ANNEXURE – 2(A)

DETAILS OF PO, PSO AND CO OF DIFFERENT DEPARTMENTS OF UTDs

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class: M. A. Arabic
Semester – I
Paper I: Quran & Hadees Literature
Objectives: The objects of the course to make the students aware of the impotance and literary trends in Arabic Language. It makes the students acquainted with the Quranic and Hadis literature. Further it helps to understand salient features of Arabic literature.

Course Learning Outcomes
Unit no -1: The students will gain knowledge about Hadees style.
Unit no -2: The students will know about the style of Quran.
Unit no -3: The students will learn about the literature of Quran.
Unit no -4: The students will be able to understand about Aijaz of the Quran.
Unit no -5: The students will be able to understand about literary importance of Holy Quran.

Assessment Tasks
Unit no -1: Students will be given an assignment on Hadees literature.
Unit no -2: Discussion about the contribution of Abul Hasan Ali Nadwi.
Unit no -3: The students will be asked for a write up about Quran.
Unit no -4: The students will write an essay on Quranic literature.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – I
Paper II : Classical Prose

Objectives: The main objectives of this course to make the students aware of the classical prose style and the language used in the concerned period. The students become acquainted wit different styles of prose written in the classical period and it helps them to understand the standard classical Arabic language.

Course Learning Outcomes
Unit no -1: The students will gain knowledge about Prose style of modern writers.
Unit no -2: The students will know about the Prose style of modern writers.
Unit no -3: The students will learn about the Prose literature of modern writers.
Unit no -4: The students will be able to understand the prose style of modern writers.
Unit no -5: The students will be able to understand the prose style of Ahmad Ameen.

Assessment Tasks
Unit no -1: Students will be given and assignment on Abul Hasan Ali or Al Mukhtarat.
Unit no -2: Discussion about the Maqamah.
Unit no -3: The students will be asked for a write up on Al Hariri.
Unit no -4: The students write on essay on Modern Arabic Literature.
Unit no -5: The students will write on the prose style of Mehmmod Aqqad.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – I
Paper III : Classical Poetry

Objectives:
The objectives of studying classical poetry are to know the styles, language and the topics of classical poetry. This course make the students acquainted with various styles that prevailed over the ages in classical Arabic poetry. Further the students start appreciating classical Arabic poetry of different kinds.

Course Learning Outcomes
Unit no -1: The students will gain knowledge about the poetry of Pre-Islamic period.
Unit no -2: The students will know about the poetry of early Islamic period.
Unit no -3:The students will learn about the poetry of Abbasid period.
Unit no -4: The students will be able to understand about classical poetry.

Assessment Tasks
Unit no -1: Students will be given an assignment on Abu Tammam.
Unit no -2: Discussion about the contribution of Mukhadram poets. (Al-Khansa)
Unit no -3: The students will be asked for a write up on Qasidah.
Unit no -4: The students will write an essay on Al-Mutanabbi or Abbasid poetry.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – I
Paper IV : Grammar

Objectives:
The objectives of this course that the students may be able to translate with grammar, various text from Arabic into other any language.
The students become aware the importance and broadness of Arabic grammar. Further they can improve their skill with eminent Arabic Grammar.

Course Learning Outcomes
Unit no -1: The students will gain knowledge about standard grammar.
Unit no -2: The students will be taught of kinds of vowels.
Unit no -3: The students will gain knowledge about Maf'ul and its kinds.
Unit no -4: The students will know about the Atwawabe-ul-Ismil Mansoob.

Assessment Tasks
Unit no -1: Students will be given an assignment on different methods of Grammar.
Unit no -2: Students will be given a topic on how to use the vowels.
Unit no -3: The students will be given an assignment Maf'ul and its kinds.
Unit no -4: Discussion about interpretation.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – II
Paper I : Modern Poetry

Objectives:

The objectives of this course are to make students aware of various literary schools and trends in Modern Arabic Poetry.

It makes students acquainted with various schools and trends prevailing in the modern period and it mkes them familiar with new genres of modern Arabic poetry.

Course Learning Outcomes

Unit no -1: The students will gain knowledge about the poetry of 1st generation of modern poets.

Unit no -2: The students will know about the poetic style of second generation of modern poets.

Unit no -3: The students will learn about the poetry of third generation of modern poets.

Unit no -4: The students will be able to understand the poetic style of fourth generation of modern poets.

Assessment Tasks

Unit no -1: Students will be given an assignment on Shauqi and Hafiz Ibrahim etc.
Unit no -2: Discussion about the contribution of M. Shareef Saleem.
Unit no -3: The students will be asked for a write up on Baroodi, Basha Fikri.
Unit no -4: The students will write an essay on Palestinian poets.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – II
Paper II: Modern Prose

Objectives:

The main objectives of this course is to make the students ware of the modern pros styles and the language used in the concerned period.

The students become acquainted with different styles of prose writings in the modern period and it helps them to understand modern Arabic language.

Course Learning Outcomes

Unit no -1: The students will gain knowledge about Prose style of modern writers.

Unit no -2: The students will know about the Prose style of second generation of modern writers.

Unit no -3: The students will learn about the Prose literature of third generation writers.

Unit no -4: The students will be able to understand the prose style of fourth generation of Arabic literature.

Assessment Tasks

Unit no -1: Students will be given an assignment on Al-Manfalooti.

Unit no -2: Discussion about the contribution of Al-Aqqad, Jubran, and Al-Mazni.

Unit no -3: The students will be asked for a write up on history of short story.

Unit no -4: The students will write an essay on short story.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – II
Paper III : Advance Grammar

Objectives:

The objectives of this course is that the students may be able to grammatical knowledge of Arabic. Further they may be aware of fundaments of grammar.

Students have expertise in advance grammar and they become acquainted with basic fundamentals of grammar.

Course Learning Outcomes
Unit no -1: The students will know about definition of the Ismi Isharah.
Unit no -2: The students will be taught about the Haal, Na't, Takeed.
Unit no -3: The students will learn technical terms of Aadaadal Murak'kiba.
Unit no -4: The students will know about the contribution of Khalil bin Ahmad.
Unit no -5: The students will be taught the term of Arabic or English.

Assessment Tasks
Unit no -1: Students will be given knowledge of Al-Ism-Al-Mairoor.
Unit no -2: Discussion about Ism-Al-Mabni.
Unit no -3: The students will be asked to analyze Ism-Al-Ishara, Al-Adadal Murkaba.
Unit no -4: The students will be given the topic of Al-Zurrof al-Mabniyya to analyze.
Unit no -5: The study of Al-Asaleeb al-Nahviyya or shart.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – II
Paper IV : Rhetorics

Objectives:
The objectives of this course is to make students aware of fundamentals of Rhetoric's.
The students become acquainted with basic fundaments of Rhetorics.

Course Learning Outcomes
Unit no -1: The students will teach meanings and definition of Rhetorics.
Unit no -2: The students will gain knowledge about development of Rhetorics through the ages.
Unit no -3: The students will be taught about Ilm-al-Maany.
Unit no -4: The students will know about Ilm al-Badie.

Assessment Tasks
Unit no -1: Students will be given an assignment on Ilmul Bayan.
Unit no -2: Discussion about Ilmul Maany.
Unit no- 3: The students will be given an assignment on al-Tashbeeh, Estiaarah and al Kinayeh.
Unit no - 4: The students will write an essay on Itnab and Al-Masawaat etc.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – III
Paper I : Pre Islamic to Umyyad Arabic Literary History

Objectives:

The objectives of this course is to make the students aware of the literary history of the Arabic literature, the changes and developments that took place over various stages.

The students have in depth knowledge of the development of Arabic literature during various periods. Further the students have the knowledge of main characteristics of Arabic literature produced in different periods.

Course Learning Outcomes

Unit no -1: The students will gain knowledge about the history of Arabic literature of Pre-Islamic period.
Unit no -2: The students will know about the history of early Islamic and Umayyad period.
Unit no -3: The students will learn about the literary style of Andalusian period.
Unit no -4: The students will be able to understand the brief history of modern literature.
Unit no -5: The students will know about Hajjaj bin Yousuf.

Assessment Tasks

Unit no -1: Students will be given an assignment on Hassan bin Sabit and Saaleek poets.
Unit no -2: Discussion about the prose style of Mukhdarimoon poets.
Unit no -3: The students will be asked for a write up on Ibne Hani Farzdaq.
Unit no -4: The students will write an essay on emergence of press and newspapers.
Unit no -5: The students will write an essay on economically position of early period.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – III
Paper II : Classical Arabic Prose

Objectives:

The main objectives of this course to aware the students of the Classical Arabic Prose styles and the standard language based on Quranic Language.

The students become acquainted with the different styles of Quarnic version and importance in Arabic literature.

Course Learning Outcomes

Unit no -1: The students will gain the knowledge of classical prose.
Unit no -2: The students understand the style of prose writing of the holy Quran.
Unit no -3: The students will be able to understand Arabic culture through holy Quran.
Unit no -4: The students will learn the importance of piece in the world to understand each other in different societies.
Unit no -5: The students will learn on the Eijaz ul Quran.

Assessment Tasks

Unit no -1: Students will be given and assigned on the holy Quran Surah Al Naba.
Unit no -2: Students will be asked to write the literary side of Quran Surah Nooh.
Unit no -3: The students write an essay on the literature of the holy Quran.
Unit no -4: The students will write on the style of holy Quran in the different surah of it.
Unit no -5: The students write up on Nuzul al Quraan.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – III
Paper III : Literary Criticism

Objectives:
This course has been design to make students of literary Arabic criticism.
Students will become acquainted with the rules and principles of different periods and schools of literary criticism.

Course Learning Outcomes
Unit no -1: The students will gain knowledge about the definition of criticism.
Unit no -2: The students will be gain knowledge.
Unit no -3: The students will know about offshoots of Arabic criticism.
Unit no -4: The students will be taught about subjective criticism.
Unit no -5: The students will be write up on Muqad'dima al Shero wa Shoara.

Assessment Tasks
Unit no -1: The students will be given an assignment on what is ciriticism.
Unit no -2: Discussion about elements of criticism.
Unit no -3: Students will be given an assignment on Ibne Qutaibah.
Unit no -4: Discussion about forms of criticism.
Unit no -5: Students will be given an assignment on Husain Mursafi.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – III
Paper IV : Composition and Translation

Objectives:

Translation is a market demand so its course is designed in such a way that students may get expertise in translating different text to get jobs easily.

Emphasis has to be given to this course to make acquainted the students to become capable of translating text of various languages.

Course Learning Outcomes
Unit no -1: The students will be taught journalistic and political translation English-Arabic.
Unit no -2: The students will be able to do interpretation.
Unit no -3: The students will promote skill development in Arabic.
Unit no -4: The students will know about the methods and principles of translation.
Unit no -5: Students know how to face the problems of translation.

Assessment Tasks
Unit no -1: Discussion about the journalistic and political translation English-Arabic.
Unit no -2: The students will be given a topic for conversation.
Unit no -3: The students will be able to speak and write Arabic frequently.
Unit no -4: The students will be write on kinds of translation.
Unit no -5: Students write up on modern technique of translation or computer.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – IV
Paper I : History of Abbasid Literature

Objectives:

In this paper history of Arabic literature of two periods i.e. Abbasid period and modern period has to be taught so that students may know main characteristics of Prose and Poetry of these two periods.

The students in depth knowledge of Arabic literature during the Abbasid and modern periods. And they will become aware of the literary schools and movement during modern period.

Course Learning Outcomes
Unit no -1: The students will gain knowledge about the prose in Abbasid.
Unit no -2: The students will know about the development of poetry in Abbasid period.
Unit no -3: The students will learn about Indo- Arab cultural relation.
Unit no -4: The students will know the impact of Iranian of Arbs.

Assessment Tasks
Unit no -1: Students will be given an assignment on al-Jahiz and Ibn al-Muqaffa etc.
Unit no -2: Discussion about the poetic style of al-Mutanabbi, Bashshar and al-Maarry etc.
Unit no -3: The students will be asked for a write up on Seebwahy, Khalid bin Ahmad.
Unit no -4: The students will be asked for a write up on Imam Bukhari, Abulalla Al Ma'arri.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – IV
Paper II : Modern Arabic Prose of Egypt

Objectives:

Egypt has produced a good number of Arabic scholars who made significance contribution to the development of Arabic and literature, so through this course students are made aware of some Egypt Arabic scholars.

Students are introduced to Arabic literature written by Egyptian writers and they have knowledge of important Arabic books published in Egypt.

Course Learning Outcomes

Unit no -1: The students will be aware of the contribution of Egyptian scholars.
Unit no -2: The students will know about some prose writers from Egypt.
Unit no -3: The students will learn about renowned Arabic poets from Egypt.
Unit no -4: The students will learn about some famous Arabic books written by Egyptian scholars.
Unit no -5: The students will learn about Tahahusain and his book 'Al Ayyam'.

Assessment Tasks

Unit no -1: Students will be given an assignment on some prominent prose writers and poets.
Unit no -2: Discussion about prose writers such as Ahmad Ameen, Mehmood Aqqad.
Unit no -3: The students will be asked for a write up on any Arabic poet from Egypt.
Unit no -4: The students will write an article on S. Qutub, Al Rafie, Wahyul Qdari.
Unit no -5: The students will write an article on Modern Egyptian literature.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – IV
Paper III : Pre-Islamic Poetry

Objectives:

The objective of studying Pre-Islamic poetry is to know the styles, language and the topics of Pre-Islamic poetry.

This course makes the students acquainted with various styles that prevailed over the ages in Pre-Islamic Arabic poetry. Further the students start appreciating Pre-Islamic Arabic poetry of different kinds..

Course Learning Outcomes

Unit no -1: The students will gain knowledge about the poetry of Pre-Islamic period.
Unit no -2: The students will know about the poetry of early Islamic period.
Unit no -3: The students will learn about the poetry of Imraulaais.
Unit no -4: The students will be able to understand about poetry of Antrah Al Abace.

Assessment Tasks

Unit no -1: Students will be given an assignment on Imraul Quais or Zuhair Ibn Abi Sulma.
Unit no -2: Discussion about the contribution of Pre-Islamic poets.
Unit no -3: The students will be asked for a write up on Qasidah.
Unit no -4: The students will write an essay on Amr bin Kulsum or Saba Mulliqaat.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : M. A. Arabic
Semester – IV
Paper IV : Essay and Short Notes

Objectives:
Composition and essay writing is a very important part of language learning. Further speaking and expressing thoughts a also very important.
They are capable of writing long essays, press reports etc. and they express their thoughts freely on different topics.

Course Learning Outcomes
Unit no -1: The students will know about précis writing.
Unit no -2: The students will learn about preparation of press reports.
Unit no -3: The students will be able to know about group discussion.
Unit no -4: The students will be able to write research paper, article, essay.

Assessment Tasks
Unit no -1: Discussion about précis writing.
Unit no -2: The students will be asked to write a press report.
Unit no -3: The students will be engaged for group discussion.
Unit no -4: The students will be able to write many type of Arabic writing.

DEPARTMENT OF ARABIC
Barkatullah University, Bhopal

Class : Diploma and Certificate Course in Arabic

Objectives:
The objectives of the course to make the students aware of the importance of Arabic language. To impart quality education in Modern Arabic language and literature.
Focused and efficient diploma and certificate in Modern Arabic language for the students to enable them to reach the height their aspirant in academic and professional fields.

Certificate in Modern Arabic language with huge potential of research and job opportunities.

DEPARTMENT OF BIOSCIENCE

No. of PG Course(s) run by the department=01
M.Sc. Bioscience

Programme Outcomes (POs): M.Sc. Bioscience

- Students will be able to develop critical thinking about subject.
- Students will be able to learn various aspects of the subject.
- Students will be able to learn various techniques of the subject.
- Students will be able to use various application of the subject.
- Students will be able to deliver knowledge about the subject.
- Students will be able to produce knowledge for the larger interest of the society.

Programme Specific Outcomes (PSOs)

After completion of post graduate program in Bioscience the students will be able to understand various aspects of Bioscience and their applications for the larger interest of the society.

Course Outcomes (COs)

BS-101 General Cytology and Genetics

CO-1: Analyzing the basic idea of the structure and function of the cells.
CO-2: Understanding the concept of Mendelism and gene interaction.
CO-3: Understanding about the role of chromosomes
CO-4: Understanding the structure of DNA and its application and protein synthesis
CO-5: Analyzing the basic idea of genetic engineering and genetic disorders

BS-102 General Microbiology

CO-1: To understand the basics of microbiology.
CO-2: To understand the different type of microorganisms.
CO-3: To describe the symbiosis of microorganisms and microbial disease.
CO-4: Understand the structure, function and metabolism of microbes.
CO-5: Understand the application of microbes in ecological and economic processes.

BS-103 Animal and Plant Physiology

CO-1: Understand the physiology of animals and plants.
CO-2: Understand the various systems of human beings.
CO-3: describe the role of various systems of human beings.
CO-4: Understand the basics of plant physiology.
CO-5: Understand the role of plant hormones and its applications.

BS-104 Taxonomy, Biogeography and Evolution

CO-1: Understand the basics of classification.
CO-2: To study about the types of classification.
CO-3: Understand the distribution of plants and animals in various geographical regions.
CO-4: Understand the concept of evolution of livings beings.
CO-5: To understand the role of evolution in population genetics.

BS-201 Biochemistry
CO-1: Describe the role of macromolecules.
CO-2: Understand about the structure and function of hormones.
CO-3: Describe the metabolism of macromolecules.

BS-202 Ecology
CO-1: Understand the fundamentals of ecology.
CO-2: Understand the various types of Autoecology.
CO-3: Understand the various types of Autoecology.
CO-4: Describe the concept of ecology.
CO-5: Describe the appropriate methodology for collection of ecological data.

BS-203 Developmental Biology
CO-1: Understand the fundamentals of developmental biology.
CO-2: Describe the mechanism of reproductive physiology.
CO-3: Analyze the various techniques of developmental biology.
CO-4: Analyze the development and regeneration of organs.
CO-5: Analyze the various techniques of in-vitro fertilization.

BS-204 Biostatistics
CO-1: Understand the fundamentals of biostatistics.
CO-2: Analyze the measures of central tendencies.
CO-3: Analyze the various methods of distribution.
CO-4: Analyze the various types of statistical tests.
CO-5: Analyze correlation, regression of biostatistics.

