
8. Function Overriding.
9. Inheritance (Single, Multiple, Hybrid, Hierarchal, Multilevel)
10. Polymorphism.

DATA STRUCTURES

6. Polynomial Operations.
7. Stack and Queue using Array & Pointers.
8. Linear and Binary Search.
9. Insertion and Heap Sort.
10. Quick and Merge Sort.

UCAE205 DESKTOP PUBLISHING

Semester	**: II**	**Credits**	**: 2**
Category	**: NME**	**Hours/Week**	**: 4**
Class & Major	**: I UG**	**Total/Hours**	**: 52**

Objectives:

To enable the students

- Develop the knowledge about the concepts of Photoshop, Corel Draw and Page Maker.

Photoshop:

1. Extract an object from a given picture
2. Insert a picture in the existing image background
3. Design a pattern of your own creativity
4. Make a Glowing Text in Photoshop
5. Create your very own animated beating heart in Photoshop
6. Create an Animated text.

Corel Draw:

7. Create a 3D text in Corel Draw

8. Create an advertisement for a Textile company in Corel Draw
9. Design a banner for a marriage function.
10. Design a Logo.

Page Maker:

11. Deign a Label.
12. Design a Greeting Cards
13. Design Pamphlets.
14. Design a Simple Booklet.
15. Design a business/Visiting card for a company embed photo in it.

UCAE206 PC HARDWARE TROUBLESHOOTING

Semester : I **Credits : 2**
Category : NME **Hours/Week : 4**
Class & Major : I UG **Total/Hours : 52**

Objectives:

To enable the students

- Develop the knowledge about the PC hardware and Troubleshooting.

1. Troubleshooting symptom failures in motherboard
2. Identify different beep codes and error codes.
3. Identification of different motherboards & CPU's
4. Installation of operating system
5. Installation of application software
6. Installation of antivirus software.
7. Preventive maintenance of the computer system.
8. Debugging the computer system.
9. To remove, study and replace of Hard Disk.
10. To remove, study and replace of CD ROM Drive.

Evaluation Component

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
I	III	Core I	UCAM105/ UCSM104/ UISM106	Programming in C	Program Writing	Online Test
	III	Core II	UCAM106	Digital &logic fundamentals	Model	Online Test
II	III	Core IV	UCAM203/ UCSM204/ UISM204	Object oriented Programming using C++	Program Writing	Online Test
	III	Core V	UCAM204/ UCSM203	Data Structure and Algorithms	Problem Solving	Online Test

NON-MAJOR ELECTIVES-UG

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
II	IV	Non – Major Elective	UCAE205	Desktop Publishing	Designing	Online Test
II	IV	Non – Major Elective	UCAE206	PC Hardware Troubleshooting	Formatting	Online Test

COURSE PROFILE: B.Sc ISM

Semester	Part	Category	Course Code	Course Title	Contact/ Week	Credit	
						Min	Max
I	I	Language	UTAL105/UTAL106/ UHIL101/UFRL101	Basic Tamil-I/ Advanced Tamil-I/ Hindi-I/French-I	4	2	3
	II	English	UENL105/UENL106	Basic English-I/ Advanced English-I	5	3	4
	III	Core I	UISM106	Programming in C	4	3	3
	III	Core II	UISM107	Fundamentals of Information Technology	4	3	3
	III	Core Practical I	UISR103/UCAR103/	Introduction to computer Applications	2	1	1
	III	Core Practical II	UISR104	Programming in C- Practical	3	2	2
	III	Allied I	UMAA107	Probability and Statistical methods	6	5	5
	IV	Value Education			2	1	1
				Total	**30**	**20**	**22**
II	I	Language	UTAL205/UTAL206/ UHIL201/UFRL201	Basic Tamil-II/ Advanced Tamil-II/ Hindi-II/French-II	4	2	3
	II	English	UENL205/UENL206	Basic English-II/ Advanced English-II	5	3	4
	III	Core III	UISM204	Programming In C++	4	3	3
	III	Core IV	UISM205	MIS & ERP	3	3	3
	III	Core Practical III	UISR203	Programming In C++ Lab	3	2	2
	III	Allied II	UBAA202	Business Communication	5	5	5
	IV	Non Major Elective			4	2	2
	IV	Soft Skill			2	1	1
	V	Extension Programme/ Physical Education			-	1	2
				Total	**30**	**22**	**25**
III	I	Language	UTAL305/UTAL306/ UHIL301/UFRL301	Basic Tamil-III/ Advanced Tamil-III/ Hindi-III/French-III	4	2	3
	II	English	UENL305/UENL306	Basic English-III/ Advanced English-III	5	3	4
	III	Core V	UISM304	Java Programming	4	4	4
	III	Core VI	UISM305	Fundamentals of Computer Networks	3	3	3

	III	Core Practical IV	UISR304	Java Programming	3	2	2
	III	Allied III	UCOA301	Financial Accounting	5	5	5
	IV	Non-Major Elective			4	2	2
	IV	Value Education			2	1	2
				Total	**30**	**22**	**25**
IV	I	Language	UTAL201/ UTAL202/ UHIL201/ UFRL201	Tamil/Hindi/French	4	2	3
	II	English	UENL201 UENL202	English	5	3	4
	III	Core VII	UISM403	Visual programming	6	5	5
	III	Core VIII	UISM404	Database Management System	5	5	5
	III	Core Practical V	UISR403	RDBMS & Visual Programming –Practical	3	2	2
	III	Allied IV	UCOA403/ UCOR403	Accounting Package	5	5	5
	IV	Soft skill			2	1	1
	V	Extension Programme/ Physical Education			-	1	2
				Total	**30**	**24**	**27**
V	III	Core IX	UISM509	PHP & MySQL	5	5	5
	III	Core X	UISM510	Object oriented analysis & Design	4	4	4
	III	Core XI	UISM511	Operating System	4	4	4
	III	Core XII	UISM512	Data mining and ware housing	4	4	4
	III	Core Practical VI	UISR504	PHP & MYSQL-Lab	3	2	2
	III	Core Practical VII	UISR505	Case tools Lab	3	2	2
	III	Allied Optional			5	4	4
	IV	Value Education			2	1	1
				Total	**30**	**26**	**26**
VI	III	Core XII	UISM608	Web Technology	5	4	4
	III	Core XIII	UISM609	Multimedia	4	4	4
	III	Core XIV	UISM603	E-Commerce and its Applications	4	3	3
	III	Core XV	UISM610	Software Engineering	4	4	4
	III	Core Practical VIII	UISR603	Web Technology	3	3	3
	III	Core Project	UISP601	Project Work	3	3	3
	III	Major-Optional	UISO605/ UISO604	Data mining and ware housing/ Cloud Computing	5	4	4
	IV	Soft skill			2	1	1
	V	Extension Programme / Physical			-	-	2

		Education					
				Total	**30**	**26**	**28**
				Grand Total	**180**	**140**	**153**

EXTRA CREDIT EARNING PROVISION

Semester	Part	Category	Course Code	Course Title	Contact Hrs	Credit	
						Min	Max
II	III	Summer Internship	UISI201	Summer Internship	-	-	1
III	III	Working model	UISI301	Working Model	-	-	1
IV	III	Summer Internship	UISI401	Summer internship	-	-	1
V	III	Self Study Paper	UIDM501	Self study paper	-	-	1

ALLIED OPTIONAL-UG

Semester	Part	Category	Course Code	Course Title	Contact Hrs	Credit
V	III	Allied Optional	UISA502	2D Animation	3T + 2P	4

UISM106 PROGRAMMING IN C

Semester : I **Credit : 3**
Category : Core I **Hours/week : 4**
Class & Major : I Bsc ISM **Total Hours : 52**

Objectives:

To enable the students

- Understand the concepts of the C programming language.
- Design, build, execute and debug C applications.
- Apply variables, arrays, strings, and flow control statement, point and disk files in C applications.

UNIT-I BASICS **08 Hrs**

C fundamentals: character set – Identifiers and keywords – data types – constants variables – declaration – expression – statements. Operators and Expression: arithmetic operators – unary operators – relational and logical operators – assignment operators – conditional operators and library function.

UNIT-II CONTROLS & LOOPS **10 Hrs**

Data input and Output statements: getchar and putchar functions – scanf and printf function – more about scanf and printf functions. Control statements: if-else, while, do-while, for-nested control structure – switch – break –continue- comma operator – goto statement.

UNIT-III FUNCTIONS **10 Hrs**

Definition – accessing and function – function prototype – passing argument to a function – recursion. Program structure: storage classes – automatic variables – external variables – static variable.

UNIT-IV ARRAYS **12 Hrs**

Definition of array – processing array- passing array to function – multidimensional arrays – arrays and strings

UNIT-V POINTERS **12 Hrs**

Pointers: Fundamentals – pointer declaration – passing pointer to a function – array of pointers- Structure and Unions: Definition of structure – processing structure – user defined data types- structure and pointers - passing structure to function – self referential structure- Unions - Bit wise operations.

Text Books

- Balagursamy E., *Programming in ANSI C, 3 rd Edition*, Tata McGraw hill, 2009.
- Schildt, H.C: *The Complete Reference,* 4th Edition, TMH Edition, 1999.

Reference Books

- Gottfried, B.S,*Programming with C,* Second Edition, TMH Pub. Co. Ltd., New Delhi 1996.
- Kanetkar Y.*Let us C,* BPB Pub., New Delhi, 1999.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M

4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

UISM107 INTRODUCTION TO INFORMATION TECHNOLOGY

Semester : I **Credit : 3**
Category : Core II **Hours/week : 4**
Class & Major : I BscISM **Total Hours : 52**

Objectives:

To enable the students

- Understand the concepts of Input, Output and Memory.
- Acquire knowledge in basics of Hardware and Software Management.
- Develop software's for creating applications.

UNIT- I INTRODUCTION TO COMPUTERS **12 Hrs**

Introduction- Characteristics of Computer –Classification of Computers –Uses of Computers- Classification of Digital computer Systems- Anatomy of a digital computer.

UNIT- II CENTRAL PROCESSING UNIT AND MEMORY **10 Hrs**

Introduction – CPU – Memory – Memory organization – Random access memory – Read Only Memory – Registers – Memory – Clock speed – Bus – Cache memory .