BS-301 Applications of Biotechnology I
CO-1 Understanding of basics of environmental and agricultural biotechnology.
CO-2 Understanding of various applications of Biotechnology.
CO-3 Understanding of various techniques of Biotechnology.
CO-4 Understand the water management.
CO-5 Understand the various methods of ecological engineering.

BS-302 Applications of Biotechnology II
CO-1 Understanding of scope and importance of biotechnology.
CO-2 Understanding of various applications of genetic engineering.
CO-3 Understanding of various techniques of biotechnology.
CO-4 Understand the applications of Agriculture Biotechnology.
CO-5 Understand the pollen biotechnology.

BS-303 Elective Part 1 Endocrinology I
CO-1 Understand the basic idea of endocrinology.
CO-2 Understand the various type hormones and its applications.
CO-3 Understand the physiology of pituitary gland.
CO-4 Understand the physiology of thyroid gland.
CO-5 Understand the physiology of pancreas gland.

Applied Aspect of Ecology I
CO-1 Understand about freshwater ecosystem.

CO-2 Understand about marine water ecosystem.
CO-3 Know about Terrestrial and Forest ecosystem
CO-4 Understand about pollution and environmental health.
CO-5 Understand about how to control climatic changes.

Pharmacogenomics and Bioinformatics
CO-1: Understand the various techniques of Pharmacogenomics.
CO-2: Understand the various techniques of bioinformatics.
CO-3: Analyze the multiple sequence alignment, pattern and motifs.
CO-4: Analyze the protein structure, its folding and polymorphism
CO-5: Understand the various software, tools and techniques of genome assembly analysis and annotation.

BS-304 Elective Part 2 Endocrinology II
CO-1 Understand the basics of reproductive physiology of endocrine glands.
CO-2 Know about various applications of reproductive endocrinology.
CO-3 Know about various transmitters, neurohormones, and neurosecretions.
CO-4 Understand the basics of sexually transmitted diseases.
CO-5 Know about hormonal deficiencies and diseases.

Applied aspect of Ecology II
CO-1 Understand the basics of biodiversity.
CO-2 Understand the policies and strategies of wild life and its conservation.
CO-3 Understand the importance of wild life and its conservation.
CO-4 Know about of some flagship species and their ecology.
CO-5 Analyze various tools and techniques of ecology.

Molecular Modeling and Drug Designing
CO-1: Understand the various techniques, database and software.
CO-2: Understand about the molecular modeling and drug designing
CO-3: Understand the legend based drug designing.
CO-4: Understand the structure based drug design.
CO-5: Understand the drug discovery process and strategies of drug design.

DEPARTMENT OF BIOTECHNOLOGY

No. of PG Course(s) run by the department=01
M.Sc. Biotechnology

Programme Outcomes: M.Sc. Biotechnology

PO 1- Students can explore research as evidence for enhancing and changing practices.

PO 2- Students can demonstrate proficiency in written, verbal and digital skills at individual and collaborative levels.

PO 3- Students can actively participate in skill development of rural area and technology transfer.

PO 4- Students can apply critical thinking skills and ethical decision making which are required for advancing of technology.

Programme specific outcomes:

PSO 1- Students will be able to design, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields. Higher studies (M.Phil., Ph.D.) can be pursued in order to attain research positions.

PSO 2- Students can become Junior Production Officer and Technical Assistant in biotechnology, pharmaceutical Companies, bio fertilizer industry, aquaculture industries, environmental units, crop production units, food processing industries, national bio-resource development firms.

PSO 3- Entrepreneurship ventures such as consultancy and training centres can be opened.

PSO 4- Some of the major pharmaceutical and drug companies' highering biotechnological professionals include Dabur, Ranbaxy, Hindustan Lever and Dr Reddy's Labs, food processing industries, chemical industry and textile industry as well.

PSO 5- Beside this industry also employ bio-technological professionals in their marketing divisions to boost up business in sectors where their products would be required. Beside industrial sector there are ample opportunities in academics as well.

PSO 6- Students will be able to understand the potentials, and impact of biotechnological innovations on environment and their implementation for finding sustainable solution to issues pertaining to environment, health sector, agriculture, etc.

PSO 7- Several career opportunities are available for students with biotechnology background abroad especially in countries like Germany, Australia, Canada, USA and many more where biotechnology is a rapidly developing field.

PSO 8- Critically evaluate various educational programme based on technology.

PSO 9- Demonstrate expertise, advanced knowledge and mastery in area of management, teaching and research.

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

DEPARTMENT OF COMMERCE

PROGRAMME OUTCOMES –
M.COM. Financial management

- To inculcate the knowledge of business and the techniques of managing the business with special focus on marketing, Insurance and banking theory law and practices.
- To impart the knowledge basic accounting principles and the latest application oriented corporate accounting methods.
- To develop the decision making skill through costing methods and practical application of management accounting principles.
- To enhance the horizon of knowledge in various field of commerce through advertising and sales promotion, auditing and entrepreneurial development.
- To enhance the computer literacy and its applicability in business through latest version on tally and e-commerce principles.
- To create awareness in application oriented research through research for business decisions.

COURSE OUTCOMES M.COM

PRINCIPLES OF MANAGEMENT

- To know the overview of management
- To study planning procedure
- To identify the organizational structure and forms
- To familiarize with communication motivation and leadership towards directing
- To analyse the process of controlling

ADVANCED CORPORATE ACCOUNTING

- To study the basic concepts of corporate accounting
- To prepare the final accounts of companies
- To analyse the internal or external reconstructions of companies
- To know the liquidators final statement of accounts
- To summarize the consolidated financial statement and balance sheet for holding companies

MARKETING MANAGEMENT

- To know the modern marketing concepts and evaluation
- To study the consumer behavior
- To analyze the product and price
- To analyze the promotion mix
- To explore the place mix and strategies decisions

ADVANCED COST ACCOUNTING

- To study the costing concept and methods
- To analyse the unit cost and job costing
- To know the process costing with normal and abnormal loss
- To update the standard costing methods

- To prepare the reconciliations statements.

MODERN BANKING

- To familiarize the banking sector reforms
- To know the control banking systems operating index
- To study the different types of deposits
- To analyze the differently types of customers and the services offered by bank
- To know the various document related with banks

RESEARCH METHODOLOGY

- To fulfill the bank requirement of business research
- To evaluate various research decisions
- To know the methods of data collection
- To study the analysis and interpretation of data
- To familiarize report writing

INVESTMENT MANAGEMENT

- To study investment concept, types feature and function
- To analyze investment goals, risk and return analysis
- To know the investment valuation measures and approach
- To familiarize investment portfolio, mutual funds and efficient market hypothecs
- To study derivative investment port and calls options.

MANAGEMENT ACCOUNTING

- To know the basics of management accounting
- To study the financial statement analysis
- To familiarize fund flow cash flow statement
- To analyze various budget
- To familiarize with marginal costing

COMPUTERIZED ACCOUNTING

- To familiarize with mutual accounting and computerized accounting
- To get input on tally Feb. 9
- To study account information on Tally Feb .9 with use of keys
- To know inventory information application of VAT, TDS
- Make the students to prepare various accounting reports

SERVICES MARKETING

- To know the services vision and mission
- To study services positioning and differentiation
- To familiarize service marketing mix
- To analyze the customer focused services
- To study the specific service marketing

DIRECT TAXES

- To update the current finance tax planning
- To know the provisions of Income tax act
- To study various heads of incomes
- To analyze the profit and gain from business or profession
- To identify the various other serious of income and capital gain

ADVANCED BUSINESS STATISTICS

- To update basis of statistics
- To analyse the various methods of theoretical probability distribution
- To know the advanced statistical tools for analysis T,Z and d
- To familiarize the correlation methods and regression analysis
- To study the advanced application oriented tests – F , test and Anova

FINANCIAL SERVICES AND MARKETS

- To know the financial system and economic development
- To familiarize with stock exchange functions
- To study the merchant banking functions and services
- To analyse the factoring services and depository system in India
- To know the trend in Global financial market

HUMAN RESOURCES MANAGEMENT

- To know the basic of human resources management
- To analysis human resources planning
- To familiarize recruitment and selection procedures
- To study the trains methods and career development plan
- To know the methods of wage and salary administration – compensation plans

E- COMMERCE

- To know the E- commerce frame work
- To familiarize with E- commerce and world wide web
- To study the application of Electronic Data Interchange
- To know the marketing on the internet
- To study multimedia and digital video

SPECIAL ACCOUNTING

- To know the banking company accounts
- To study the4 insurance company accounts
- To know the double accounts concepts
- To familiarize inflation accounting
- To study human resources accounting

INTERNATIONAL BUSINESS ENVIRONMENT

- To know the globalization concept
- To familiarize political and social environment

- To analyze the economic and technological environment
- To study institutional environment
- To identify legal and ecological factors affecting international business

INDIRECT TAXES

- To know the basic methods and legal provisions of indirect taxes
- To familiarize Central Excise Act 1944
- To know the Tamil Nadu General Sales Tax Act 1959 and VAT
- To study Service Tax Act 1994
- To study Customs Act 1962

ENTREPRENEURSHIP DEVELOPMENT

- Understand the institutional support to entrepreneurs
- Describe the Women Entrepreneur
- Classify the challenges of women entrepreneur
- Describe the Project management
- Identify the evaluation of Project

DEPARTMENT OF COMMERCE
PROGRAM SPECIFIC OUTCOME
M.COM

Programme Aim

The aim of this Programme is to develop Commerce professionals with specialised skills and applied competencies in theoretical and practical knowledge of Banking and Finance catering to the contemporary needs of industry and academia by providing student-centric learning ambience backed with critical thinking and problem solving capabilities.

Objectives

The objective of this Programme is to provide a systematic and rigorous learning and exposure to Banking and Finance related disciplines.

The main objective of this Programme is to train the student to develop conceptual, applied and research skills as well as competencies required for effective problem solving and right decision making in routine and special activities relevant to financial management and Banking Transactions of a business. The specific outcome s of the M.Com. Programme are to:

1. Impart the students with higher level knowledge and understanding of contemporary trends in commerce and business finance
2. Equip the students to evaluate environmental factors that influence business operation with the conceptual requirements and skills on preparation and interpretation of financial statements
3. Prepare the students to apply Statistical methods and proficient use of tools for modeling and analysis of business data
4. Facilitate the students to apply capital budgeting techniques for investment decisions
5. Prepare students to appraise the structure and operations of banking system
6. Prepare the students for an in depth analysis of investment, portfolio management, investment banking and liquidation of investments
7. Develop competency in the students about the laws and regulations, and roles of commercial, government and central banks in controlling money market and inflation
8. Facilitate the students to analyse and frame micro financing schemes for rural banking
9. Impart the students the concept of risk mitigation in financial sectors and their role in investment decisions of individuals and business enterprises
10. Provide guidance to students to plan and undertake independent research in a chosen discipline
11. Train the students on teamwork, lifelong learning and continuous professional development

DEPARTMENT OF COMMERCE

M.Com Financial Management
Course Outcome:

Semester-I
Paper-I Business Environment
Objectives

To analyze the competitive business environment and enable the students to grasp the complexities of modern Indian business and government policies.

Semester-I
Paper-II Business Economics
Objective
The course develops managerial perspective to economic fundamentals as aids to decision making under given environmental constraints.

Semester-I
Paper-III Quantitative Techniques-I
Objectives
The techniques of quantitative measurement and illustrate their application in a business organization

Semester-I
Paper-IV Management Concept
Objectives
This course is to help students understand the conceptual frame work of management and organizational behaviour.

Semester-II
Paper-I Organizational Analysis
Objectives
Functioning and design of organization. Examining the implications of organizational structure & process of managerial behaviour.

Semester-II
Paper-II Quantitative Techniques-II
Objective
The students with the mathematical and statistical and statistical tools of Quantitative analysis :

Semester-II
Paper-III Financial Analysis and planning
Objective :-
To develonterpreting and using financial information.

Semester-II
Paper-IV Principles of Marketing
Objective :-
To objectives oferstanding of the conceptual frame work of marketing and its applications in decision making under various environmental constraints.

Semester-III
Paper-I Research Methodology
Objective :-
To understand the bas of social research and to develop ability for independent research.

Semester-III
Paper-II Human Resrouce Management
Objective :-
The course aims to familiarize ts of Human Resource Management.

Semester-III
Paper-III Financial Management
Objective :-

The objective of this course is to help ual frame work of financial. management and its applications under various environmental constraints.

Semester-III Management Information System

Paper-III:-
Objective

To provide an understanding to the students the basr the decision making process. The supporting systems which continuously provide the information to the managers.

M.Com Financial Management
Semester-III
Paper-IV Cost Control Techniques
Objective

This course aims at equipping with the tools and techniques on in different type of organisation.

M.Com Financial Management
Semester-IV
Paper-I Business Promotion and Project Planning
Objective

To acquaint with project formulation implementation and management M.Com Financial

Semester-IV
Paper-II International Marketing Management
Objective :-
The objective of this course is to familiarize studere in International Marketing.

Semester-IV
Paper-III Financial Control Techniques
Objective
The course aims at familiarizing the students with the financial cision-making

Semester-IV
Paper-IV Management Accounting
Objective
To develop insights into concepts for business decisions and techniques a mhem:

Semester-IV
Paper- IV :- ENTREPRENEURIAL DEVELOPMENT
Objectives

The objective of the course is to help the students to understand the dynamics of qaint students with business idea, setting up an enterprise, raising necessary funds and other management aspects and to impart knowledge of the basic problems of management of small business units with special reference to India.

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

Department of Computer Science & Applications

Programme – M.Sc. Computer Science

After successful completion of two year degree program in Computer Science a student should be able to:

Programme Outcomes

- To understand both the theoretical and practical concepts of Computer Science.
- To gain programming skill to provide solutions for real world problems.
- To gather a better understanding to analyze, design and development of software systems.
- To build a foundation for academics and research in Computer Science.

Specific Outcomes

- Demonstrate understanding of the principles and concepts of the computer systems to develop efficient computing system. .
- Analyze, design, develop, implement and test computer systems for providing solutions for computing problems.
- Enhancing skills and learning new computing technologies for attaining professional excellence and research.
- Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design and data analytics of varying complexity.
- Acquaint with the contemporary trends in industrial/research and thereby bring forth novel solutions to existing problems.

Course Outcomes M.Sc. Computer Science

Course Course Outcomes

CS-101 Object Oriented Programming using C++

- Develop a thorough understanding of object-oriented programming by designing programs using OOP techniques.
- Translate the algorithms to programs (in C++ language).
- Ability to debug program identifying syntax and logical errors.
- Ability to apply logical skills to solve problem solving using C++ language

CS-102 Operating Systems

- The structure of OS and basic architectural components involved in OS design.
- The various device and resource management techniques for timesharing and distributed systems.
- Ability to analyse various scheduling and synchronisation techniques.
- Comprehensive outlook in design principles of operating systems.

CS-103 PC Software

- Recognize when to use each of the Microsoft Office programs to create professional and academic documents, reports, worksheets and presentations.
- Use Microsoft Office programs to create personal, academic and business documents keeping in mind prevalent professional and/or industry standards.

CS – 104 Computer Organisation

- Conceptualize a simple computer with hardware design including data format, instruction format, instruction set, addressing modes, bus structure, input/output, memory, arithmetic/logic unit, control unit, and data, instruction and address flow
- Use boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits
- Analyze and evaluate computer performance

CS-201 Data Structures & Algorithms
- Choose appropriate data structure as applied to specified problem definition.
- Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- Apply the concepts learned to various domains like DBMS, compiler construction etc.

CS-202 Visual Basic
- Understanding of event-driven programming
- Concept of form design
- Skilled to program in VB and use databases at backend

CS-203 Computer Networks
- To apply the concepts of layered architecture in assessing the placement of network devices, protocols and services.
- To compare the services provided by the UDP/TCP transport layer protocols and explain the mechanisms used to provide a reliable data transport service on an unreliable IP network.
- Analyze the application of network technologies in designated scenarios and explore how these technologies can be deployed to support the Quality of Service requirements of current and future applications.

CS-204 Java & HTML
- Implementing Object Oriented programming concepts using basic syntax of control structures, strings and functions for developing skills of logic building activity.
- Identifying classes, objects, members of a class and the relationships among them needed for finding the solution to specific problems.
- Demonstrating how to achieve reusability using inheritance, interfaces and packages and achieving faster application development.
- Understanding and use of different exception handling mechanisms and concept of multithreading for robust, faster and efficient application development.
- Developing web applications with netbeans and J2EE Technologies.

CS-301 (Elective) Software Engineering
- Various software application domains and different process models .
- Converting requirements model into the design model and using software and interface design and engineering principles.
- SCM and classifying different testing strategies and tactics.
- Principles of Software Project management. This will enable them to handle responsibilities of project manager.

CS-301 (Elective) Internet Technologies
- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Style Sheets.

- Build dynamic web pages using JavaScript (Client side programming).
- Create XML documents and Schemas.
- Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.
- Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database.

CS-302 RDBMS & Oracle
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on database as needed.
- Design and implement a database schema for a given problem-domain
- Normalize any database as per requirement.
- Students can develop a small back-end application having complete audit-trail, so that any intrusion can be identified.

CS-303 UNIX & Shell Programming
- The structure of OS and basic architectural components involved in OS design.
- The various device and resource management techniques for timesharing and distributed systems.
- Mutual exclusion, Deadlock detection of distributed operating system.
- Use of Unix/Linux utilities to create and manage simple file processing operations.
- Organizing directory structures with appropriate security.
- Developing shell scripts to perform complex tasks.

CS-304 Computer Graphics
- Understand thebasic conceptsused incomputer graphics.
- Understand thebasic concepts of polygon
- Implementation of variousalgorithmstoscan, convert the basic geo metrical primitives, transformations, areafillingand clipping.
- Understanding 3-D primitives and viewing transformation.

CS-401 (Elective) Compiler Design
- Understand thestructureofcompilers.
- Understand the basic techniques used in compiler construction such as lexical analysis, top-down, bottom-up parsing, context-sensitive analysis, and intermediate code generation.
- Understandthebasicdatastructures usedincompilerconstructionsuchas symbol tables and stack machines.
- Understand different functions of Compilers.

CS-401 (Elective) ARTIFICIAL INTELLIGENCE
- Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

CS-402 Emerging Technologies

- Understanding of client/serverApplications
- Understanding of Distributed systems
- Managing ofERP projects
- Demonstrate an understanding of the importance of data mining and the principles of business intelligence
- Use of appropriate data mining tools like classification, clustering or Frequent Pattern mining on large data sets.

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

Programme - M.Sc. Information Technology

After successful completion of two year degree program in Information Technologya student should be able to

Programme Outcomes

- To understand the key concepts of Information Technology.
- Use and apply current technical concepts and practices in the core information technologies of networking, data management, software engineering, computer security.
- Demonstrate understanding of the IT methodologies and frameworks used to solve complex computing problems.
- Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
- To build a foundation for academics and research in IT.

Specific Outcomes

- Demonstrate understanding of the principles and concepts of the computer systems to develop efficient computing system
- Developing necessary skill set and analytical abilities for developing efficient computer based solutions for real life problems.
- To imbibe quality software development practices.
- Enhancing skills and learning new computing technologies for attaining professional excellence and research.
- Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, multimedia and data analytics of varying complexity.
- Acquaint with the contemporary trends in industrial/research and thereby bring forth novel solutions to existing problems.

Course Outcomes M.Sc. Information Technology

IT-101 Object Oriented Programming using C++

- Develop a thorough understanding of object-oriented programming by designing programs using OOP techniques.
- Translate the algorithms to programs (in C++ language).
- Ability to debug program identifying syntax and logical errors.
- Ability to apply logical skills to solve problem solving using C++ language.

IT-102 Operating Systems

- The structure of OS and basic architectural components involved in OS design.
- The various device and resource management techniques for timesharing and distributed systems.
- Ability to analyse various scheduling and synchronisation techniques.
- Comprehensive outlook in design principles of operating systems.

IT-103 PC Software

- Recognize when to use each of the Microsoft Office programs to create professional and academic documents, reports, worksheets and presentations.

- Use Microsoft Office programs to create personal, academic and business documents keeping in mind prevalent professional and/or industry standards.

IT – 104 ComputerOrganisation
- Conceptualize a simple computer with hardware design including data format, instruction format, instruction set, addressing modes, bus structure, input/output, memory, arithmetic/logic unit, control unit, and data, instruction and address flow
- Use boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits
- Analyze and evaluate computer performance

IT-201 Data Structures & Algorithms
- Choose appropriate data structure as applied to specified problem definition.
- Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- Apply the concepts learned to various domains like DBMS, compiler construction etc.

IT-202 Visual Basic
- Understanding of event-driven programming
- Concept of form design
- Skilled to program in VB and use databases at backend

IT-203 Computer Networks
- To apply the concepts of layered architecture in assessing the placement of network devices, protocols and services.
- To compare the services provided by the UDP/TCP transport layer protocols and explain the mechanisms used to provide a reliable data transport service on an unreliable IP network.
- Analyze the application of network technologies in designated scenarios and explore how these technologies can be deployed to support the Quality of Service requirements of current and future applications.

IT-204 Java & HTML
- Implementing Object Oriented programming concepts using basic syntax of control structures, strings and functions for developing skills of logic building activity.
- Identifying classes, objects, members of a class and the relationships among them needed for finding the solution to specific problems.
- Demonstrating how to achieve reusability using inheritance, interfaces and packages and achieving faster application development.
- Understanding and use of different exception handling mechanisms and concept of multithreading for robust, faster and efficient application development.
- Developing web applications with netbeans and J2EE Technologies.

IT-301 (Elective) Software Engineering
- Various software application domains and different process models .
- Converting requirements model into the design model and using software and interface design and engineering principles.
- SCM and classifying different testing strategies and tactics.

- Principles of Software Project management. This will enable them to handle responsibilities of project manager.

IT-301 (Elective) Internet Technologies
- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Style Sheets.
- Build dynamic web pages using JavaScript (Client side programming).
- Create XML documents and Schemas.
- Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.
- Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database.

IT-302 RDBMS & Oracle
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on database as needed.
- Design and implement a database schema for a given problem-domain
- Normalize any database as per requirement.
- Students can develop a small back-end application having complete audit-trail, so that any intrusion can be identified.

IT-303 UNIX & Shell Programming
- The structure of OS and basic architectural components involved in OS design.
- The various device and resource management techniques for timesharing and distributed systems.
- Mutual exclusion, Deadlock detection of distributed operating system.
- Use of Unix/Linux utilities to create and manage simple file processing operations.
- Organizing directory structures with appropriate security.
- Developing shell scripts to perform complex tasks.

IT-304 Multimedia Technology
- To identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications.
- To identify the current and future issues related to multimedia technology.
- To identify both theoretical and practical aspects in designing animation and 3-D multimedia systems using contemporary hardware and software technologies.

IT-401 Elective - II ARTIFICIAL INTELLIGENCE
- Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

IT-402 Emerging Technologies
- Understanding of client/serverApplications
- Understanding of Distributed systems
- Managing ofERP projects

- Demonstrate an understanding of the importance of data mining and the principles of business intelligence
- Use of appropriate data mining tools like classification, clustering or Frequent Pattern mining on large data sets .

C RAJGOPALACHARI INSTITUTE OF MANAGEMENT (CRIM)

Programme outcomes, Programme specific outcomes and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students

All the courses of MBA are having stated Course Level Outcome(s). During introduction, syllabuses are shared/ communicated to students and it's also available on BU's website. During orientation, students are provided with target objectives of the papers/courses and theoretical/practical work incorporated in the syllabus. Department gives emphasis on concept building and exposure of latest knowledge of the subject/course.

For practical exposure department have incorporated teaching using practical assignments, presentations, case studies, group discussion, class tests, tutorials and projects….For developing communication skills, group discussions, presentation on theory/practical based topics are regularly carried out in the class.

The department's teaching, learning and assessment activities are basically incorporated based on recommendations of Board of Studies and Academic Council. Classrooms, auditorium, placement cell are equipped with the latest technology to facilitate meetings, seminars and panel discussions. Industrial visits and Summer Internship (SIP) training to various corporate houses are a part of the learning process ...Students go for 45 days to 60 days for SIP to learn, inculcate skills and exposure to meet futuristic job profile.

The overall outcomes of MBA Programme are assessed with the help of the knowledge and skills requirements described by the course outcomes and they are mapped to specific questions on University Examination, internal exams and home assignment i.e. 80% (University Examination) + 20% (Internal assessment/s like: Mid Sem Exam, Quiz/s, Assignment/s, Presentation/s, etc) At the end of each semester, university conducts examinations and result published by university are analyzed.

Assignment(s)/Presentation(s)

Assignment(s)/Presentation(s) are given during the course delivery, the assignments/presentations are provided to students, such that students will refer the text books and good reference books to find out the answers and understand the expected objective of the given task.

Mid Semester Examination (MSE):

One MSE is conducted per semester, to ensure that students have achieved the desired level of competencies and for assessing the attainment level of the specific CO of the subject at mid level of the course delivery for course correction (if any required)

Viva-Voce:

To understand the impact of SIP (Summer Internship Training) they have completed. Student Survey: It's an important assessment tool to find out factors for future strategy, to understand the strength and weakness of various course i.e. whether the knowledge, skill and attitude learned is adequate or not, to understand the satisfaction level related to placement assistance they received, etc.

DEPARTMENT OF EARTH SCIENCES

MSc. Applied Geology

PROGRAMME OUTCOMES (POs):

On successful completion of this programme Graduates of the Geology will be able:

- To developed their observational, analytical and quantitative skills in the field, lab and geological mapping.
- To gain knowledge on the significance of Dynamics of Earth and Earth Resourses.
- To know and different geological methods to collect data and solve problems.
- To Interpret, analyze, discuss about geological problems and research techniques.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

On completion of this course, the student shall be able:

- To Comprehensive understanding scope of applied geology , process of rocks formation ,Geological time scale, Outcrops, structure, geological mapping, generation of landforms.
- To explore comprehensive knowledge based on various branches of Geology, with special focus on Applied Geology subjects in the areas of Geomorphology, Structural geology, Hydrogeology, Petrology, Environmental Geology, Mineral Exploration etc.
- To Recognize and identify the minerals and rocks in the field.
- To Understanding of role of geologist and hydrogeologist in the relative fields.
- To acquire knowledge about on field surveying techniques, identification of structures.

COURSE OUTCOMES (COs):

After completing the all Courses twelve papers students shall be able :

- To understand about the applied aspect of geology in the relative fields.
- To comprehensive understanding of landforms, rocks formation process ,idea about Indian stratigraphy,geological time scale ,structure of the earth etc.
- Details are given in each course papers.

CO1- Geomorphology and Geodynamics

On completion of this course, the student shall be able to :

- Understand the role of geologist in geomorphology
- Know the Basic concepts of Geomorphology, Geomorphic agents and processes
- Know the basic fundamentals of geomorphology and geodynamics
- Understand the various lanforms and their classification.
- Acquire knowledge of Morphometric analysis of drainage basin
- Understanding of lanforms made by different agencies like river.wind, coastal, glacial etc.
- Understand the role of plate tectonics in causing earthquakes
- Describe the different types of landslides and how to recognize their potential in the field.
- Acquire knowledge about on origin and internal structure of earth, Earth dynamic, Palaeomagnetism and its uses, seafloor spreading

CO2 - Structural Geology and Global Tectonics

On completion of this course, the student shall be able to :

- Understanding on various Primary and Secondary Structures, structural signatures, and tectonic setups.
- Understand the concept of strain, strain types and their measurement,
- Understand the component and analysis of stress
- Know the classification, terminology, elements and mechanics of folding and faulting mechanics of faulting and folding
- Understand the Mountain building processes, Continental drift theory and Orogenic belts of India.

CO3 - Stratigraphy and Indian Geology

On completion of this course, the student shall be able to :

- Understand the basic Principles of stratigraphy and stratigraphic correlation criteria , Tectonic Divisions of the India.
- Understand different types of stratigraphic units and how they are named their utility in regional stratigraphic correlation.
- Know the crustal evolution during the Precambrian in peninsular India and Precambrian-Cambrian boundary events.
- Acquire knowledge about the stratigraphic super groups its distribution, classification, correlation and economic importance in Indian stratigraphy.
- Understand the Archaean Group, Cuddapah, Vindhyan, Gondwana Group, Deccan Traps
- Acquire knowledge about the boundary problem between Permian – Triassic and Mesozoic - Tertiary

CO4 - Palaeobiology

On completion of this course, the student shall be able to:

- Understand Concept of Paleobiology, Phylogenetic analysis, plant fossils through ages with special references to Gondwana flora
- Critically analyse fossil record to understand how major vertebrate groups originated, evolved over time and became extinct
- Understand the basic principles of organic evolution and their application in paleontology, organic evolution of horse, man and elephant
- Understand the Morphology, Classification, Evolutionary trends of brachiopoda, Mollusca, Trilobita, echnoidea etc.
- Major events in the history of Precambrian and phanrozoic time periods
- Gain knowledge about history of Development of Micropaleontology and its applications

CO5 - Mineralogy and Geochemistry

On completion of this course, the student shall be able to:

- Understand basic concept of mineralogy, bonding, Solid solution, Physical and Chemical Properties of minerals
  Explain silicate classification of minerals
- Gain knowledge about families of rock forming minerals like olivine, garnet, feldspar, pyroxenes etc
- Gxplain basic concept of geochemistry, thermodynamics and crystal chemistry
- Explain concept of PTX, Eh, pH diagrams
- Better understanding on geochemistry of rocks and minerals and interpretation of geochemical path finders for economical minerals

CO6 - Environmental Geology

On completion of this course, the student shall be able to:

- Understand basic concept of environmental Geoscience, Gain knowledge about important processes like greenhouse, global warming etc
- Recognition of natural hazards and mitigation of their human impacts.
- Describe environmental problems related to dams and reservoirs
- Gain knowledge about environmental impact assessment and risk management planning
- Appropriate use of the geological environment for waste disposal
- Develop ability to critically think about the environment Impact of mining projects.

CO7 - Igneous and Metamorphic Petrology

On completion of this course, the student shall be able to :

- Understand the basic concept, origin, classification and texture, Structures of igneous and their pathogenic significance
- Understand Earth energy and types of magma and its generation

- Acquire knowledge about the phase rule and equilibrium in silicate melts, binary and ternary systems
- Understand the Petrogenesis of the Basalts, Granite, Carbonatites, Kimberlites,and Ophiolites rocks
- Understand the basic concept, origin, classification of metamorphic rocks
- Gain knowledge about types of metamorphism, its types and agents
- Types of metamorphism and Classification of metamorphic rocks Graphical representation of metamorphic mineral assemblages – ACF, AKF, and AFM diagrams

CO8 – Sedimentalogy

On completion of this course, the student shall be able to:

- Understand the Processes of sedimentation, Origin of sediments, Textures of clastic and non-clastic sedimentary rocks and their significance.
- Identify and describe basic features of Primary, secondary and organic sedimentary structures and their importance, classification of sedimentary rocks
- Critically analyse and use of structures and textures in sediment dispersal and basin studies
- Understand the Diagenesis–Compaction, Cementation

CO9 - Hydrogeology and Engineering Geology

On completion of this course, the student shall be able to:

- Recognize and be able to demonstrate understanding of the hydrology, hydrologic cycle, components and as it pertains to ground water systems.
- Understand the occurrence and availability of both surface and subsurface water resources and the role of the hydrologic cycle.
- Critically analyze the precipitation, its Types and Computation methods.runoff, factors affecting runoff
- Describe the Hydrological properties of water bearing formations, Geological and Geophysical methods of groundwater prospecting
- Explain basic concept and scope of engineering geology and Engineering properties of rocks, Describe concept and design of wells, their types
- Understand the Quality assessment of groundwater

CO10 - Ore Geology and Fuel Geology

On completion of this course, the student shall be able to:

- Knowledge about a wide range of ore deposits, the geometry of ore bodies, alteration patterns and assemblage of ore and gangue minerals
- Understand morphology of ore bodies and structure of ore localization, formation of ore bodies, ore forming elements, methods and the sources of ore forming fluids
- Explain concept of fuel geology, geothermometry,
- Gain knowledge about Know about the information geochemical behavior of ore forming elements during crystallization of magma
- Understand the various processes and of ore deposits like hydrothermal solution, supergene enrichment,placer deposits etc.
- Understand the origin, formation and classification of coal and petroleum

CO11 - Mineral Exploration and Mining Geology

On completion of this course, the student shall be able to:

- Explain mineral exploration methods including geological, geochemical and geophysical are discussed to find and assess mineral deposits.
- Acquire knowledge about ore guides, Classification and its significance
- Understand processes of formation of mineral deposit
- Understand the basic Principal and methods of Geophysical, geochemical and geoboatnical prospecting

• Explain basic concept of mining geology, different mining methods for coal exploration methods of sampling

CO12 - Remote Sensing and GIS Applications

On completion of this course, the student shall be able to:

• Describe basic principles of remote sensing and analysis of remotely sensed data by means of aerial photographs
• Describe fundamental principles and techniques of aerial photography
• Gain knowledge about Electromagnetic spectrum, its interaction with atmosphere, platforms sensors etc
• Understand basic concept of GIS and its components
• Gain knowledge about image interpretation, digital image processing, image rectification etc

M.Sc. (Tech.) Remote Sensing:

PROGRAMME OUTCOMES (POs) :

On successful completion of the Post PG programme-

- PostGraduates will demonstrate an ability to identify, formulate and solve Remote Sensing and GIS problems.
- PostGraduates will be fully equipped with concepts, methodologies and applications of Remote Sensing and Geospatial Technology.
- PostGraduate will demonstrate skills in handling Remote sensing instruments, software tools, techniques and decision making modeling while using Remote Sensing and Geospatial Technology.
- PostGraduate will demonstrate an ability to analyze and interpret data.
- PostGraduates will demonstrate knowledge of professional and ethical responsibilities

PROGRAMME SPECIFIC OUTCOMES (PSOs):

On completion of this course, the student shall be able to :

- Acquire knowledge about the Fundamental principles and physics of Remote sensing and data Acquisition.
- Acquire knowledge of aerial photography and photogrammetry, techniques of digital image processing, preparation of different thematic maps for different aspects
- Acquire knowledge of Remote sensing satellites, platforms, sensors and their characteristics.
- Gain skills in image analysis and interpretation in preparing thematic maps
- Get familiarized with various data analysis techniques.
- Exposed to various Remote Sensing Applications to Earth Sciences and Mapping skills in different disciplines like lithological and structural features, Geomorphic Mapping
- learn remote sensing softwares and their applications in different disciplines

Course Outcomes (COs):

After completing the all six papers students will understand the concepts, basics of remote sensing and GIS in the relative fields.

CO1- PRINCIPLES OF REMOTE SENSING:

On completion of this course, the student shall be able to :

- Recognize and explain at basics and fundamental of remote sensing.
- know and explain advantages and limitations of remote sensing.
- Gain knowledge about different types sensors ,satellite ,platforms etc.
- Techniques of visual image interpretation
- Understand remote sensing data products and their procurement
- Understand and obtain spectral signature of various objects.
- Visually interpret satellite imagery for generation of various thematic maps

CO2 -PRINCIPLES OF AERIAL PHOTOGRAPHY AND PHOTOGRAMMETRY

On completion of this course, the student shall be able to :

- Students will be able understand basics and fundaments of in aerial photography
- Students will be able to understand the different types of aerial photographs, and various techniques used in aerial photography
- Students will be able to know about the Geometric characteristics of Aerial Photographs, Orthophotographs.
- The student shall be able to understand the concept of stereoscopy and its use to determine height by parallax bar
- Students will be able to know about the applications of photo interpretation in geology , geomorphology, ground water investigation etc.

CO3 - IMAGE PROGESSING AND DIGITAL COMPUTER PROGRAMMING

On completion of this course, the student shall be able to :

- To explain of digital image processing

• To perform digitization of photographic image,convertiong digital to visual image
• To perform radiometric correction of remotely sensed data
• To know about image registration its principles and procedures.
• Acquire knowledge in steps of digital image processing, preparation of different thematic maps for different aspects.
• Students will be able understand concept of digital image classification and pattern recognition

CO-Pr1 - AERIAL PHOTO AND REMOTE SENSING DATA INTERPRETATION
On completion of this Lab course, the student shall be able to:
• Acquire skills to carry out the Lab Exercises independently on visual interpretation of satellite images and digital processing of aerial photographs.
• Get familiarized about various image processing softwares and enhancement and image processing techniques.
• Understanding different steps involved in satellite image processing

CO4 - REMOTE SENSING IN ENVIRONMENTAL STUDIES and GEOTECHNICAL ENGINEERING
On completion of this course, the student shall be able to :
• to understand the basics of environment ,types of environmental pollutions and impact of men on biosphere.
• to know about the concept of solid waste management and its classification
• to knoe about the basic concept of fundamentals of geotechnical engineering and terrain classification for engineering geological mapping
• Understand the fundamentals and measurements of disaster management and mitigation measures

CO5 - REMOTE SENSING IN EARTH SCIENCES and MINERAL EXPLORATION
On completion of this course, the student shall be able to :
• to understand the basics concept of mineral exploration ,characteristics feature and methods.
• To know the use of remote sensing techniques in mineral exploration
• To know about the basics of earth sciences and geomorphology
• to understand about various features extraction elated to mineral exploration from remote sensing data.