UNIT- III INPUT AND OUTPUT DEVICES **10 Hrs**

Introduction – Keyboard – Mouse – Trackball –Scanner – Game Controller – Bar code Reader – Web cam – OCR. Output devices: Monitor – Video Standards – Printer - Plotter – Multimedia Projector-Sound card and speakers.

UNIT- IV SOFTWARE **10 Hrs**

Introduction to computer software – Hardware and software interactions – classification of software. Telecommunication: Introduction – Analog and digital signals – Modulation and its types.

UNIT- V COMPUTER NETWORKS **10 Hrs**

Introduction of computer networks - Overview of a network - Communications processes - Communications medias - Types of Network - Topology.

Text Book

- Alexis Leon and Mathews Leon, *Fundamentals of information technology*, Vikas Publishing house private limited, New Delhi 2nd Edition, 2009.

Reference Book

- Bansal, Fundamentals of Information Technology, APH Publishing, New Delhi, First Edition, 2002.

UCAR103/UISR103 INTRODUCTION TO COMPUTER APPLICATIONS

Semester : I **Credits : 1**
Category : Core practical I **Hours/Week : 2**
Class & Major: I Bsc ISM **Total/Hours : 26**

Objectives:

To enable the students

- Develop students with the knowledge of document preparation, excel calculation and PowerPoint presentation.

MSWORD

1. Text Manipulations.
2. Usage of Numbering, Bullets, Footer and Headers.
3. Usage of Spell check, and Find & Replace.
4. Text Formatting.
5. Picture insertion and alignment.
6. Creation of documents, using templates.
7. Creation templates.
8. Mail Merge Concepts.
9. Copying Text & Pictures from Excel.
10. Saving and creating pdf documents

MS - EXCEL

11. Cell Editing.
12. Usage of Formulae and Built-in Functions.

13. File Manipulations.
14. Data Sorting (both number and alphabets).
15. Worksheet Preparation.
16. Drawing Graphs.
17. Usage of Auto Formatting.

POWER POINT

18. Inserting Clip arts and Pictures.
19. Frame movements of the above.
20. Insertion of new slides.
21. Preparation of Organization Charts.
22. Presentation using Wizards.
23. Usage of design templates.

INTERNET

24. Creating Mails
25. Search Engines
26. Uploading and downloading

UISR104 PROGRAMMING IN C-PRACTICAL

Semester : I	**Credits : 2**
Category : Core Practical II	**Hours/Week : 3**
Class & Majo : I BCA	**Total/Hours : 39**

Objectives:

To enable the students

- Understand the basic concepts of the C programming language.
- Design, build, execute and debug C applications.
- Develop variables, arrays, strings, flow control statement, point and disk files in C applications.

I Summation of Series **9 Hrs**

1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in functions)

II String Manipulation **7 Hrs**

1. Counting the no. of vowels, consonants, words, white spaces in a line of text and array of lines.
2. Reverse a string & check for palindrome.
3. Sub string detection, count and removal.

III Recursion **7 Hrs**

1. ${}^{n}P_{r}, {}^{n}C_{r}$
2. GCD of two numbers
3. Fibonacci series
4. Minimum and Maximum of numbers
5. Towers of Hanoi

IV Matrix Manipulation **8 Hrs**

6. Addition & Subtraction
7. Multiplication

8. Transpose, and trace of a matrix
9. Determinant of a Matrix

V Sorting and Searching **8 Hrs**

1. Insertion Sort
2. Bubble Sort
3. Linear Search
4. Binary Search

UISM204 OBJECT ORIENTED PROGRAMMING USING C++

Semester : II **Credits : 3**
Category : Core III **Hours/Week : 4**
Class & Major: I Bsc ISM **Total/Hours : 52**
Objectives:
To enable the students

- Understand the concepts of object oriented programming.
- Design, build, execute and debug C++ applications.
- Develop, compile and run simple to moderately complex C++ programs

UNIT-I OOPS **10 Hrs**

Principles of procedure oriented programming and object oriented programming-Concepts, Benefits and Application of Object Oriented Programming-Tokens, Expressions and Control Structures Functions in C++-Main Function-Function Prototyping-Call by Reference-Return by Reference-Inline Function-Function Overloading.

UNIT-II CLASSES AND OBJECTS **10 Hrs**

Specifying a Class-Defining member function-Nesting of member function-Arrays withina class-Memory Allocation for objects-Static Data members-Static Member Function-Arrays of Objects-Objects as Function arguments-Friend Function.

UNIT-III CONSTRUCTORS AND DESTRUCTORS **12 Hrs**

Constructors-Parameterized Constructors-Multiple Constructors in a Class-Dynamic Initialization of Objects-Copy Constructor-Dynamic Constructors-Destructors-Operator Overloading and Type Conversions.

UNIT-IV INHERITANCE **10 Hrs**

Introduction-Defining Derived Classes-Single Inheritance-Making a Private Member Inheritable-Multilevel, Multiple, Hierarchical, Hybrid Inheritance –Virtual Base Classes-Pointers, Virtual Functions and Polymorphism.

UNIT-V I/O OPERATIONS **10 Hrs**

Managing Console I/O Operations-C++ Streams-C++ Stream Classes-Unformatted I/O Operations-Formatted Console I/O Operations-Managing Output with Manipulators-Working with Files-Introduction-Classes for File Streams-Opening and Closing a File-File Modes-File Pointers and their Manipulators.