CO6- REMOTE SENSING IN WATER RESOURCES and TERRAIN EVALUATION
On completion of this course, the student shall be able to :
• to understand the basics of water resources and also various remote sensing applications in the field of water resources.
• To know uses and importance of remote sensing for hydrological investigations
• To perform terrain evalution and methodology for lu/lc classification system
• Understand the assessment of Basin morphometry and its analysis ,drainage mapping and hydro-geomorphological,Groundwater prospect mapping
• Get exposure to the Groundwater and Watershed Management aspects.

CO-Pr2 - APPLICATON OF REMOTE SENSING DATA FOR VARIOUS STUDIES
On completion of this Lab course, the student shall be able to :
• Acquire skills in analysing optical Remote Sensing data for various thematic mapping and its applications.
• Gain skills in various Satellite data and its use for different purposes.
• Understand the important of Open source technology in GIS and various options available in its implementation.
• Acquire skills in using open source remote sensing and GIS softwares

Department of Continuing Education, Barkatullah University, Bhopal

B.Ed Course

Programme Outcome :-

- Gain insight into philosophy, sociological and psychological basis of education.
- Reflect on the problem and issues related to emerging Indian society.
- To make use of education technology.
- Develop knowledge, skills, attitude among the pupil teachers to manage all types of children in effective manner.

Programme Specific Outcome:-

- To obtain a total perspectives of the role of techno logical in modom educational practices.
- To equip the student teacher with his various technological applications available to him/her inspiring instructional practices.
- To develop the professional skill required for guiding pupils.

Course Outcome :-

- To prepare trained teacher for secondary, higher secondary school.
- To teach in a effective and successfully to students.
- To be committed, inspired and interested in teaching.
- To develop skills of using instructional materials.
- To develop diagnostic and remedial skill in teaching.
- To develop a sense of responsibility towards society.

M.A. Education

Programme Out Come :-

- To enable the students the understand the contribution of philosophy, psychology and teacher education.
- To acquaint the students with different western and Indian thinkers.
- To acquaint the students to critically discuss the interrelationship of education and other streams.
- Tot acquaint the students with concept and concern of education administration.
- To develop the ability and competencies of students to plan, execute research and apply it findings in education practices.

Programme Specific Outcome :-

- To develop an understand about various areas of education problems and its solutions.
- To enable students understand relations between types of research tools and nature of date.
- To acquaint the students the critically discuss the relationship between various streams with education.
- To enable students the understand the psychological, philosophical and technological orientation the education.
- To enable the students the understand modern social tendency.

Course Outcome :-

- To Prepare strong, trained teacher with scientific bent of mind.
- To teach at B.Ed., M.Ed. and M.Phil level with research oriented mind.

- To ensure that students are having proper knowledge of thoughts and practices.
- Know the instructional appreciations of internet and web resource.
- To provide knowledge about gender equity equality for women empowerment.
- Acquire the skills of conducting action research and to develop the skills of interpreting and reporting the findings of action research.

DEPARTMENT OF ENVIRONMENTAL SCIENCE & LIMNOLOGY

No. of PG Course(s) run by the department=01

M.Sc. Environmental Science

Programme Outcomes (POs):

- Ethics: Recognize different value systems including moral dimensions of responsibility for students.
- Effective Citizenship: Social concern and national development centred, and the ability to act with an informed and responsible citizen.
- Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

Specific Outcomes

- PSO1: Understand the nature and basic concepts of environment science and ecology.
- PSO2: Analyse the relationships among plants, animals and environment.
- PSO3: Perform procedures as per laboratory standards in the areas of Environment and Ecology
- PSO4: Understand the applications of Environmental Sciences in various fields.
- PSO5: Understand the issues of environmental contexts and sustainable development

Course Outcomes

- CO1: To understand the fundamentals of environment for its better conservation.
- CO2: To understand various types of environmental pollution and able to suggest strategies for their mitigation.
- CO3: To develop understanding on climate change and related issues.
- CO4: To understand the importance of natural resources.
- CO5: To understand the importance of environmental impact assessment.
- CO6: To understand the importance of conservation of environment for society.

DEPARTMENT OF ELECTRONICS

Program Outcomes, Program Specific Outcomes, Course Outcomes and Course Specific

Outcomes for M.Sc. (Electronics) Offered by Department of Electronics, Barkatullah University, Bhopal

➢ Program Outcomes:

The programs offered by this institute have been develop in competitive spirits, nurture individual thinking and groom the students in order to enable them to meet with the scientific and technological challenges in the global arena. We also developed professionally competent, environmentally and socially conscious, value imbibed and ethical students.

➢ Specific Outcomes:

The department runs two (2) programs which include M.Sc. (Electronics) and Ph.D. (Electronics). These programs educate and prepare students to accept the national and global challenges in the field of electronics and provide them the knowledge base to serve the society through their active participation in scientific and educational institutions.

The Ph.D. program is designed to give elaborated exposure to students in the front line areas of electronics and makes globally competent scientific manpower.

➢ Course Outcomes:

M.Sc. (Electronics) is designed to develop and improvise basic concepts of the students and prepares them to undertake scientific challenges and enrich teaching fraternity. It also makes them technically sound and competent in handling technical instruments for various applications.

➢ Course Specific Outcomes (CSO) of M.Sc. (Electronics):

ET-101: Digital Design and Application

Students will be able to understand the sound knowledge and ability to identify and solve problems in the area of digital electronics.

ET-102: Operational Amplifier

Students will be imparted to improve their concept and knowledge of operational amplifiers and it`s applications.

ET-103: Network Analysis and Synthesis

Students will be capable of understanding the basic concept of networks and their analysis, synthesis and applications.

ET-104: Semiconductor Devices and Power Electronics

Students will have the exposure of most modern techniques available in the field of semiconductor and power electronics.

ET-105: Lab. 1 – Operational Amplifier

Students will acquire knowledge from classrooms and then the laboratory environment provides them the practical understanding of operation amplifiers.

ET-106: Lab. 2 – Digital Design and Application
Students will acquire knowledge from classrooms and then the laboratory environment provides them the practical understanding of digital circuits.

ET-107: Seminar (Based on Experiments/Theory)
Students will present their progress of understanding in the various fields of electronics and this will increase their skills to talks on the podium.

ET-108: Assignments (Based on Experiments/Theory)
Students will submit the write-ups of their progress of understanding the various fields of electronics and this will increase their writing skills.

ET-201: Sensor and Transducers
Students will be imparted to improve their concept and knowledge of sensors and transducers and their applications.

ET-202: Digital System and Microprocessor
Students will be able to understand the sound knowledge and ability to identify and solve problems in the area of digital systems and microprocessors.

ET-203: Electronic Instrumentations
Students will be capable of understanding the basic concept of electronic instruments and their applications.

ET-204: Operating System
Students will have the exposure of most modern techniques available in the field of operating systems.

ET-205: Lab. 1 – Sensors and Transducers
Students will acquire knowledge from classrooms and then the laboratory environment provides them the practical understanding of sensors and transducers.

ET-206: Lab. 2 – Microprocessor
Students will acquire knowledge from classrooms and then the laboratory environment provides them the practical understanding of microprocessors.

ET-207: Seminar (Based on Experiments/Theory)
Students will present their progress of understanding in the various fields of electronics and this will increase their skills to talks on the podium.

ET-208: Assignments (Based on Experiments/Theory)
Students will submit the write-ups of their progress of understanding the various fields of electronics and this will increase their writing skills.

ET-301: Data Communication and Networks
Students will be imparted to improve their concept and knowledge of data communication and networks and their applications.

ET-302: Embedded Systems and Applications
Students will be able to understand the sound knowledge and ability to identify and solve problems in the area of embedded systems and their applications.

ET-303: Process Control Instrumentations (Elective)
Students will be capable of understanding the basic concept of process control instrumentation and their applications.

ET-304: Internet Technologies (Elective)
Students will have the exposure of most modern techniques available in the field of internet.

ET-305: Minor Project
The acquired knowledge by students during the course will enable them to make electronic circuits for practical applications.

ET-306: Lab. 1 – Data Communication
Students will acquire knowledge from classrooms and then the laboratory environment provides them the practical understanding of data communications and networks.

ET-307: Lab. 2 – Embedded System
Students will acquire knowledge from classrooms and then the laboratory environment provides them the practical understanding of embedded system.

ET-308: Seminar (Based on Experiments/Theory)
Students will present their progress of understanding in the various fields of electronics and this will increase their skills to talks on the podium.

ET-309: Assignments (Based on Experiments/Theory)
Students will submit the write-ups of their progress of understanding the various fields of electronics and this will increase their writing skills.

ET-401: Computer Networking
Students will be imparted to improve their concept and knowledge of computer networking and their applications.

ET-402: Microwave and Optical Communication (Elective)
Students will be able to understand the sound knowledge and ability to identify and solve problems in the area of microwave and optical communications and their applications.

ET-403: Electromagnetism and Non Linear Optics (Elective)
Students will be capable of understanding the basic concept of electromagnetism and non linear optics and their applications.

ET-404: Major Project/Trainings
Students will go for their major projects or trainings in the leading technical institutes and laboratories by this they will have the exposure of most modern technologies available in the country and can participate in this.

ET-405: Seminar (Based on Experiments/Theory)
Students will present their progress of understanding in the various fields of electronics and this will increase their skills to talks on the podium.

ET-406: Assignments (Based on Experiments/Theory)
Students will submit the write-ups of their progress of understanding the various fields of electronics and this will increase their writing skills.

DEPARTMENT OF GENETICS AND BIOCHEMISTRY
DEPARTMENT OF GENETICS

No. of PG Course(s) run by the department=02
1.M.Sc. Biochemistry
2.M.Sc. Genetics

Programme outcomes: (M.Sc. Biochemistry)
The department is running two PG programmes (M.Sc. Biochemistry and M.Sc. Genetics) and one Ph.D. programme in Genetics. The students upon successfully qualifying their respective Master's degree/ Doctorate degree should be able to demonstrate their skills so as to explore:

PO1- Research Aptitude-research/ PDF avenues to shine their future in their respective field: Students must be well accustomed with research methodology and aptitude, which comprises numerous dimensions' such as skill developments in scientific writing, data collection, handling and computing along with validation through statistical analysis.

PO2- Professional Aptitude-validate their proficiency in the subject: The course curriculum has been developed by integration of multidisciplinary approach in the field of life-sciences to train the students for their betterment, enhance the ability and thinking power as well as in developing professional aptitude; which has enabled among themselves:

- To teach the basic and practical knowledge as well as scientific abilities in the respective field of Biochemistry/ Genetics.
- To provide thorough knowledge since inception to the latest and highly evolved.
- To make the students aware of applications of their studies in various industries (Diagnostics/ pharmaceutical).
- To facilitate students for taking up and shaping a successful career on completion of the course.
- To encourage the students to publish at least one paper as a outcome of their project dissertation.

PO3- Effective Citizenship-applying their knowledge in developing skills and decisive aptitude: Being the Post-graduates and field workers during the course, the students' have to communicate with a lot of people, they will become more familiar as well as become confident enough to take up future problems/challenges.

PO4- Effective Communication-modulating the students to opt and adopt an English medium: The medium of programme/ instructions is in English. A lot of admitted students have completed their undergraduate degree opting as Hindi medium; so the students will not only communicate/ write in the English medium but also useful in consulting International literature/ research publications as well as books.

PO5- Social Interaction- the social activities as a part of their course curricula: Due to field visits/ sample collections for their dissertations, the students interact with a lot of people of positive and negative mentalities; which groom themselves to adopt in the society through social interactions in their future endeavors.

PO5- Ethics and IPRs-not to harm surroundings and honour: The subject has been developed in such a manner to teach students about the ethical approaches i.e., not to harm or mutate living creatures (primitive ones, animals and plants); as well as proper respect to the IPRs of others and not to copy literature/ plagiarism as well to honor the rules as framed by the statutory bodies of India such as UGC, DBT etc.

PO6- Sustainability of the Environment: conservation practices are studied for sustainable development

Specific outcomes:

The students should acquire the subject related knowledge and must able to demonstrate expertise in their acquired learning with reference to teaching and research. It is expected after the admission to completion of the programme:

PSO1- To train the students the multidisciplinary approach of the subjects so as to create foundation for further studies/ research.

- Empowering complete awareness of biomolecules along with their interactions with other molecules.
- Developing vision of cellular structure and function along with the insights of cellular signaling at molecular level.
- Exposure of latest in the field of life sciences viz., Genomics, Proteomics, Immune responses, Codon bias Angiogenesis along with the latest evolution of biological tools.

PSO2- To prepare the students with the abilities of the laboratory as well as field based studies/ research.

- To make the students aware about conservation and sustainable use of rich diversity of our universe.
- Expertise in database search and sequence analysis.
- Develop an understanding of computational biological techniques in the field of virology and though codon bias identification of vaccine candidates and forecasting future development and gene therapy.
- Analysis of biomolecules using various techniques.
- Laboratory skills in isolation & transformation techniques.
- To address the socio-economic challenges of the fields.

PSO3- To develop the potential among students to become an entrepreneur of coming future.

PSO4- To build the Department on the modern lines for education and training.

Course outcome:

After compleating their Masters Programme, the students are able to achieve teaching and research capabilities.

Programme outcomes: (M.Sc. Genetics)

The department is running two PG programmes (M.Sc. Biochemistry and M.Sc. Genetics) and one Ph.D. programme in Genetics. M.Sc. (Molecular Biology) has been proposed from the session 2019-20. The students upon successfully qualifying their respective Master's degree/ Doctorate degree should be able to demonstrate their skills so as to explore:

PO1- Research Aptitude-research/ PDF avenues to shine their future in their respective field: Students must be well accustomed with research methodology and aptitude, which comprises numerous dimensions' such as skill developments in scientific writing, data collection, handling and computing along with validation through statistical analysis.

PO2- Professional Aptitude-validate their proficiency in the subject: The course curriculum has been developed by integration of multidisciplinary approach in the field of life-sciences to train the students for their betterment, enhance the ability and thinking power as well as in developing professional aptitude; which has enabled among themselves:

- To teach the basic and practical knowledge as well as scientific abilities in the respective field of Biochemistry/ Genetics.
- To provide thorough knowledge since inception to the latest and highly evolved.
- To make the students aware of applications of their studies in various industries (Diagnostics/ pharmaceutical).
- To facilitate students for taking up and shaping a successful career on completion of the course.
- To encourage the students to publish at least one paper as a outcome of their project dissertation.

PO3- Effective Citizenship-applying their knowledge in developing skills and decisive aptitude: Being the Post-graduates and field workers during the course, the students' have to communicate with a lot of people, they will become more familiar as well as become confident enough to take up future problems/challenges.

PO4- Effective Communication-modulating the students to opt and adopt an English medium: The medium of programme/ instructions is in English. A lot of admitted students have completed their undergraduate degree opting as Hindi medium; so the students will not only communicate/ write in the English medium but also useful in consulting International literature/ research publications as well as books.

PO5- Social Interaction- the social activities as a part of their course curricula: Due to field visits/ sample collections for their dissertations, the students interact with a lot of people of positive and negative mentalities; which groom themselves to adopt in the society through social interactions in their future endeavors.

PO5- Ethics and IPRs-not to harm surroundings and honour: The subject has been developed in such a manner to teach students about the ethical approaches i.e., not to harm or mutate living creatures (primitive ones, animals and plants); as well as proper respect to the IPRs of others and not to copy literature/ plagiarism as well to honor the rules as framed by the statutory bodies of India such as UGC, DBT etc.

PO6- Sustainability of the Environment: conservation practices are studied for sustainable development

Programme specific outcomes:

The students should acquire the subject related knowledge and must able to demonstrate expertise in their acquired learning with reference to teaching and research. It is expected after the admission to completion of the programme:

PSO1- To train the students the multidisciplinary approach of the subjects so as to create foundation for further studies/ research.

- Empowering complete awareness of biomolecules along with their interactions with other molecules.
- Developing vision of cellular structure and function along with the insights of cellular signaling at molecular level.
- Exposure of latest in the field of life sciences viz., Genomics, Proteomics, Immune responses, Codon bias Angiogenesis along with the latest evolution of biological tools.

PSO2- To prepare the students with the abilities of the laboratory as well as field based studies/ research.

- To make the students aware about conservation and sustainable use of rich diversity of our universe.
- Expertise in database search and sequence analysis.
- Develop an understanding of computational biological techniques in the field of virology and though codon bias identification of vaccine candidates and forecasting future development and gene therapy.
- Analysis of biomolecules using various techniques.
- Laboratory skills in isolation & transformation techniques.
- To address the socio-economic challenges of the fields.

PSO3- To develop the potential among students to become an entrepreneur of coming future.

PSO4- To build the Department on the modern lines for education and training.

Course outcome
After compleating their Masters Programme, the students are able to achieve teaching and research capabilities.

INSTITUTE OF DISTANCE EDUCATION

Programme outcomes, Programme specific outcomes and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.

Institute of Open & Distance Education
No. of UG Course(s) run by the department=03
Bachelor of Arts
Bachelor of Commerce
Bachelor of Library & Information Science

Institute of Open & Distance Education
No. of PG Course(s) run by the department=07
Master of Arts (Political Science)
Master of Arts (Sociology)
Master of Arts (Economics)
MA (History)
Master of Arts (Hindi Literature)
Master of Arts (English Literature)
Master of Library 7 Information Science

Institute of Open & Distance Education
Bachelor of Arts (BA)
Programme Outcomes: Bachelor of Arts
PO1 - Community Engagement and Global Understanding.
PO2 - Critical and Creative Thinking.
PO3 - Literacy and Communication.
PO4 - Evaluate and Conduct Research.
PO5 - Depth and Breadth of Understanding.
PO6 - Professional Development and Ethical Behavior.