Text Book

- Balagurusamy E. ,*Object Oriented Programming with C++*, ,TMH Publishing.

Reference Book

- Robert Lafore , *Object Oriented Programming with C++*, Galgotia

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

UISM205 MIS AND ERP

Semester : II **Credit : 3**
Category : Core IV **Hours/Week : 3**
Class & Major : I Bsc ISM **Total Hours : 39**

Objectives:

To enable the students

- Enable the students to management information system.
- Develop hardware's and software's to develop information system.
- Examine about Marketing, Accounting, Production and HR Information.

UNIT-I OVERVIEW OF MIS **8Hrs**

Definition of MIS-MIS as an evolving concept-MIS and other academic disciplines-Structure of a MIS: Operating elements of an information system-Management activity-organizational function-Hardware, software AND communications technology for information system: A computer system-Data representation for computers-instructing a computer-communication facilities-communication networks-distributed systems.

UNIT-II STORAGE AND RETRIEVAL OF DATA **7 Hrs**

Physical versus logical models of data-logical data concepts and definitions-physical storage devices-file organizations-Database organizations-Transaction processing systems, office automation and information processing control functions: transaction processing- document preparation-message and document communication-information processes control.

UNIT-III DECISION MAKING PROCESS **7 Hrs**

Intelligence and design phases-concepts of decision making-behavioral models of the decision maker-behavioral model of organizational decision making-decision making under psychological stress-methods for deciding among alternatives-documenting and communicating decision rules-Relevance of decision-making concepts for information system design. Concepts of information: definition-information in the mathematical theory of communication-quality of information-value of information in decision making.

UNIT- IV BUSINESS FUNCTION AND BUSINESS PROCESS 7 **Hrs**

Functional areas and business process- functional area of operations- Business process-Marketing Sales- Supply chain management- Accounting and finance- Human Resource- Functional area of information system- The development of ERP system SAP R/3- New Directions in ERP-Significance and benefits of ERP software and system.

UNIT-VPROCESS 7 **Hrs**

Marketing information system and sales order process in ERP: Sales and distribution in ERP- Pre sales activities- Sales order processing- inventory sourcing- Delivery- Billing- Payment- Customer relationship management- benefits of CRM.

Text Book

- Gordon B. Davis AND Margrathe H.Olson , *Management Information System* , Mc Graw Hill , second edition,2005.
- "Ellen Monk and Bret Wagner" " *Enterprise Resource Planning*" 3rd edition- MGH. 2008.

Reference Book

- "Enterprise Resource Planning – *A Managerial Perspective*", Tata McGraw Hill, First Edition, 2011.
- O'Brein AND Marakas , *Management information System* , Mc graw- hill seventh Edition,2009.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

UISR203 PROGRAMMING IN C++-PRATICAL

Semester : II **Credit : 2**
Category : Core Practical III **Hours/Week: 3**
Class & major : I Bsc ISM **Total Hours : 39**

Objectives:
To enable the students

- Understand the concepts of object oriented programming
- Enable the students to write simple application programs using C++
- Develop, compile and run simple to moderately complex C++ programs

C++ Programs **(Each exercise 3 Hrs)**

1. Classes and Objects
2. Functions and overloading
3. Usage of Arrays
4. Arrays using functions
5. Constructors
6. Constructors overloading
7. Destructors
8. Type conversion and operator overloading
9. Inheritance
10. Pointer ,virtual functions
11. Polymorphism

12. File operations
13. Templates

Evaluation Component

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
I	III	Core I	UISM106	Programming in C	Problem Solving	Online Test
	III	Core II	UISM107	Fundamentals of Information Technology	Poster Presentation	Online Test
II	III	Core III	UISM204	Programming In C++	Problem Solving	Online Test
	III	Core IV	UISM205	MIS & ERP	Poster presentations	Online Test

ALLIED OPTIONAL-UG

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
V	III	Allied Optional	UISA502	2D Animation	Designing	Online Test

COURSE PROFILE: MCA

Semester	Category	Course Code	Course Title	Contact/ Week	Credit	
					Min	Max
I	Core I	PCAM103	Mathematical Foundation	4	3	3
	Core II	PCAM10	Marketing Management	5	3	3
	Core III	PCAM110	C Programming	5	4	4
	Core IV	PCAM111	Web user Interface design	4	3	3
	Core Practical I	PCAR105	C Programming –Practical	3	2	2
	Core Practical II	PCAR106	Web user interface design-Practical	3	2	2
	Core		Library	1	-	-
	Non Major Elective I			5	4	4
Total				**30**	**21**	**21**
II	Core V	PCAM205	Database Management System	5	4	4
	Core VI	PCAM206	Applied Statistics	5	4	4
	Core VII	PCAM207	Object Oriented programming using C++	4	4	4
	Core VIII	PCAM208	Data structures and algorithms	4	3	3

	Core Practical III	PCAR203	Database Management System-Practical	3	2	2
	Core Practical IV	PCAR204	Object Oriented programming using C++-Practical	3	2	2
	Core		Library	1	-	-
	Non Major Elective I	PALE201/ PALE301	Preparatory Course for NET/SET	5	4	4
	Service Learning	PCSX201/ PCAX201	Introduction To Information Technology	–	1	1
			Total	**30**	**24**	**24**
III	Core IX	PCAM307	Financial Accounting	5	4	4
	Core X	PCAM308	Java Programming	5	4	4
	Core XI	PCAM309	Visual Programming and Web Hosting	6	4	4
	Core XII	PCAM311	Operating System	5	4	4
	Core Practical V	PCAR304	Visual programming-Practical	3	2	2
	Core Practical VI	PCAR305	Java Programming-Practical	3	2	2
	Core		Library	1	-	-
	Value Education		Women studies	2	1	1
			Total	**30**	**21**	**21**
IV	Core XIII	PCAM406	Human Resource Management	4	4	4
	Core XIV	PCAM407	Cloud Computing	4	4	4
	Core XV	PCAM408	Unified modeling Techniques	4	4	4
	Core XVI	PCAM410	Distributed Technology	5	4	5
	Core XVII	PCAM411	Principles of Compiler Design	4	3	3
	Core Practical VII	PCAR405	UML LAB	3	2	2
	Core Practical VIII	PCAR406	Distributed Technology -Practical	3	2	2
	Core		Library	1	-	-
	Value education		Women Studies	2	1	1
			Total	**30**	**24**	**24**
V	Core XVIII	PCAM512	Android Programming	6	5	5
	Core XIX	PCAM507	Data Mining and Warehousing	5	4	4
	Core XX	PCAM511	Digital Image Processing	5	5	5
	Core XXI	PCAM509	Operation Research	4	4	4
	Core XXII	PCAM510	Software Engineering	4	3	3
	Core Practical IX	PCAR504	Android programming -Practical	3	2	2
	Core Practical X	PCAR505	Mini project	**2**	**2**	**2**
	Core		Library	**1**	**-**	**-**
			Total	**30**	**25**	**25**
VI	Core Project I	PCAP601	Project work	30	20	20
			Grand Total	**180**	**135**	**135**

EXTRA CREDIT EARNING

Semester	Category	Course Code	Course Title	Contact Week	Credit	
					Min	Max
III	Extra Credit		Working Model/Self study paper	-	1	1
IV	Extra Credit	PUSI401	Summer internship	-	1	1
V	Extra Credit		Application Development/Paper presentation	-	1	1

NON-MAJOR ELECTIVES-PG

Semester	Part	Category	Course Code	Course Title	Contact Week	Credit	
						Min	Max
I	IV	Non – Major Elective	PCAE102	Web Designing	5	4	4

PCAM110 C PROGRAMMING

Semester : I **Credits : 4**
Category : Core III **Hours/Week : 5**
Class & Major : I MCA **Total Hours : 65**

Objectives:

To enable the students

- Understand basic concepts of the C programming language.
- Design, build, execute and debug C applications.
- Develop variables, arrays, strings, flow control statement, point and disk files in C applications.

UNIT-I INTRODUCTION **10 Hrs**

C fundamentals character set-identifier and keywords-data types-constants-variables-Declarations-Basic data types-Enumerated data types-Expressions- operators in C -Library function-managing input and output operations.

UNIT-II LOOPING STATEMENTS **10 Hrs**

C Control Structures: Decision making with IF statement-IF….ELSE statement- Nested IF statements-For statements-Do…while statements-while…do statements-GOTO statements-SWITCH statements.

UNIT-III FUNCTIONS **14 Hrs**

C function: Definitions – Prototypes - Passing Arguments - Recursion-Parameters or Arguments to function-Return Values-Prototype of function-Rules of using a function. Storage Classes: Automatic, External, Static, Register Variables - Scope of a variable.

UNIT-IV ARRAYS **15 Hrs**

Arrays-Defining and Processing-Passing arrays to functions-Multidimensional arrays-Arrays and Strings. Structures and Functions-Passing structures to Function-Unions-Bitwise operations.

UNIT- V POINTERS **16 Hrs**

Pointers Declarations – Initialization - Passing Pointers to functions-pointers and arrays-Array of pointers-structures and pointers-Files: Creating, Processing, Opening and Closing data file. Dynamic Memory Allocation – Allocating a Block of memory: Malloc – Allocating Multiple Blocks of Memory – Altering the size of Block .C Preprocessor-Directives-Macros-Working with Several Files-Command Line Arguments.

Text Book

- Balagurusamy *"Programming in ANSI C"*, TMG, 2007.

Reference Books

- Gottfried. B.S., *"Programming with C",* 2/e, Schaum Outline series, TMH, 2005.
- Kernighan B.W. and Ritchie D.M, "*The C Programming Language: ANSI C*" Version, Second Edition, and PHI/Pearson Education Pvt.Ltd.
- Somashekara, "*Programming in C"*, PHI, 2006.
- Behrouz A. Forouzan and Richard. F. Gilberg, *"A Structured Programming Approach Using C"*, II Edition, Brooks–Cole Thomson Learning Publications,2007.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

PCAM111 WEB USER INTERFACE DESIGN

Semester : I **Credits : 3**
Category : Core IV **Hours/Week : 4**
Class & Major: I MCA **Total Hours : 52**

Objectives:
To enable the students

- Know the UI Design principles, the features of HTML and Scripting.
- Design the webpage using JavaScript.
- Develop Applications in web user interface.