Programme specific outcomes:

PSO1 - The students acquire knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough.

PSO2 - The B.A. graduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking.

PSO3 - The program also empowers the graduates to appear for various competitive examinations or choose the post graduate programme of their choice.

PSO4 - The B. A. program enables the students to aquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.

PSO5 - The students will be ignited enough to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.

PSO6 - Programme provides the base to be the responsible citizen.Course outcome

Course outcome

CO1 - Understand how cultural, historical, geographical, political, linguistic, and environmental forces shape the world and recognize the role of the individual within

CO2 - Analyse and critically reflect on complex problems incorporating multiple

CO3 - Demonstrate the ability to extract and convey information accurately in a variety of formats.

CO4 - Engage in scholarly inquiry to identify and investigate questions of a theoretical and/or applied nature.

CO5 - Demonstrate detailed knowledge in one or more disciplines and integrate knowledge and perspectives across disciplinary boundaries.

CO6 - Demonstrate personal integrity and professional behaviour in scholarly endeavours and in collaborating with others within and beyond the academic community.

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

Institute of Open & Distance Education

Bachelor of Commerce (BCom)

Programme Outcomes: Bachelor of Commerce

Program Outcomes Students who have taken admission to this program of B.Com are expected to concentrate upon the following outcomes.

PO1 - Commercial sense.

PO2 - Develop managerial skills.

PO3 - Entrepreneurial skill.

PO4 - Budgeting policy.

PO5 - Human Resources Management.

PO6 - Develop Numerical ability.

PO7 - Well versed with business regularity framework.

Programme specific outcomes:

PSO1 - The B. Com. graduates would be able to acquire basic and fundamental knowledge and skills for doing business and commercial activities of their choice.

PSO2 - The program also empowers the graduates to appear for various competitive exams or choose a profession of their choice such as CA, CS, ICWA, MBA, M.Com etc.

PSO3 - The program enables the students to aquire the accounting knowledge, management principles, retail trading, banking and insurance transactions, business economics and financial management.

PSO4 - The students also acquire knowledge in the field of management accounting, corporate accounting, statistical and mathematical techniques and knowledge relating to corporate law and business laws.

PSO5 - The students become capable of doing a business of their chioce or chosing a profession or can become employees having basic knowledge and skill required for such activities.

Course outcome

Accountancy

CO1 - Understanding basic concepts of accountancy, principles of accountancy and accounting cycle to maintain accounts of trading & non-trading organizations.

CO2 - Getting acquainted with the procedure of preparation of income statements, retained earnings, balance sheet and statement of cash flows which are required for external users and more useful to managers for managerial decision making.

CO3 - Inculcating different skills for analysis and interpretation of financial data to understand financial health of an organization and ensure that resources are being used to achieve the organizations objectives.

CO4 - Developing knowledge about cost ascertainment and fixation of selling price and cost control, obtaining the knowledge of various provisions of Income Tax Act and their applications in computations of taxable income of an individual under different heads of income.

CO5 - Getting working knowledge of generally accepted auditing procedure, techniques and skills.

Business Communication

CO1 - Spoken communication and written communication.

CO2 - Writing of Resume, letters of application, business letters.

CO3 - Writing News-report, Essay, paragraph,, Review, etc.

CO4 - Narration of experience, daily routine.

CO5 - Interview Techniques.

CO6 - Understanding and interpretation of poem, prose, essay, short stories, etc.

CO7 - Spoken communication and written communication.

CO8 - Writing of Resume, letters of application, business letters .

CO9 - Writing News-report, Essay, paragraph,, Review, etc.

CO10 - Narration of experience, daily routine.

CO11 - Interview Techniques.

Business Economics

CO1 - Understanding the link between business economics and business decision.

CO2 - Realizing the importance of demand forecasting and method of demand forecasting.

CO3 - Justifying the demand function and production function.

CO4 - Evaluating various production theories.

CO5 - Clarifying the meaning of Marginal, average, total revenue, and Marginal, average and total cost and its implication.

CO6 - Understanding different markets structure in marketing system

Financial Accounting

CO1 - Understanding the concepts of financial Accounting

CO2 - Exposure to nature and advantages of Accounting, Accounting concepts and conventions.

CO3 - Introduction to Accounting standards in India

CO4 - Obtaining the knowledge of computerized Accounting.

CO5 - Getting knowledge about accounting procedure of partnership firm, accounts of professionals, single entry system, branch accounts and consignment accounts.

Principles of Business Management

CO1 - Supporting to Achieve Group Goals.
CO2 - Knowledge about motivating employees by providing financial and nonfinancial incentives.
CO3 - Evaluating the economic growth and development of an organization.
CO4 - Understanding the relation between individuals, groups, departments and between levels of management.
CO5 - Comprehending the human resource productivity.

Principle of Marketing
CO1 - Enhancing the skill of marketing among students.
CO2 - Providing different techniques of marketing for increase of sales.
CO3 - Creating the sense how to behave in the market while buying or selling of product.
CO4 - Understanding how to undertake crucial task such as competition analysis, production etc.
CO5 - Providing information about buying pattern and different attitudes of consumers.

Corporate Accounting
CO1 - Exposure to the issue of shares and debentures of the company
CO2 - Attainment of knowledge about accounting procedure of company final account.
CO3 - Understanding the accounting procedure amalgamation and absorption of company
CO4 - Ability to get the knowledge about valuation of shares.
CO5 - Understanding the accounts procedure of liquidation of Ltd. company.

Business Economics
CO1 - Understanding the basic concepts and theories of Macro economics.
CO2 - Awareness about changing macro economics policies and theories.
CO3 - Justifying various concepts such as; GDP, GNP NNP, Personal Income, Disposable Income, Per Capita Income, and National Income.
CO4 - Explanation of the factors determining gross domestic product, employment, the general level of prices, and interest rates.
CO5 - Acquaintance with law of markets, consumption function and investment function.
6. Understanding monetary policy of Central Banks and its implications.

Money and Financial System
CO1 - Understanding the nature, functions and issues related to money, banking and non banking financial intermediaries and financial system.
CO2 - Knowing about changing role of banking and financial intermediaries in the process of growth & development.
CO3 - Realization of the term structure, role and functions of RBI, NBFIs, Development Banks, Commercial Banks, Money Market, Capital Market and Forex Market.
CO4 - Getting knowledge about changing paradigms in Indian Banking (EBanking, Mobile Banking Tele Banking, Core Banking – Retail Banking - ATM, Credit Card and Debit card, Kisan card).

Entrepreneurship Development
CO1 - Motivating to acquire the skill to be an Entrepreneur
CO2 - Creating Entrepreneurial skill among the students.
CO3 - Creating awareness among students about self employment/ own business.
CO4 - Providing various innovative business ideas to the society.
CO5 - Developing a skill of stability in the business at critical situation.

Business Statistics

CO1 - Making familiar with statistical tools which are relatively used in business.
CO2 - Imparting the ability to collect present, analyze and interpret data.
CO3 - Ability to predict trend values by using list square methods in regression.

Environmental Studies

CO1 - Understanding environmental concerns by the students at the undergraduate level.
CO2 - Understanding the relationship of man with the environment and help them change his attitude for more positive, proactive, eco-friendly and sustainable lifestyles.
CO3 - Getting information about climate change, Global warming, Acid rain, Green house effect, Ozone, layer depletion.
CO4 - Cultivating attitudes to safeguard the environment built particularly with field experience.
CO5 - Realization of the impact of human actions on the immediate environment and the linkage with the larger issues.
CO6 - Getting information about Environment Protection Acts.

Business Management

CO1 - Knowing about the growing size and complexity of business.
CO2 - Getting known with good working environment and conditions.
CO3 - Explanation about how to reduce wastage and increase efficiency.
CO4 - Importance of research and development.
CO5 - Knowledge about cut throat competition in the market.
CO6 - Acquaintance with the modern management practices being used by the corporate world.

Business Regulatory Framework

CO1 - Introduction to Business Law as well as other Laws.
CO2 - Achieving the knowledge of Law.
CO3 - Knowing the rights and liability of every citizen regarding society.
CO4 - Awareness of legal liability.
CO5 - Welfare of society
CO6 - Creating legal awareness among the students.
CO7 - Acquainting with the latest laws, governing business and commercial transactions.

Business Environment

CO1 - Understanding business environment at national and international level.
CO2 - Knowledge about agricultural development, industrial development and service sector development in India.
CO3 - Discussing the problems of Indian economy.
CO4 - Measuring implementation and impact of Liberalization, Privatization and Globalization on Indian Economy.
CO5 - Justifying performance, role, function, merits and demerits of Foreign Capital, Multinational corporations and International Corporation (IMF, IBRD, WTO and SAARC).

Advanced Accountancy.

CO1 - Knowledge about various provision of Banking Regulation Act for maintenance of Bank final accounts.

CO2 - Knowledge about the accounting procedure of Hire purchase system of sales.
CO3 - Calculation of fire insurance claim under loss of stock policy and loss of profit policy
CO4 - Knowledge about the Firm Accounting procedure.
CO5 - Obtaining the knowledge about analysis and interpretation of financial statements.
CO6 - Understanding the procedure of calculation of working capital requirement and preparation of funds flow statement.
CO7 - Exposure to cost accounting and management accounting.

Auditing
CO1 - Knowledge about auditing principles and techniques of auditing.
CO2 - Getting knowledge of vouching of cash and credit transactions.
CO3 - Knowing the appointment procedure of Auditor.
CO4 - Acquiring the skills of Audit program of co-operative societies and banks.
CO5 - Knowledge about writing of audit reports.

Income Tax
CO1 - Understanding basic concepts in Indian Tax Act.
CO2 - Obtaining the knowledge about tax free incomes.
CO3 - Acquiring the knowledge about general deductions from income.
CO4 - Exposure to income tax planning
CO5 - Knowing the procedure of calculation of income tax
CO6 - Understanding the procedure of e-filling of return and e-payment of tax.
CO7 - Getting known with application of principles and provisions of direct tax laws in computation of taxable income under various heads of income.

Cost Accounting
CO1 - Creating logical thinking power.
CO2 - Creating ability to take decision at different level of production activity like make or buy, project launching etc.
CO3 - Developing knowledge among students about cost ascertainment and fixation of selling price and cost control.
CO4 - Knowledge about presentation of cost accounting information for the purpose of decision making.
CO5 - Determination of profitable or unprofitable activity in business by using different cost accounting tools.
CO6 - Developing knowledge about preparation of tenders, quotations, etc.
CO7 - Helping in determining the product total cost and fixation of selling price.
CO8 - Creating skills about handling of various financial records, documentation, collection and classification of different costs.
CO9 - Enhancing the knowledge of business project analysis and cost planning and procedure.
CO10 - Getting known with how to publish information about production to management, consumer, Government, Employee at different levels for decision making purpose.

Industrial Management
CO1 - Understanding about work for maximum outputs.
CO2 - Knowing about mobilization of best talents.
CO3 - Motivation of employees
CO4 - Improving standard of living.
CO5 - Ample job opportunity.

CO6 - Establishing sound industrial relations.
CO7 - Achievement of goals.
CO8 - Creating relationship between owners and workers.
CO9 - Management provides innovation.
CO10 - Active cooperation of human being.
CO11 - Industrial management aims of achieving Predetermine objectives.
CO12 - It helps coordination and establishes team spirit
CO13 - Basic of management and multidisciplinary teams.

Institute of Open & Distance Education
Bachelor of Library & Information Science (BLibISc)
Programme Outcomes: Bachelor of Library & Information Science
PO1 - Students will be aware of purpose, role and importance of libraries in society
PO2 - Students will have theoretical and practical knowledge of library procedures.
PO3 - Students will develop the skills of critical evaluation of reference sources.
PO4 - Students will be familiar with the library scenario in general and the Indian scenario in particular.
PO5 - Students will know financial and human resource management of libraries.
PO6 - Student will learn use of ICT in library services

Programme specific outcomes:
PSO1-Students will be able to design, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields. Higher studies (M.Phil., Ph.D.) can be pursued in order to attain research positions.
Course outcome
At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.
Institute of Open & Distance Education
Master of Arts (MA) in Political Science
Programme Outcomes: Master of Arts
PO1 - The students acquire in depth knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough to solve the issues related with mankind.
PO2 - The postgraduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking of their respective subjects.
PO3 - The program also empowers the post-graduates to appear for various competitive examinations or choose the any post graduate or research programme of their choice.
PO4 - The M. A. program enables the students to aquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.
PO5 - The students will be ignited enough through the knowledge of the special PG programme to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.
PO6 - Through the PG programme the students will come know about research in their respective subject. It may also provide the information to the students for collection of Data, enquiry, primary and secondary methods of collection of data, classification and tabulation of data. Students get knowledge of various research methods and can realize the importance of research to find solutions of a specific issue.

Programme specific outcomes:

PSO1 - Students will be able to describe the history and making of Indian constitution with its philosophical base. Students will be able to explain parliamentary system in India.

PSO2 - Students will be able to critically analyze and apply the basic principles of Indian and western political thinkers and scholars.

PSO3 - Students will be able to understand the composition and functions of Election Commission of India and other state election commissions and can work as an observer.

PSO4 - Students will be able to understand the meaning, nature and scope of the International Relations. The programme provides the students with the capacity to identify issues and problems relating to the realization of human rights.

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

Institute of Open & Distance Education

Master of Arts (MA) in Sociology

Programme Outcomes: Master of Arts

PO1 - The students acquire in depth knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough to solve the issues related with mankind.

PO2 - The postgraduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking of their respective subjects.

PO3 - The program also empowers the post-graduates to appear for various competitive examinations or choose the any post graduate or research programme of their choice.

PO4 - The M. A. program enables the students to aquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.

PO5 - The students will be ignited enough through the knowledge of the special PG programme to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.

PO6 - Through the PG programme the students will come know about research in their respective subject. It may also provide the information to the students for collection of Data, enquiry, primary and secondary methods of collection of data, classification and tabulation of data. Students get knowledge of various research methods and can realize the importance of research to find solutions of a specific issue.

Programme specific outcomes:

PSO1 - Curriculum or Syllabus of the sociology department attempted to provide social sense amongst the students. It also tried to give them sociological understanding of various concepts which we found in the society and at the same time it gave them a sociological perspective to analysis social issues, social movements, social structure, social thinkers and their theoretical contribution in the sociology, teaching faculties of the sociology department took initiative to make students familiar with the sociological discourse.

PSO2 - It can be defiantly observed that specific outcome of these programme students became more familiar with sociological discourse.

PSO3 - They have got sociological understanding of social issues social movements, social thinkers and their work in sociology, social structure and concepts which found in the society.

PSO4 - Another very useful outcome also we found that academic study of the papers related to social research methods, social welfare policies, human rights and society played very vital role to provide useful knowledge to students for their careers in social research, NGO's government job.

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

Institute of Open & Distance Education

Master of Arts (MA) in Economics

Programme Outcomes: Master of Arts

PO1 - The students acquire in depth knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough to solve the issues related with mankind.

PO2 - The postgraduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking of their respective subjects.

PO3 - The program also empowers the post-graduates to appear for various competitive examinations or choose the any post graduate or research programme of their choice.

PO4 - The M. A. program enables the students to aquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.

PO5 - The students will be ignited enough through the knowledge of the special PG programme to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.

PO6 - Through the PG programme the students will come know about research in their respective subject. It may also provide the information to the students for collection of Data, enquiry, primary and secondary methods of collection of data, classification and tabulation of data. Students get knowledge of various research methods and can realize the importance of research to find solutions of a specific issue.

Programme specific outcomes:

PSO1 - Students can know how to apply the knowledge from Economics in various sectors of society in order to solve various financial issues.

PSO2 - Students will know Foreign Trade, FDI, International Trade, Foreign Policy, International Institutions, such as W.T.O, World Bank, I.M.F, ASSION, and Trade Policies and International debts etc. and can design local policies to overcome economical crises.

PSO3 - Students can utilize their knowledge to solve issues in land reforms, traditional and Modern Agriculture, Small and Marginal Farmers, Agricultural Production and Productivity.

PSO4 - Students can design policy to build the gap between agricultural, Industry, infrastructure sectors. Students can be aware of and make the public aware of Taxation, Public debt, Fiscal and Monetory policy etc.

PSO5 - Students can understand Fund Based Activities and Non Fund based Activities, Sources of Revenue, Merchant Banking in India, Functions of Merchant Bank and Commercial Banks, Concept of Credit Rating such as CRISIL, IICRA, CAREDCR, ONICRA.

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

Institute of Open & Distance Education

Master of Arts (MA) in History

Programme Outcomes: Master of Arts

PO1 - The students acquire in depth knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough to solve the issues related with mankind.

PO2 - The postgraduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking of their respective subjects.

PO3 - The program also empowers the post-graduates to appear for various competitive examinations or choose the any post graduate or research programme of their choice.

PO4 - The M. A. program enables the students to aquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.

PO5 - The students will be ignited enough through the knowledge of the special PG programme to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.

PO6 - Through the PG programme the students will come know about research in their respective subject. It may also provide the information to the students for collection of Data, enquiry, primary and secondary methods of collection of data, classification and tabulation of data. Students get knowledge of various research methods and can realize the importance of research to find solutions of a specific issue.

Programme specific outcomes:

PSO1 - We can say that History has surrounded us and waits for the right time to explode.

PSO2 - It never lets one to forget past easily.

PSO3 - Present has its own need and facilities. Some try to forget History where as some we History as per their necessity.

PSO4 - All the sage and saints through their saying portray history is very good. It means that everyone is utilizing history according to their perspective only thing is we don’t realize it as it is past and parcel of our life.

PSO5 - When it becomes violent and aggressive, then we realize that past is still alive and exists. None of the countries can history of its own and make a new beginning. In this way, History always is alive giving a direction to presents hence history cannot be considered as only a syllabus to study.

PSO6 - Countries may be ruled or became independent anytime but the feeling of patriotism remains in the hearts of the people.

PSO7 - History provors people about going independence whenever they are ruled by.

PSO8 - One historical truth is past condition creating present and it can giving new birth to future and so it is important to remind it.

PSO9 - Students can avail good opportunities to work in the field of archeology, education and research.