UNIT-I WEB MEDIUM **10 Hrs**

Core web technologies - web browsers - Markup Languages- Style sheet technologies - images -sound - video - programming technologies- client side, server side - network and related protocols - Introduction tostatic, dynamic and active web pages.

UNIT-II HTML **10 Hrs**

Introduction to HTML - Lists - Adding graphics to HTML documents.

UNIT- III TABLES **10 Hrs**

Tables - Linking documents - Frames - Form and its elements.

UNIT - IV JAVASCRIPT **10Hrs**

Introduction to JavaScript - JavaScript in web pages – writing JavaScript with - HTML - Basic programming techniques - operators and expressions - conditional checking - loops - functions - user definedfunctions - dialog boxes.

UNIT- V JAVASCRIPT **12Hrs**

JavaScript DOM: JSSS DOM - understanding objects in HTML- browser objects - web page object hierarchy - handling events - The formobject - built-in objects - user defined objects - cookies - setting a cookie.

Text Books

- Thomas A Powell, "*Web Design - The Complete Reference*", Tata McGraw-Hill, Second Edition, 2003.
- Ivan N. Bayross, "*Web enabled Commercial Application Development using HTML, JavaScript, DHTML and PHP*", 4th Revised Edition, BPB Publications, New Delhi, 2010.

Reference Books

- Thomas A Powell, "The Complete Reference - HTML", Osborne-McGraw-Hill, Third Edition, 2000.
- Gary B. Shelly, H. Albert Napier, Ollie N. Rivers, "*Web Design: Introductory Concepts and Techniques*", Cengage Learning, 2008.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

PCAR105 C PROGRAMMING

Semester : I **Credits : 2**
Category : Core Practical I **Hours/weeks: 3**
Class & Major: I MCA **Total Hours: 39**

Objectives:
To enable the students

- Develop the students to write a program in C solve the problems

1. Program to print Pascal Triangle & Floyd's Triangle.
2. Program to conversion of Number System in c
3. Solution of Quadratic Equations (for all cases).
4. Sorting of names in Alphabetical order.
5. Matrix operations (Addition, Subtraction, Multiplication – using functions.)
6. Finding factorials, generating Fibonacci Numbers using recursive functions.
7. Summation of Series : sin(x), cos(x), exp(x) [Comparison with built-in-functions]
8. String manipulations without using string functions (string length, string comparison, string copy, palindrome checking, counting words and lines in strings (Use function pointers).
9. Program to prepare purchase report using pointers
10. Creation , insertion and deletion in a linked list using Pointers
11. C program for ATM transactions.
12. Book Shop inventory using Structures.
13. Creation and processing of Sequential files for payroll and Mark list preparation (use structures for Record Description).

PCAR106 WEB USER INTERFACE DESIGN – PRACTICALS

Semester : I **Credits : 2**
Category : Core Practical II **Hours/Week : 3**
Class & Major: I MCA **Total Hours : 39**

Objectives

- Enable the students to know about simple design and how to create with Scripts

HTML and DHTML **20 Hrs**

1. Designing and formatting the contents of a webpage using basic tags

2. Creating a webpage for displaying the Time-table for current semesterwith 'Table' tags

3. Designing a webpage using Frame tag

4. Designing an application form for opening a SB account using 'form'tag

5. Creating a webpage using audio and video tags

JavaScript **19Hrs**

5. Data validation using JavaScript

6. Writing a simple JavaScript with Conditional and Branching constructs
7. Adding interactivity to a web page (Events)
8. Working with Dialog boxes
9. Adding Scripts to Forms
10. Designing a simple calculator

PCAM205 DATABASE MANAGEMENT SYSTEM

Semester : II **Credit : 4**
Category : Core V **Hours/Week : 5**
Class & Major : I MCA **Total Hours : 65**

Objectives:
To enable the students

- Acquire knowledge on basic AND practical skills on RDBMS
- Describes the data storage AND indexing techniques.
- Develop the query Optimization and Transaction management.

UNIT-I INTRODUCTION 10Hrs

Database System vs. File Systems – View of Data – Data Models – Database Language– Transaction Management – Database Systems Structure – History of Database Systems Database Systems Applications – Entity Relationship Model

UNIT-II RELATIONAL DATABASE 15 Hrs

SQL – Basic Structure – Set Operations – Complex Queries – Joined Quires – DDL Embedded SQL – Dynamic SQL – Other SQL Functions – Query by Example – Integrity and Security of Searching – Relational Database Design

UNIT- III DATA STORAGE AND INDEXING 15Hrs

Storage AND File Structure- Disks – DAID – File Organization – Indexing AND Hashing – B+ TREE –B TREE –Static Hashing – Dynamic Hashing – Multiple Key Access

UNIT-IV QUERY EVALUATION AND OPTIMIZATION 10Hrs

Query Processing- Selection Operation – Sorting – Join Operation – Evaluation of Expressions Query Optimization.