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

Institute of Open & Distance Education

Master of Arts (MA) in Hindi Literature

Programme Outcomes: Master of Arts

PO1 - The students acquire in depth knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough to solve the issues related with mankind.

PO2 - The postgraduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking of their respective subjects.

PO3 - The program also empowers the post-graduates to appear for various competitive examinations or choose the any post graduate or research programme of their choice.

PO4 - The M. A. program enables the students to aquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.

PO5 - The students will be ignited enough through the knowledge of the special PG programme to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.

PO6 - Through the PG programme the students will come know about research in their respective subject. It may also provide the information to the students for collection of Data, enquiry, primary and secondary methods of collection of data, classification and tabulation of data. Students get knowledge of various research methods and can realize the importance of research to find solutions of a specific issue.

Programme specific outcomes:

PSO1 - Students get information about social relations among the people through stories to develop social morals.

PSO2 - Students get information about education system and they also promote to stop dowry system and another problems in society by reading literature in Hindi language course

PSO3 - Student know about hindi prachin kavita , also know modern poem it gives human value’s , social commitment.

PSO4 - These poems also promote students to develop sensitiveness and also Develop humanity. Student know new compose like dairy and letter of renowned authors

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

Institute of Open & Distance Education

Master of Arts (MA) in English Literature

Programme Outcomes: Master of Arts

PO1 - The students acquire in depth knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough to solve the issues related with mankind.

PO2 - The postgraduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking of their respective subjects.

PO3 - The program also empowers the post-graduates to appear for various competitive examinations or choose the any post graduate or research programme of their choice.

PO4 - The M. A. program enables the students to aquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.

PO5 - The students will be ignited enough through the knowledge of the special PG programme to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.

PO6 - Through the PG programme the students will come know about research in their respective subject. It may also provide the information to the students for collection of Data, enquiry, primary and secondary methods of collection of data, classification and tabulation of data. Students get knowledge of various research methods and can realize the importance of research to find solutions of a specific issue.

Programme specific outcomes:

PSO1 - Literature or the fine arts contribute to the gradual civilization of man by activating his senseperceptions sharply so as to be quick enough to react to their appeal.

PSO2 - These arts appeal to the emotional aesthetic reflective intellectual meditative and spiritual faculties of man. Utility is the criterion of mechanical arts.

PSO3 - On the other hand, literature is a mode of reflecting reality, intending to appeal to the various faculties of sensitive sensible and sentient man.

PSO4 - It also offers pleasure. Besides it helps the learner to know the noble values in life making him a responsible citizen of this world and leads him to make the place more worth living. 5.Simultaneously this course will help the students to improve communicative skills in English.

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

Institute of Open & Distance Education

Master of Library & Information Science (MLibISc)

Programme Outcomes: Master of Library & Information Science

PO1 - Value and support critical engagement with issues and practices in LIS and related fields through diverse approaches to independent ongoing learning.

PO2 - Explain, analyse and interpret professional and scholarly literature, research data and information resources to articulate their implications for LIS and related fields of knowledge and practice.

PO3 - Exercise and enact the values and principles of the field and its specialisations with an awareness of overarching social responsibility associated with progressive public service for the public good.

PO4 - Discriminate among current and emerging information and communication technologies to judge effective management and use in constantly changing information workplaces.

PO5 - Relate the practices and roles of individual librarians and information professionals to broader organizational, professional, political, economic, social and technological contexts.

PO6 - Navigate, evaluate and use multiple elements of a range of information environments, including those associated with data curation, information visualization, databases and information architectures.

PO7 - Identify and explore opportunities to engage in experiential learning and to participate, advocate, and lead in professional development and training in professional organizations relevant to emerging specialisations and career paths.

PO8 - Evaluate and demonstrate the effectiveness of user-centered information systems, services and resources for individual users and diverse communities in a networked global society within which information organizations and information professionals operate.

PO9 - Differentiate among the numerous areas of LIS practice and scholarship, and demonstrate a facility across media when speaking, writing and presenting about them to diverse audiences in formal and informal professional and scholarly domains.

Programme specific outcomes:

PSO1 - Perform administrative, service, and technical functions of professional practice in libraries and information centers by demonstrating skills in information resources; reference and user service; administration and management; organization of recorded knowledge and information.

PSO2 - Use existing and emerging technologies to meet needs in libraries and information centers.

PSO3 - Integrate relevant research to enhance their work in libraries and information centers.

PSO4 - Demonstrate professionalism as librarians or information specialists.

Course outcome

At the end of the course the student should be able to practise direct and indirect role in research by awaring themselves and others in handling sophosticated instruements they must develop research oriented skills.

DEPARTMENT OF COMPARATIVE LANGUAGE AND CULTURE

DEPARTMENT OF COMPARATIVE LANGUAGES AND CULTURE
BARKATULLAH UNIVERSITY, BHOPAL

Programme Outcomes, Program Specific Outcomes and Course Outcomes of the Programmes offered by the Department

No. of Post Graduate Courses offered by the Department: 05

1.M.A. Sanskrit
2.M.A. Linguistics
3.M.A. English
4.M.A. Hindi
5.M.A. Urdu

Programme Outcomes (PO):

Being concerned with the single subject, the Post Graduate Programmes cover deeper study leading to research in various fields of the subject and their application in the larger interest of society.

Why language and literature?

PO-1 Language is not only the important but the only means of communication between the individuals and also the identity of the people and society as well.

PO-2 Language binds the people together, gives them a sense of oneness and develops the spirit of unity.

PO-3 In a multi-linguistic and multi-cultural country like India, Study of Language and Literature is very much essential to know one another and also the Ancient Heritage.

PO-4 Being the mirror of society and the imitation of life, Literature connects individuals with the rest of World.

PO-5 Classical literature reflects the height of progress which India or any Nation reached in Ancient time.

PO-6 Literature plays a vital role in Nation-Building just maintaining the Value and Morality in life.

PO-7 Literature inspires young men and women with noble ideas, it develops in them a sense of responsibility, confidence and self-reliance.

PO-8 In such, Literature is all necessary in a Democratic Society and as to live truly, a man requires intellectual foods, emotional and spiritual gratifications.

Programme Specific Outcome (PSO) :

After successfully completion of the Post-Graduate programme in Linguistics or any other literature mentioned above, students will be able to have better understanding in various aspects of language and literature and their application in the development of the society.

PSO-1 Students can be able to develop critical thinking in the literature-specific.

PSO-2 Students will be able to enlarge their Teaching and Research Methods.

PSO-3 Students will be able to critically understand the Thinkers and Scholars of the literature-specific.

PSO-4 Student can have deep knowledge in various fields of the specific literature such as Prose, Poetry, Drama, Fiction, Epic etc.

PSO-5 Students can acquire the literary and cultural value of the specific literature.

PSO-6 Students can have the specific knowledge of Scientific aspect of literature such as Poetics, Dramaturgy, Grammar etc and apply them in the relevant area.

PSO-7 The Humanization of Nature in the relevant literature will make the students more friendly towards the Environment-sustainability

Course outcome (CO) :-

The course curriculum of each programme has been designed in such a manner that :

CO-1 Students can acquire the basic and the applied knowledge of subject.

CO-2 Students can be able to choose their career in Teaching/ Research/Official language or any other field.

CO-3 Students can have an applied outcome of their projects / Dissertations.

CO-4 Students can apply their knowledge in various fields of creativity.

CO-5 Students can connect their knowledge with the development of society.

CO-6 Students can effectively communicate/share their knowledge

CO-7 Students can effectively apply the various linguistic tools in the concerned literary area.

Details of the outcomes are displayed in the University website.

Department of Legal Studies and Research

Programs: LL.M. (Two year) & B.A.LL.B.(Five year integrated course)

Program Outcomes:

[POs.1].Logical Thinking: Explore,Interpret and explain the substantial & procedural laws.Develop how students think and understand the legislative draft.

[POs.2]. EffectivePublic Speaking: Train to learn the art of effective public speaking with logical presentation.

[POs.3].Communication skill: Ability to ascertain the art of communicating and demonstrating their oral advocacy skills. Presenting facts in a logical way to the client and ability to convince onlegal reasoning forms the essence of communication in courts of law.

[POs.4].Social Interaction: analyze the legal and social problems and work towardsfinding solutions to the problems by application of laws and regulations.

[POs.5].Responsible Citizen: Inculcate values of Rights and Duties, and transfer these values to real-life through legal and judicial process for promoting welfare of the society.

[POs.6].Environment and Sustainability: Understand the impact of the professional, legal solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainabledevelopment.

[POs.7].Life-long Learning: Law practice requires up gradation and updating of knowledge hence student recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broader context of legal change.

Program Specific Outcomes:

[PSOs.1]. Indulgent and Understanding of Law and Judicial process:knowledge of substantive & procedural laws including connected rules &regulations. Understanding of Judicial process of India

[PSOs.2].Drafting, Counselling skill: Develop the skill of drafting various legal documents. Enhancement in Ability of framing specificplaints, petitions, writ, letters, in proper format. Students therefore learn theskills ofcounseling.

[PSOs.3]. Court Administration: Understands the court procedure, culture and protocol thereby grasp the court administration. How the procedures after investigation and trial is followed in courts e. g. framing of charges, appeal, judgment, bails and their types, etc.

[PSOs.4]. Client Handlings: Students learn the negotiation skill and handling client for the ethical implementation of legal system.

[PSOs.5].Building Professionalism: Comprehends the standards of conduct involved in Legal practice and also demonstrate values of legal profession. This inculcates ethical responsibilities towards judges, other advocates, clients and society.

[PSOs.6]. Development of Interpersonal Skills: Develops the ability to analyse, synthesize and disseminate large amount of complex and disparate information comprising of legal and non-legal aspects on the working of the entire system.

[PSOs.7].ProfessionalEthics: Apply professional ethical principles and commit to legal professional. Learn to how to ensure fulfillment of ethical responsibilities and follow established norms of the legal practices.

Course Specific Outcome (COs)

Name of course:

I.) BALLB (Hons)

Subjects:-

COs 1 -Political Science -Political Science is opted as a core major subject total 6 papers are incorporated in the course. Political science is an indispensible branch of knowledge for students of law. It helps to know the political formations of organs of states and many institutions.

COs 2-Sociology - This courses are offered by Department of Law as a minor course to the students of BA LLB (Hons.) which have 3 papers .

COs 3 -General English & Legal language: These course are offered by Department of Law as a minor course to the students of BA LLB (Hons.) have 3 papers in different semesters.The course develops student's capability to write and speak in English perfectly. Itenhances students' knowledge, ideas and vision from literature and legal language perspective. The combination ofliterature and language will help the law aspirants develop critical insight, comprehension and analytical skills.It also help them to enhance ability to write in a legal context.

COs 4Economics: Economics is selected as minor paper. Three papers of economics are taught in different semesters. This course is offered to give the students the insight to the basic concepts and theories of economics. The course aims to enable students to discover and comprehend problems in the key areas using appropriate tools. This course will help the students to understand the concepts of Economics that are commonly used by all and various legal theories and laws are framed on their practical applications.

COs 5 French/Hindi: These languages courses are offered by the Department as a optional course to thestudents. The course offers basic knowledge ofFrench/Hindi. It covers the reading, writing, listening and speaking skills in the language.

COs 6Torts -This course provides a general introduction to the law of torts with the objective to teach the nature of torts, basic and general principles of torts. It is one of the core subjects of civil laws studied and include theConsumerProtectionAct. The act deals with simple, quick and economical redressal to the consumers' grievances.

COs 7Contract & specific relief - It is one of the core subjects of civil laws studied during the five year course. The main object of this course is to build the transactional and contractual capability in the students. It provides knowledge of general principles of contractual relationships,discharge ,enforceabilityand breach of contracts etc.

COs 8Jurisprudences: The course includes analysis of various theories, Concepts and sources of law. The given course involves the use of sources other than the law, including works onphilosophy and political theory.

COs 9 Law of Crimes : The Indian Penal Code (IPC) and Criminal Procedure Code (Cr.P.C) are the main criminal code of India. These laws to covers all substantive and procedural aspects of criminal law. Many more penal statutes governing various offences have been added to the course in addition to thesecodes.The Cr P C also aims at acquainting the students with the knowledge

that how the investigation in criminal cases is being conducted and how the trial of such cases is to be done in court of law.

COs 10 Interpretation of Statutes: Statutory interpretation is the process by which courts interpret and apply legislation.Students will understand the courts opinion as if some ambiguity or vagueness in the words of the statute how judges resolved it.

COs 11 Company Laws: Company Law is of vital importance for students who intend to make their careers in corporate laws. The course provides a comprehensive understanding on the of creation of the companies The course enables participant to understand the of the laws related to companies.

COs 12 Labour Laws: This course is offered by Dept. of Law as a core subject. Labour Law, including Minimum Wages Act, Maternity benefits Act, 1961, Industrial dispute Act. The course Offers in depth knowledge of social welfare legislations in India by covering Industry, Industrial Dispute, Wages, fixation and revision of wages, Maternity benefits, Trade union, Conditions for Maternity benefits, and different machinery given under the legislation.

COs 13 Personal laws –Hindu and Muslim: The objective of course is to give an overview of some of the current problems arising out of the foundational inequalities in the various family concepts. Basic concept of family laws and

COs 14 Law of Evidence: The course gives the knowledge of rules andprovisions for determined the testimony for admission or rejection of evidences in court of laws.

COs 15Administrative Law:This subject is of vital importancefor law students because of the connection with the public laws. It deals with the constitutional law inmotion. The subject will enlighten students with functioning of various administrative authorities ,functionsand powers.

COs 16 CPC : The course aims to provide the law students' knowledge of the code of civil procedure: how a lawsuit or case may be commenced; the types of pleadings or statements of case, motions or applications, and orders allowed in civil cases; the timing and manner of depositions and discovery or disclosure; the conduct of trials;

COs 17Forensics Science: Forensic science is the application of science to criminal and civil laws, mainly on the criminal side during criminal investigation.The objective of this subject is to make students conversant with the use of Forensic Science techniques and interpretation of Forensic reports

and will know how to examine forged documents, fire-arms, injuries, blood grouping DNA, fingerprinting, Narco analysis and Brain Mapping etc.

COs 18 Drafting and Pleading: Course Perspective: Drafting is a primary stage of writing. A good writing is an outcome of a good draft, similarly Pleadings being the backbone of Legal Profession and paramount requirement of a good lawyer. Whole case of the party depends upon how skillfully it is drafted by an advocate. So a great care should be exercised while drafting the pleadings. So this subject will help to make good lawyers with proficient art of pleadings

COs 19ADR: Alternative Dispute Resolution is an alternative to the formal legal system. It is an alternative to litigation. The study of this subject will enlighten the students with these alternative dispute resolution methods and will impart knowledge as to their use and importance.

COs 20Public International Law : The study of International Law becomes vitalin the perspective that the world is moving towards globalization at a pace faster than ever. Theobjective of teaching this subject is to equip the students of Trans National Law that applies to States in their interrelations and evolved world order, aim to make a better, cooperative, peaceful and developing world.

COs 21 TPA: The objective is to create understanding and knowledge about property, its kinds, modes of transfer of property like mortgage sale, will and gift etc.

COs 22Gender Justice /Law and Children/Women and Law:
Women's rights or Children's needs special protection and care. The issues of gender justice are of vital importance for law students to understand vulnerability of women. The subjects will enlighten student with protection of women and child rights under different conditions.

Course Learning Objectives

At the end of the course, students will be able to :-

- Understand the fundamentals related to various laws.
- Attain knowledge about the procedure for administration of substantive criminal, civil, or other laws in India.
- Understand the framing of criminal courts in India and their powers.

- Attain knowledge about the provisions of arrest and the powers of investigating agencies regarding arrest.
- Understand the procedures being followed in warrant and summons.
- Learn the procedure of preventive nature, investigation, trail & framing of charges.
- Demonstrate proficiency in legal analysis, problem solving and interpreting the provisions of conflict in society.
- Understand the procedure of different concept under social welfare legislation.
- Communicate and interact meaningfully with the law professionals on the issues relating to regulatory agencies have to follow in the Indian legal environment
- Interpret and apply statutory rules and regulations in case of discrepancies and disputes arising in the legal regime.
- Knowledge of various forums meant for the purpose of redressal of disputes or disagreements.
- Understand the Meaning, Purpose and Scope of Interpretation of Statutes ,Nature of Statutes and their Classification, Internal Aids to Interpretation, Get an insight of Parliamentary History ,Rules of Statutory Interpretation, various rules,Judicial Activism, the Principles of Constitutional Interpretation..
- Understand the objective, important definitions and concepts of family law and its applicability and no applicability.
- Know about the concept of various matrimonial reliefs and the procedure thereof.
- Attain knowledge about the various provisions regarding adoption in India and to understand who can Get the maintenance under this Act and what are the other provisions with regard to it.
- Know the important case laws on the different aspects of family law. Know about the various important case laws on the different aspects of Muslim law.
- Learn various basic concepts in the Constitutional law and meaning and scope of Fundamental rights India vis-àvis their practical implementation on ground with case laws along withthe restrictions on the freedoms.
- Learn how the Constitutional Remedies protect against violation of fundamental rights, Directive Principle ofState Policy.
- Understand the importance of various constitutional offices and posts
- Recognize and learn about the working of constitutional offices and posts atUnion and State level.
- Describe the procedure and effects of social welfare legislation
- Interpret and illustrate the formation of different Boards and committees under the Labour Laws.
- Analyse the provisions related to the benefits of women under Maternity benefits Act and penal consequences.
- Recall different recommendations of Supreme Court and High Court related to the social welfare

- Understand the origin development and effects of social welfare legislation
- Describe the formation of international organization.
- Understand the procedure to protect women and children under national or international laws.
- Understand the reason for the existence of civil rules of practice, given the historical and cultural context in which the rules developed , issues involved in civil procedure.
- Identify the order, purpose and content of major pleadings in Magistrate's and High courts.
- Analyse and evaluate information from statutes, case laws and other source materials, Apply court acts and rules
- Understand the concept of proved disproved not proved facts of cases,To know how the statements recorded by the police and deposition of
- the witnesses, investigation procedure
- Apply the law for deciding the cases under civil and criminal
- To understand the functioning control mechanism and of administrative authorities.
- To understand the control mechanism of administrative authorities.
- Know about the informal methods for settlement of administrative disputes.
- To understand the need of delegation of powers to the administrative authorities.
- To understand the role of forensic science in civil law and criminal law.
- To Understand the procedure Establishment of the Identity of Physical Objects by Shape, Size and chemical analysis .
- Know about the different Questioned Documents and the Identification of forensic evidences and Related Problems
- Understand and learn the basics of pleadings, drafting and conveyancing.
- Understand the format and essential steps in drafting the agreements and documents to be registered. Understand the need and preparation of documents required in court in criminal cases.
- Understand the concept of ADR system, its need and importance in the present scenario.
- Learn different non-judicial methods of dispute resolution.
- Understand the concept of Property, its origin and its kinds.
- Understand the nature of rights and duties attached with various kinds of properties and how inter vivo transactions of property take place by act of parties.
- Understand the nature of property disputes and how they arise.
- Helping student understand how it works as a parallel law to the existing laws of testamentary and intestate transfers.
- Learn how to apply the principles of Justice, Equity and Good Conscience.

- Understand the Nature and Development of Child Rights and child protection.
- Describe the major differences of laws related to child protection under different National and International Conventions
- Awareness of filing litigation for gender justice.
- At the end of the course, students will be able to Understand and express the different situations in the French/Hindi language.
- Understand the nature of law, which helps in the study of actual rules of law in tracing out principlesunderlying therein.
- Strive towards scientific development of law.
- Develop critical facilities of the mind in order to understand various legal expressions and terminologies.
- Understand basic ideas and fundamental principles of law in a given society.
- Ascertain the meaning of words and expressions in statutes.
- Course Learning Objectives: At the end of the course, students will be able to havethorough knowledge of
- Describe the evolution and growth of International law.
- Interpret and illustrate the various concepts in International law.
- Experiment the application of theoretical knowledge of International law to ground situation.

Name of course

II.) LLM

The course includes a study of evolution of legal system, Constitution and Courts in India. Criminal group is special group. Judicial process, constitutionallaw, Researchmethodology, socialtransformation are compulsory papers. Research involves gathering information for a purpose, and it is the purpose that usually determines the type of research undertaken and how it is conducted. Legal research would, in a similar vein, involve the collection of legal materials for the purpose of discovering new facts that would contribute to the body of knowledge in a legal field or subject.
So this course is primarily structured to tell the procedures to be followed in criminal cases. This course also states that how the further procedures after investigation and trial is followed in courts e. g. framing of charges, appeal, judgment, bails and their types, etc.

Course Learning Objectives: At the end of the course, students will be able

- To ascertain the nature, scope and sources of law in the given dynamic political structure.

- To analyze general trend of law reformation.
- To reveal the research area in law on particular lines which are now tentatively under consideration,
- To explore the circumstances in which the present position of legal system came about where the present statutory provision or rule of law has raised meaningful queries.
- Understand the concept, methods and procedures of courts
- Knowledge of the criminal law, process of initiation of inquiries in different forums meant for the purpose of redressal.
- Understand the procedure for administration of substantive criminal law in India.
- Demonstrate proficiency in legal analysis, problem solving and drafting. Identify the order, purpose and content of major pleadings in Magistrate's and High courts.
- Collect, analyse and evaluate information from statutes, cases/case laws and other source materials.
- Apply court acts and rules and exhibit professionalism and legal ethics.

DEPARTMENT OF MICROBIOLOGY

No. of PG Course(s) run by the department=01
M.Sc. Microbiology

Programme outcomes (POs): M.Sc. Microbiology

- Critical Thinking about microbiology and microbes.
- He will learn about history, general features and characteristics of microbes and bio-safety issues.
- He will learn various techniques for detection, identification and characterization of microbes.
- Learn about applied application of microbes.
- He will able to deliver knowledge about microbes.
- Generate knowledge about molecular approaches of Recombinant DNA technology for betterment of society.

Programme Specific Outcomes (PSOs)

M. Sc. Microbiology, IstSemester:

PSO1: Understand history of microbiology and microorganisms.

- Learn about general Techniques to isolate of microbes.
- Understand general feature and characteristics of microbes.

PSO2: Understand the Biochemistry of microbes.

PSO3: Understand the microbial genetics of microbes.

- Understand gene mutation and gene transfer.
- Learn about gene expression.

PSO4: Understand and learn about general techniques to detection and identity of microbes.

- Learn various methods to investigate significant data through statistical methods.
- Learn about basics of computer.

M. Sc. Microbiology, IInd Semester:

PSO1: Understand core techniques and essential enzyme used in recombinant DNA Technology (rDNA Technology).

- Understanding and learn cloning strategies.
- Learn about DNA sequencing methods for DNA.
- Learn about application of r-DNA Technology.

PSO2: Understand basic aspects of Bioenergetics and metabolism of microbes.

- Learn about assimilation of nitrogen by microbes.

PSO3: Lean Microbes used in food Microbiology

- Microbial spoilage of food, food preservation and microbial indicators of food safety and quality.

PSO4: Understand to industrially important strain of microbes.

- Learn about novel microbes and methods of strain improvement in industry.
- Lean about Industrial production of enzymes, alcohol, acids, Vaccines and vitamins through the helps of microbes.

M. Sc. Microbiology, IIIrd Semester:

PSO1: Understand Immunology and immunodiagnostics.

- Learn about infection, Antigen, Antibody, MHC and Immune response.
- Understand transplantation immunology, Tumour immunology and Immuno deficiency diseases.

PSO2: Understanding environmental microbiology and microorganism in air and their common diseases.

- Learn about microbial assessment of water quality test.
- Microorganisms of sewage and its treatment.
- Learn about Microbial degradation, Xenobiotics, Phytoremediation and Bioremediation.
- PSO3: Understand agriculture microbiology
- Lean about Rhizosphere and phyllosphere microflora.
- Understand plant diseases caused by microbes
- Understand physical and chemical method to control plant diseases.
- Learn about biofertilizers and its applications
- PS04: Understand about medically microorganism and normal microflora of human and animal system.
- Learn about infection/disease and their pathogens.
- Understand Pathogenesis, immunity and laboratory diagnosis of various diseases caused by medically important microbes.

M. Sc. Microbiology, IVth Semester:
Program Specific Outcomes (PSOs):
Students engaged in project /dissertation work for six months at the department or other scientific institutes of India. For this tenure student will be able to understand various aspects of basic and applied research and do research work in future for betterment of society.

Course Outcomes (COs)
CO1: Understand and learn about history and classification of microbes.
CO2: Learn about general features and characteristics of microorganisms.
CO3: Understand and learn about technique used to identify microbes in microbiology field.
CO4: Learn various methods to investigate significant data through statistical methods and Learn about basics of computer.
CO5: Knowledge generate about Biochemistry of microbes.
CO6: Knowledge generate about genome and their structures.
CO7: Learn about gene and gene mutation.
CO9: Knowledge generated about gene expression.
CO10: Generate knowledge about cloning strategies.
CO11: Understand DNA sequencing methods
CO12: Understand food and Industrial microbiology.
CO13: Understand and learn food preservation and spoilage.
CO14: Generated knowledge about microbial indicators for food safety and quality
CO15: Knowledge generated about Immunology and Immunodiagnostics.
CO16: Learn about Environmental Microbiology.
CO17: Learn about Microbial degradation, Xenobiotics, Phytoremediation and Bioremediation.
CO18: Generated knowledge about plant pathogens disease (Microbial Biodiversity) its management strategies and biosafety issues.
CO19: Learn about Bio-fertilizers and its applications.
CO20: Learn about medically important microbes, their diseases, pathogenesis, Immunity and Laboratory diagnosis.

DEPARTMENT OF PERSIAN

M.A. Persian Ist Sem

II Paper History of Persian Literature

Unit I

सख़ा मुन्शी और सासानी दौर जो क़दीम फारसी ज़माने के दौर गुज़रे हैं उस के ज़रीए विद्ययार्थियों को उस ज़माने के कल्चर व शैर व अदब के रहन–सहन आदि के बारे में मालूमात होती है।

Unit II

ताहरी दौर जिस में फारसी अदब के बहुत से मशहूर शायर व मुसन्निफ रहे हैं उनके इतिहास की मालूमात होती है।

Unit III

समानी दौर की फारसी अदब में अहम ख़िदमात रही हैं बड़े–बड़े शायर और बड़ी उपयोगी किताबें उस दौर में लिखी गई हैं। इसलिए इस दौर की तहज़ीब व तमद्दुन फारसी अदब की ख़िदमात के बारे में छात्रों को लाभ होता है।

Unit IV

ग़ज़नवी दौर की महत्वता इसलिए बहुत अधिक है क्योंकि इसी दौर में फारसी के बड़े और प्रसिद्ध शायर अबु–क़ासिम फिरदौसी के रूस्तम व सुहराब की दास्तान शाहनामा के नाम पर जो बहुत प्रसिद्ध है लिखा गया। इस शाहनामा का दुनिया की विभिन्न भाषाओं में रूपान्तर भी हुआ इस लिए यह दास्तान जो उस ज़माने की तहज़ीब अपने दामन में समेटे हैं बहुत उपयोगी हैं।

Unit V

सलजूक़ी दौर फारसी अदब के प्रसिद्ध व आवश्यक दौर में से एक है इस दौर में फारसी अदब में बहुत सी किताबें लिखी गईं जो आज भी हिन्दुस्तान के विश्वविद्यालयों में पढ़ाई जाती हैं इस लिए यह दौर भी छात्रों के लिए बहुत उपयोगी व आवश्यक है।

M.A. Persian Ist Sem

III Paper Indopersian Literature

Unit I

शैर–शायरी का रिवाज हर ज़माने में रहा है और आज भी शैर–शायरी को अच्छी दृष्टि से देखा जाता है इसलिए प्राचीन फारसी अदब के क़सीदे पढ़ाकर छात्रों को बड़ों का अहतेराम करना, इज़्जत करना और अच्छे इंसान बनाना होता है।

Unit II

शैर–शायरी में सबसे आवश्यक चीज़ ग़ज़ल है जिसको हिन्दुस्तान ही नही बल्कि हर जगह इस को सराहा जाता है इस लिए ग़ज़ल को कोरस के ज़रीए पढ़ाकर छात्रों में शौक व ग़ज़ल की बारीकियों का पता चलता है।

Unit III

चूंकि यह प्रश्न पत्र मुग़ल दौर से संबंध रखता है इस लिए मुग़ल दौर में जो फारसी अदब पर बहुत अधिक काम हुआ है इस लिए इस ज़माने के शायरों और उर की ख़िदमात से छात्रों को बहुत लाभ होता है और ज्ञान में वृद्धि होती है।

Unit IV

हिन्द–ईरान का कल्चर, तहज़ीब व तमद्दुन गन्गा–जमुनी तहज़ीब जैसी है इससे छात्रों में उस ज़माने के और उस ज़माने के कल्चर को जानने का अवसर प्राप्त होता है।

M.A. Persian Ist Sem

IV Paper Modern Persian Literature

Unit I

इस इकाई में जदीद फारसी अदब की नशरी ख़िदमात और उस का तर्जमा कराया जाता है ताकि छात्रों के अन्दर फारसी से हिन्दी, ऊर्दू व अंग्रजी में Translation करने का तरीका मालूम हो और फारसी भाषा सीखें।

Unit II

इस इकाई में फारसी अदब के शायरों की नज़्मों का तर्जुमा कराना, पढ़ाना सिखाया जाता है जिस से छात्रों में नज़्म से तर्जुमा करने की महारत हासिल हो जाये।

Unit III

चूंकि हिन्द–ईरान का कल्चर आपस में बहुत मिलता–जुलता है और हिन्दुस्तान में कई वर्षों तक फारसी अदब का चलन था और आज हिन्द–ईरान संबंध की बिना पर जदीद फारसी अदब की बहुत जरूरत है।

Unit IV

इस इकाई के माध्यम से जदीद फारसी के लेखकों के जीवन, रहन–सहन उनके तौर–तरीकों से छात्रों में कुछ करने की ख़्वाईश में वृद्धि होती है जो देश के लिए बहुत उपयोगी है।

Unit V

हर देश में शायरों की बहुत अहमियत होती है जदीद फारसी में जो बड़े–बड़े शायर हैं उनके बारे में जानकारी के माध्यम से छात्रों के ज्ञान में वृद्धि होती है और यह भी ज़ज़्बा पैदा होता है कि नज़्मों को किस प्रकार से कह कर समाज में पैश किया जाता है।

M.A. Persian IIIrd Sem

I Paper Persian Linguistics and Philology

Unit I

ज़बान (Language) और उसकी बुनियादी उसूल से छात्रों को लाभ होता है कि वह ज़बान को अच्छी तरह से सम्झें और अपने मक़ासिद को दूसरों तक पहुंचायें।

Unit II

इस इकाई के द्वारा यह लाभ होता है कि बात–चीत करने का अंदाज़ व आवाज़ कैसी हो, कहां कैसे बात–चीत किया जाये आदि।

Unit III

आवाज़ कहां से निकलती है इस की जानकारी इस इकाई के द्वारा होती है।

Unit IV

हर ज़बान व अदब की ग्रामर (व्याकरण) होती हैं हिन्दी व फारसी ज़बान की व्याकरण व नियमों को इस इकाई के द्वारा जानकारी प्राप्त होती है जिससे फारसी ज़बान व अदब का उपयोग सही प्रकार से हो।

Unit V

इस इकाई के द्वारा फारसी ज़बान के जुम्ले (वाक्य) कैसे बनाएं और कैसे प्रयोग करें इस बात को ज्ञान होता है।

M.A. Persian IIIrd Sem

II Paper History of Modern Iran

Unit I

चूंकि फारसी ज़बान ईरान की मातृ भाषा एवं सरकारी भाषा है इस लिए वर्तमान नई फारसी भाषा के बारे में जानकारी छात्रों के लिए अत्यंत आवश्यक व उपयोगी है।

Unit II

इस इकाई में इस बात का पता चलता है कि ईरान में किस–किस की हुकूमत (शासन) थी इसी प्रकार रज़ा शाह जो जदीद ईरान का बादशाह था उसके ज़माने में फारसी भाषा व मुल्क (देश) के हालात कैसे थे इस का ज्ञान होता है।

Unit III

रज़ा शाह से पहले एक ज़माना अहद मशरूतह के नाम से गुज़रा है छात्रों को उसकी जानकारी इस लिए बहुत आवश्यक है क्यूकिं इस ज़माने में हुकूमत (शासन) के विरूद्ध विरोध मुख़ालिफत में क्या–क्या शर्तें लागू हुईं थीं और फारसी अदब व शायरों ने किस तरह से अपने कलाम को प्रस्तुत किया।

Unit IV

सन 1979 ई. का ईरानी क्रांति के सयासी पस–मंज़र का ज्ञान होना इस लिए आवश्यक है क्यूंकि इस का संबंध ज़माने–करीब से है।

Unit V

इंकिलाब क्रांति के बाद ईरान में क्या–क्या परिवर्तन आये नीज़ जमहूरियत प्रजातन्त्र के क़याम के बाद उस का क्या असर हुआ छात्रों को इसका भी जानना आवश्यक है।

M.A. Persian IIIrd Sem

III Paper Special Study of Iqbal

Unit I

डॉ इक़बाल का शुमार हिन्दुस्तान के बड़े और इंक़लबी शायरों में होता है इस लिए इस इकाई के द्वारा छात्रों को उनके कलाम से रूशनास कराया जाता है।

Unit II

डॉ इक़बाल की मशहूर (प्रसिद्ध) फारसी तसनीफ ''मसनवी इसरार–ख़ुदी'' है इस के द्वारा छात्रों को ख़ुदी के राज़ को बताया व पढ़हाया जाता है।

Unit III

डॉ इक़बाल की ज़िन्दगी और उनके इल्मी कारनामें के द्वारा छात्रों को पढ़हाया जाता है ताकि छात्रों के अंदर जबल–वतनी व इल्म हासिल करने का जज़्बा पैदा हो।

Unit IV

अल्लामा इक़बाल के मौजूआत में से एक मौजू ''फलसफा–ए–हयात'' है इसको इस इकाई के द्वारा छात्रों को सिखाया व बताया जाता है।

Unit V

अल्लामा इक़बाल के फारसी अदब की बहुत ज़्यादा ख़िदमत की है इसलिए छात्रों को उनकी ख़िदमात को जानना आवश्यक है ताकि छात्रों में ख़िदमतक रने का जज़्बा पैदा हो।

M.A. Persian IIIrd Sem

IV Paper Essay and Translation

इस प्रश्न पत्र में इकाई नहीं है यह इसलिए है ताकि छात्रों को फारसी अदब में इतनी महारत व अबूर हासिल हो जाए कि वह फारसी भाषा में बोल–चाल व मज़मून (निबंध) लिख सकें।

M.A. Persian IInd Sem

I Paper : Classical Literature

Unit I

इस इकाई में चहार मक़ाल्लह कौसर की किताब है जिसमें इल्म दबीरी, तिब्ब (चिकत्सा), इल्म नजूमी व शेर–शायरी के बारे में पढ़हाया जाता है जिस से छात्रों को पुराने ज़माने के बारे में और शेर–शायरी के बारे में और तिब्ब (चिकत्सा) के बारे में ज्ञान प्राप्त होते हैं जो छात्रों के लिए बहुत कारआमद हैं।

Unit II

इस इकाई में क़ाबूस नामा जो नसीहत नामा है समाज व मुल्क (देश) में कैसे रहा जाये, बड़ों की इज़्ज़त व छोटों से प्यार कैसे किया जाए। यह इकाई भी बहुत मुफीद है।

Unit III

निज़ामी गन्जवीई की मशहूर (खुसरो शीरीन व सिफत खुसरो) के नाम से है इस के द्वारा छात्रों को उनके किरदार (व्यक्तित्व) व अख़लाक़ और उस ज़माने के रहन–सहन के बारे में मालूमात होती है।

Unit IV

इस इकाई के द्वारा मुसिन्नेफीन व शायरों के बारे में जानकारी प्राप्त होती है जिन्होंने फारसी साहित्य में अपनी–अपनी ख़िदमात अन्जाम दी हैं।

M.A. Persian IInd Sem

II Paper : History of Persian Literature

Unit I

यह प्रश्न पत्र चूंकि तारीख़ (इतिहास) को है इस में अलग–अलग दौर के फारसी अदब का ज़िक्र है जिस से छात्रों में दौरे–सलतनत की ख़ूबियां और उस दौर की फारसी अदब की ख़िदमात को ज्ञान होता है।