UNIT-V TRANSACTION MANAGEMENT 15Hrs

Transaction Concept – Static Implementation – Concurrency control Processor – Desertion Handling – Recovery Systems – Recovery with concurrent Transactions – Shadow paging – Buffer Management - Case Studies – Oracle – Microsoft SQL Server

Text Books

- Abraham Silberschartz, Hentry F. Korth and S. Sundharssan, "*Database System Concepts*", 4th Edition, Tata McGraw Hill, 2002.
- Raghu Ramakrishnan AND Johnnesgerhrke, "*Data Base Management Systems*", McGrwaw Hill International Edition, 2000**.**

Reference Books

- Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "*Database System Implementation*"- Pearson Education- 2006.
- Ramez Elmasri and Shamkant B. Navathe, "*Fundamental Database Systems*", Third Edition, Pearson Education, 2006.
- Silberschatz, Korth and Sudarshan, "*Database Management System*", Tata McGraw-Hill Publishing Company, 2005.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

PCAM207OBJECT ORIENTED PROGRAMMING USING C++

Semester : II **Credit : 4**
Category : Core VII **Hours/Week : 4**
Class & Major: I MCA **Total Hours : 52**

Objectives:
To enable the students

- Understand the concept of OOPS.
- Enable the students to write simple programs using C++.
- Develop C++ programs and its application.

UNIT-I OOPS **10 Hrs**

Concepts of OOP-Benefits of OOP-Application of OOP-Tokens, Expressions and Control Structures. Functions in C++-Main Function-Function Prototyping-Call by Reference-Return by Reference-Inline Function-Function Overloading-Classes and Objects-Specifying a Class-Defining member function-Nesting of member function-Arrays within a class-Memory Allocation for objects-Static Data members-Static Member Function-Arrays of Objects- Objects as Function arguments-Friendly Function.

UNIT-II CLASSES **10 Hrs**

Constructors and Destructors-Constructors-Parameterized Constructors-Multiple Constructors in a Class-Dynamic Initialization of Objects-Copy Constructor- Dynamic Constructors-Destructors-Operator Overloading and Type Conversions.

UNIT-III INHERITANCE **10 Hrs**

Inheritance-Introduction-Defining Derived Classes-Single Inheritance – Making a Private – Member Inheritable-Multilevel, Multiple, Hierarchical, Hybrid Inheritance – Virtual Base Classes –

Pointers, Virtual Functions and Polymorphism

UNIT-IV I/O OPERATIONS **11 Hrs**

Managing Console I/O Operations-C++ Streams-C++ Stream Classes- Unformatted I/O Operations -Formatted Console I/O Operations-Managing Output with Manipulators-Working with Files

UNIT-V FILES **11 Hrs**

Introduction-Classes for File Streams-Opening and Closing a File - File Modes - File Pointers and their Manipulators.

Text Book

- Balagurusamy. E ,"*Object Oriented Programming with C++*" TMH Publishing.2009.

Reference Book

- Robert Lafore , *Object Oriented Programming with C++*, Galgotia, TMH Publishing, 2007.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

PCAM208 DATA STRUCTURES AND ALGORITHMS

Semester : II **Credit : 3**
Category : Core VIII **Hours/Week : 4**
Class & Major : I MCA **Total Hours : 52**

Objectives:
To enable the students

- Understand the concepts of data structure
- Enable the students to write simple programs with data structures concepts using C++
- Develop algorithm in data structure and its application.

UNIT-I ARRAYS **11 Hrs**

Introduction to Data structures – Overview – Types – Primitive and Non- Primitive Data structures and Operations. Arrays – Types – Strings – Array of Structures – Sparse and Dense Matrices – Row – Major and Column – Major Arrays – Pointers and Arrays – Array of pointers – Pointers and Strings. Recursion – Types – Rules – Recursion Vs.Iterations – Towers of Hanoi – Advantages and Disadvantages.

UNIT-II STACKS OPERATIONS **10 Hrs**

Stacks – Operations – Pointers and Stack – Representation of Arithmetic Expressions – Infix, Prefix and Postfix Notations – Evaluation of Postfix Expression – Conversion of Expression – Applications.Queues – Operations – Disadvantages –Implementation – Types and Applications.

UNIT-III LINKED LIST **10 Hrs**

List operations – Linked list – Memory Allocation and De-Allocation – Operations – Singly Linked List – Linked List with and without Header – Operations – Circular Linked List – Doubly Linked list – Circular Doubly Linked list – Applications. Storage Management – Allocation Techniques – Storage Allocations – Storage Release Compaction – Garbage Collections.

UNIT-IV TREES **10 Hrs**

Trees - Terms – Binary Trees – Types – Representation – Operation and Traversal – Conversion of Expression – Binary Search Tree – Threaded Binary Tree – B- Tree – B+ Tree, Graph – Terminologies – Representation – Traversal – Spanning Trees.

UNIT-V SORTING AND SEARCHING **11 Hrs**

Sorting – Methods: Insertion – Selection – Bubble – Quick – Tree – Merging List – Heap – Radix – Partition Exchange. Searching – Linear and Binary Search – Hashing Method – Hashing Function – Division – Mid-Square – Folding – Length - Dependent – Digit Analysis method.

Text books

- Horowitz.E. , Sahni. S. and Mehta, "*Fundamentals of Data Structures in C++*", Galgotia-2007.
- Samanta D , " *Classic Data Structures*" , PHI, 2005

Reference books

- Gregory L.heileman, *"Data Structures,Algorithms and Object Oriented Programming"* Mc Graw Hill International Editions –2006
- Jean-Paul Tremblay and Paul G Sorenson, "*An Introduction to Data Structures with Applications*" 2 edn,Tata Mc Graw ,Hill Publishing Company Ltd.New Delhi:2007.

E- Resources

1. https://www.cs.utah.edu/~swalton/Documents/Computer-Fundamentals.pdf
2. http://www.w3schools.com/html/
3. https://www.youtube.com/watch?v=oqJy4e6Aa0M
4. https://www.youtube.com/watch?v=7r3Vln4bGLk
5. https://www.youtube.com/watch?v=n1cQPwZwTs4

PCAR203DATABASE MANAGEMENT SYSTEM-PRACTICALS

Semester : II **Credit : 2**
Category : Core Practical III **Hours/Week : 3**
Class & Major: I MCA **Total Hours : 39**

Objectives:

To enable the students

- Enable the students to know about simple queries and how to interact with database.

SQL

1. Simple queries using DDL, DML and DCL
2. SQL Aggregate functions
3. SET operations
4. Views
5. Multiple Tables and Nested Queries.
6. JOIN operations

PL/SQL

7. PL/SQL Block
8. Function
9. Procedures
10. Triggers
11. Cursors.

PCAR204 OBJECT ORIENTED PROGRAMMING USING C++ PRACTICALS

Semester : II **Credit : 2**
Category : Core Practical IV **Hours/Week : 3**
Class & Major : I MCA **Total Hours : 39**

Objectives:

To enable the students

- Develop the student to write programs using Data Structure concept

1. Functions and overloading
2. Constructors and Destructors
3. Inheritance and Virtual Functions.
4. File operations
5. Implement PUSH, POP Operations of Stack Using Arrays.
6. Implement Add, Delete Operations of Queue Using Pointers.
7. Postfix Expression Evaluation.
8. Addition of Two Polynomials using Arrays and Pointers.
9. Binary Tree Traversal Using Linked List (In-order, Pre-order, Post-order).
10. DFS.

PCAE102 WEB DESIGNING

Semester : II **Credit : 4**
Category : Non-Major Elective I **Hours/Week : 5**
Class & Major: I PG **Total Hours : 65**

Objectives:

To enable the students

- Know the basics of Internet concepts

- Understand HTML, CSS tags with Java Script programming
- Create a simple website.

UNIT-I CLIENT/SERVER MODEL **13 Hrs**

Introduction: Internet Principles - Basic Web Concepts - Client/Server model - Retrieving data from internet.

UNIT-II HTML **13 Hrs**

Introduction to HTML – List – Creating Table – Linking Document Frames — Style sheet – Style Sheet Basic – Adding Style to document – Creating Style Sheet rules - Style Sheet Properties – Font – Text – List – Color and Background.

UNIT-III JAVASCRIPT **13 Hrs**

Introduction to JavaScript – Advantages of JavaScript- Data Type – Variables - Operator and Expression.

UNIT-IV LOOPS **13 Hrs**

Array – Loops – Function – Dialog Box - Cookies.

UNIT-V OBJECT **13 Hrs**

JavaScript Document object Model – Introduction – Object in HTML - Window Object – Document object – Browser object – Form object – Navigator object - Screen object.

Text Books

- Thomas A Powell,*The Complete Reference HTML*, 2nd Edition, Tata McGraw Hill Publishers,2003.
- Bayross.I, *Web Enable Commercial Application Development using HTML,DHTML, Java Script, Pen CGI*, BPB Publications, 2000.

Reference Books

- J.Jaworshi, *Mastering JavaScript*, BPB Publications, 1999.
- Deitel & Deitel, *Internet & World Wide Web How to program*, Pearson Education,2009.

Practical **Hours : 26**

Objectives

- It helps the student to acquire knowledge practical skills on visual programming.
- To enable students to design and code visual programs.
- To develop their creativity in designing the project and to analyze the problem and to provide solution to the problem

1. Simple web page and modify it with bullet list.
2. Put an existing image on a web page. Create table with data.
3. Web page with various HTML tags.
4. Web page using hyperlinks.

5. Web page using Frames.
6. An array of 10 elements and find the total of it.
7. Reverse a string and check for palindrome using Java script.
8. Simple calculator using form fields.
9. Open the web page in full screen with no toolbar, status bar.
10. Open a document and a link to show the page using mouse events.

EVALUATION COMPONENT

Semester	Category	Course Code	Course Title	Component III	Component IV
I	Core III	PCAM110	C Programming	Problem Solving	Online Test
	Core IV	PCAM111	Web user interface design	Problem Solving	Online Test
II	Core V	PCAM205	Database Management System	ER Diagram	Queries
	Core VII	PCAM207	Object Oriented programming using C++	Problem Solving	Debugging
	Core VIII	PCAM208	Data structures and algorithms	Problem Solving	Seminar

NON-MAJOR ELECTIVES-PG

Semester	Part	Category	Course Code	Course Title	Component III	Component IV
I	IV	Non – Major Elective	PCAE102	Web Designing	Problem Solving	Online Test