Unit II

मुग़ल दौर में चूंकि संस्कृत से फारसी और फारसी से संस्कृत में बहुत सी किताबों का तर्जमा हो चुका है इस लिए यह दौर छात्रों के लिए बहुत उपयोगी है क्योंकि इससे हिन्द–ईरान साहित्य का भी पता चलता है।

Unit III

इस इकाई में ईरान का सूफी दौर बहुत प्रसिद्ध है फारसी अदब पर बहुत सी किताबें लिखी गई हैं इस लिए छात्रों के लिए जरूरी है।

Unit IV

क़ाचारी दौर भी फारसी अदब के लिए बहुत महत्वपूर्ण रहा है इस लिए इस की जानकारी भी बहुत आवश्यक है।

Unit V

दौरे–जदीद (आधुनिक युग) चूंकि इस दौर में भी बहुत से मुसन्नेफीन और शायर पैदा हुए हैं और वर्तमान फारसी अदब की जानकारी बहुत महत्वपूर्ण है इस लिए इस इकाई से भी छात्रों को हिन्द व ईरान के रहन–सहन, कल्चर, तहज़ीब व तम्मदुन व संबंधों का पता चलता है।

M.A. Persian IInd Sem

III Paper : Indo-Persian Literature

Unit I

इन्डो–परशियन साहित्य से छात्रों में हिन्दुस्तानी फारसी अदब की ख़िदमात को पता चलता है कि हिन्दुस्तान में कैसे कैसे मुसन्निफ़ व शायर इस मैदान में गुज़रे हैं।

Unit II

उरफी जो मुग़ल दौर के बहुत प्रसिद्ध क़सीदे के शायर हैं छात्रों को उरफी के कलाम की ख़ुसूसियात और अन्दाज़े बयान का ज्ञान होता है।

Unit III

इस इकाई में ग़ालिब के कलाम की खुसूसियात को तज़किरा है ग़ालिब चूंकि हिन्दुस्तान के एक बड़े और प्रसिद्ध शायर थे इस लिए उनके बारे में भी जानकारी बहुत आवश्यक है।

Unit IV

ग़ालिब की ग़ज़लों की अहमीयत और उनके दौर की फारसी अदब और तर्ज–तहरीर छात्रों के लिए फायदेमन्द है।

Unit V

इस इकाई में नात खाँ अली के वाक़्ये जिस में उन्होंने गोलकुण्डा को तज़किरा किया है उसकी तारीख़, समाजी व अदबी अहमीयत का ज्ञान छात्रों के महत्वपूर्ण व आवश्यक है।

M.A. Persian IInd Sem

IV Paper : Modern Persian Literature

Unit I

नवीन फारसी के द्वारा मौजूदा फारसी अदब व कल्चर को पता चलता है।

Unit II

नवीन फारसी में बड़े बड़े अफसाने निगार गुज़रे हैं जिन की खिदमात और फारसी अदब की अहमीयत व तम्मदुन को पता चलता है।

Unit III

जदीद फारसी में बड़े बड़े शायरों का नाम मौजूद हैं इस इकाई के द्वारा उन के शायरों व शायरी की खुसूसियात का पता चलता है।

Unit IV

इकाई के द्वारा अफ़साना निग़ारों व शायरों के रहन–सहन उन के ज़माने के हालात और उनकी ख़िदमात का पता चलता है।

Unit V

जदीद फारसी और क्लिासिकल साहित्य में क्या अंतर है इस यूनिट के द्वारा छात्र जदीद क्लासिकल साहित्य का अंतर और उनकी अहमीयत का पता चलता है।

M.A. Persian IV Sem

I Paper : Linguistics and Philology

Unit I

इस इकाई के द्वारा छात्रों को फायदा होता है कि फारसी भाषा का खानोवाद (परिवार) क्या है।

Unit II

इस इकाई के द्वारा छात्रों को फारसी ज़बान के तारीखी पस मंजर का ज्ञान होता है।

Unit III

चूंकि ईरान में फारसी ज़बान से पहले बहुत सी भाषाओं का चलन था जैसे ओसतानी ज़बान, पहलवी ज़बान, फारसी ज़बान आदि। इस इकाई के द्वारा इन तमाम चीज़ों का पता चलता है।

Unit IV

इस इकाई में ईरान की वर्तमान भाषा पर चर्चा होती है जिस से छात्रों के ज्ञान में वृद्धि होती है।

Unit V

ईरानी भाषा की तरज़े–तहरीर (लिपी) रसमुल ख़त जो अलग–अलग दौर में अलग–अलग भी इस इकाई से लिपी का पता चलता है।

M.A. Persian IV Sem

II Paper : History of Modern Iran

Unit I

ईरान की क्रांति के ईरान के हालात के बारे में छात्रों को बताया जाता है जिस से वहां के सियासी व समाजी व सक़ाफती हालात का पता चलता है।

Unit II

चूंकि क्रांति से पहले ईरान की औरतों के हालात अच्छे नहीं थे तालीम की तरफ औरतों का रूझान नहीं था। क्रांति के बाद औरतों में तालीम व अन्य चीज़ों को लेकर जर्बदस्त बेदारी आई। इस इकाई के द्वारा छात्र–छात्राओं के अन्दर तालीम की अहमीयत का पता चलता है।

Unit III

ईरान में तेल के भण्डार हैं हुकूमत की पालसी उस के बारे में हैं उसका पता चलता है।

Unit IV

1979 ई. के बाद ईरान में क्या–क्या तकनीकी आई और उस के फायदे का ज्ञान इस इकाई के द्वारा मिलता है।

Unit V

क्रांति के बाद ईरान के आम समाज में क्या क्या बदलाव आये हैं इस इकाई में छात्रों के ज्ञान में वृद्धि होती है।

M.A. Persian IV Sem

III Paper : Special Study of Iqbal

Unit I

इस इकाई में डॉ इकबाल की बहुत मशहूर फारसी मशनवीए इसरारे खुदी को छात्रों को पढ़ाया जाता है जिसमें इकबाल के फलसफाना कलाम का ज़िक्र होता है इस से छात्रों के ज्ञान व फलसफे में वृद्धि होती है।

Unit II

इस इकाई में इसरारे खुदी के विभिन्न विषयों को पढ़ाया जाता है जिस से छात्रों को उन तमाम विषयों के बारे में पता चलता है।

Unit III

चूकिं फारसी मशनवी इसरारे खुदी के लेखक/शायर अल्लामा डॉ इकबाल हैं इस लिए उनके हालात व खिदमात का जिक्र होता है उसके द्वारा छात्रों को इकबाल के बारे में पता चलता है।

Unit IV

डॉ इकबाल अपनी जिन्दगी में भोपाल आए थे उनके नाम से पुराने भोपाल में इकबाल मैदान आज भी उनकी याद दिलाता है इस इकाई के द्वारा छात्रों को पता चलता है कि इकबाल भोपाल कब आए कहां ठहरे आदि।

Unit V

इकबाल नए ज़माने के मुफक्किर आज़म हैं और शायरे इंकलाबात हैं इस लिए इस इकाई के द्वारा छात्रों के ज्ञान में और भी वृद्धि हो जाती है।

फारसी भाषा की आवश्यकता और उपयोगिता

परशियन विभाग, बरकतउल्ला विश्वविद्यालय, भोपाल

दुनिया की हर जुबान (Language) इंसानी ख़्यालात व मकासिद को ज़ाहिर करने का ज़रीया होती है। हर मुल्क की अपनी अलग–अलग जुबान होती है जैसे यूरोप के विभिन्न देशों में अंग्रेजी, अरब व अफरिक़ा के विभिन्न देशों में अरबी, हिन्दुस्तान में हिन्दी, ऊर्दू इसी प्रकार से ईरान, अफग़ानिस्तान आदि में फारसी भाषा बोली और लिखी जाती है इसको परशियन भी कहते हैं।

मज़हब व अदब में फारसी भाषा की ज़रूरत

हिन्दुस्तान की पुरानी भाषा संस्कृत है जो फारसी से बहुत करीब है बहुत से स्कॉलरों ने लिखा है कि फारसी और संस्कृत दोनों आपस में बहिनें हैं। जबकि हिन्दुस्तान में कई सौ साल तक मुग़लों ने शासन किया है। उस दौर में सरकारी व अदबी भाषा फारसी थी तो उन्होंने हिन्दुस्तान व अदब की बहुत सी किताबों का संस्कृत से फारसी भाषा में तर्जुमा (Translation) किया जो आज भी बड़े–बड़े पुस्तकालयों में मौजूद हैं जैसे रामायण, महाभारत, अर्थववैद व जौग व शष्ठ, महाविष्णो पराण, उपानिशैद, कथा सरत सागर, सिन्घासन बत्तीसी व कलीलह दिम्ना आदि।

रजिस्ट्ररार कार्यालय में फारसी भाषा की ज़रूरत

मुग़ल शासन में जब हिन्दुस्तान की भाषा फारसी थी उस समय जिन्दगी के विभिन्न क्षेत्रों में जैसे ईतिहास, चिकित्सा, न्यायालय, कृषि और स्कूल आदि में पढ़ने व पढ़ाने का काम फारसी में किया जाता था। न्यायालय के शब्द जो आज उपयोग किये जाते हैं वह इस प्रकार हैं नक़्ल, अरज़ी गुज़ार, दाख़िल–ख़ारिज, दफतर, क़िता, अराज़ी, मुन्दरजह ज़ैयल, मज़कूर, बतौर सनद, बकार आयद, गवाह शुद, होश व हवास, चश्मदीद, अज़तरफ ख़ुद, माबैन, फरीक़ैन आदि।

शिक्षा एवं चिकित्सा में फारसी भाषा की ज़रूरत

इतिहास व न्यायालस तंत्र के साथ–साथ चिकित्सा, यूनानी, आयुर्वेद व चिकित्सा साइंस में भी फारसी भाषा का बहुत ज़्यादा उपयोग है। भारत सरकार ने यूनानी और आयुर्वेद दोनों भाषाओं की उपयोगिता को प्रयोग करते हुए देश में यूनानी व आयुर्वेदिक चिकित्सालय खोल रखी हैं जहां जो डॉक्टर, हकीम, वैद्य काम करते हैं उनको फारसी भाषा का ज्ञान होता है।

स्कूल, कॉलेज, विश्वविद्यालय में फारसी भाषा की ज़रूरत

देश के विभिन्न विश्वविद्यालयों और कॉलेजों में फारसी भाषा बतौर पाठ्यक्रम संचालित किये जाते हैं जहां से विद्यार्थी बी.ए., एम.ए., एम.फिल, पीएच.डी करके हिन्दुस्तान के विभिन्न विभागों में कार्यरत हैं।

सेना में फारसी भाषा की ज़रूरत

बरकतउल्ला विश्वविद्यालय में भी फारसी विभाग है जहां सेना के जवान भी फारसी से एम.ए. करने आते हैं क्यूंकि सेना में भी फारसी भाषा के जानकार की आवश्यकता है।

मुल्की पैमाने पर फारसी भाषा की ज़रूरत

कुछ महिने पहले हिन्दुस्तान के प्रधानमंत्री श्री नरेन्द्र मोदी जी अपने ईरान के प्रवास के दौरान जहां ईरानी हुकूमत से बन्दरगाह चाबहार से सम्बधिंत कुछ अनुबंध हुए थे लिहाज़ा इस काम की उन्नति के लिए वहां फारसी जानकार लोगों की आवश्यकता पड़ी।

हिन्दुस्तान के हर शहर, गांव में जितनी भी पुरानी रजिस्ट्रीयां, जमीन, मकान, दुकान आदि की मितली हैं वह यातो फारसी में हैं और अगर दूसरी भाषा में हैं तो उनके शब्द फारसी भाषा के हैं लिहाज़ा इन दस्तावेज़ों को पढ़ने और समझनें के लिए फारसी भाषा की ज़रूरत है।

सिफारतख़ाने में फारसी भाषा की ज़रूरत

नई दिल्ली में हर देश के सिफारतख़ाने हैं यहां तक कि ईरान का भी सिफारतख़ाना है। हिन्दुस्तान और ईरान के बीच बात–चीत और मुहायदे के अनुवाद के लिये फारसी जानकार व्यक्तियों की बहुत आवश्यकता होती है।

इसके अतिरिक्त फारसी की आवश्यकता बहुत है इतिहास, संस्कृति, धार्मिक ज्ञान, आदि के लिए हमें फारसी किताबों से बहुत कुछ सीखने को मिलता है।

DEPARTMENT OF PHARMACY

PROGRAMME- PHARMACY

Programme Outcome

PO1-Pharmacy, the science and art concerned with the preparation and standardization of drugs.

PO2-Its scope includes the cultivation of plants that are used as drugs, the synthesis of chemical compounds of medicinal value, and the analysis of medicinal agents.

COURSE- B.Pharm

COURSE OUTCOME

CO1-Bachelor of Pharmacy or B.Pharm is a 4-year undergraduate program which is compulsory for anyone who wants to practice as a pharmacist.

CO2-B. Pharmacy is the study of preparing and conferring drugs and medicines for a number of illnesses and deficiencies.

COURSE SPECIFIC OUTCOME

SEMESTER-I

CSO1-

BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I

This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

STUDENT OUTCOME

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system

CSO2-

BP102T. PHARMACEUTICAL ANALYSIS

This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs.

STUDENT OUTCOME

Upon completion of the course student shall be able to

- understand the principles of volumetric and electro chemical analysis
- carryout various volumetric and electrochemical titrations
- develop analytical skills.

CSO-3

BP103T. PHARMACEUTICS- I

This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

STUDENT OUTCOME

Upon completion of this course the student should be able to:

- Know the history of profession of pharmacy
- Understand the basics of different dosage forms, pharmaceutical incompatibilities and
- pharmaceutical calculations
- Understand the professional way of handling the prescription
- Preparation of various conventional dosage forms

CSO-4
BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY
This subject deals with the monographs of inorganic drugs and pharmaceuticals.

STUDENT OUTCOME

Upon completion of course student shall be able to

- Know the sources of impurities and methods to determine the impurities in inorganic
- Drugs and pharmaceuticals
- Understand the medicinal and pharmaceutical importance of inorganic compounds

CSO-5
BP105T.COMMUNICATION SKILLS
This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

STUDENT OUTCOME

Upon completion of the course the student shall be able to
1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
2. Communicate effectively (Verbal and Non Verbal)
3. Effectivelymanage the team as a team player
4. Develop interview skills
5. Develop Leadership qualities and essentials.

CSO-6
BP 106RMT.REMEDIAL MATHEMATICS
This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.

STUDENT OUTCOME

Upon completion of the course the student shall be able to:-
1. Know the theory and their application in Pharmacy
2. Solve the different types of problems by applying theory
3. Appreciate the important application of mathematics in Pharmacy

Programme Outcome M.Pharm , Branch -Pharmaceutics

PO1Students explore and learn various advanced analytical instrumental techniques for identification, characterization and quantification of drugs like NMR, Mass spectrometer, IR, HPLC, GC etc. They also learn skills of design novel drug delivery systems and various aspects and concepts used at pharmaceutical industries addition to this they also understand concept of generic drug and their development, various regulatory filings indifferent countries, different phases of clinical trials and submitting regulatory documents : filing process of IND, NDA and ANDA.

PO2- This course is designed to impart knowledge on the area of advances in novel drug delivery systems their formulation and different evaluation parameters and to learn skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving apart from it they also learn Applications of computer in pharmaceutical research and development. This course also impart knowledge and skills necessary for the fundamental need for cosmetic and cosmeceutical products.

PO3 - This course is designed to impart knowledge on the area of Research Methodology & Biostatistics it also helps to understand different guideline used in the pharmaceutical research and different statistics tools and techniques for the analysis of the pool of data generated in the research .

PO4- This semester is designed to impart empirical knowledge and skills which students have learnt during the duration of postgraduate programme for the development of new formulation , or to advance or update the conventional formulation ionorder to meet the present requirement of the patients and pharmaceutical market .

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Programme Specific Outcome-

PSO1 - After completion of course student is able to know, Chemicals and Excipients,analysis of various drugs in single and combination dosage forms, Theoretical and practical skills of different instruments.

PSO2- Upon completion of the course, student will be able to understand various approaches for development of novel drug delivery Systems, different criteria for selection of drugs and polymers for the development of delivering system and skills for the formulation and evaluation of Novel drug delivery systems.

PSO3-in this course student shall be able to understand elements of preformulation studies,Active Pharmaceutical Ingredients and Generic drug Product Development, Industrial Management and GMP Considerations. ,Optimization Techniques & Pilot Plant Scale Up Techniques along with Stability Testing, sterilization process & packaging of dosage forms.

PSO4- after the completion of this course the students will be able to understand different Concepts of innovator and generic drugs, drug development Process, Regulatory guidance's and guidelines for filing and approval Process, Preparation of Dossiers and their submission to regulatory agencies in different countries ,Post approval regulatory requirements for actives and drug products ,Submission of global documents in CTD/ e CTD formats ,Clinical trials requirements for approvals for conducting clinical trials and importance of Pharmacovigilence and process of monitoring in clinical trials.

PSO5-At the end of this course students are able to use various approaches for development of novel drug delivery systems. ,different criteria for selection of drugs and polymers for the development of NTDS And different methods of the formulation and evaluation of novel drug delivery systems.

PSO6-Upon completion of this course students will be able to understand,basic concepts in biopharmaceutics and pharmacokinetics. The use raw data and derive the pharmacokinetic

models andparameters the best describe the process of drug absorption, distribution, metabolism and elimination. They are able to understand The critical evaluation of biopharmaceutic studies involving drug product equivalenc in addition to it different skills of The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters. Along with The potential clinical pharmacokinetic problems and application ofbasics of pharmacokinetic.

PSO7- after this course students will be able to understand, History of Computers in Pharmaceutical Research and Development different Computational Modeling of Drug Disposition, use of Computers in Preclinical Development different Optimization Techniques in Pharmaceutical Formulation , use of Computers in Market Analysis and in Clinical Development They are able to understand Artificial Intelligence (AI) and Robotics Computational fluid dynamics

PSO8-, the studentsare able to understand Different key ingredients used in cosmetics and cosmeceuticals. Different Current technologies in the market along with it Various key ingredients and basic science to develop cosmetics and Cosmeceuticals they will be able to impart Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.

PSO9 - at the end of this course students are able to use different skills of Research Methodology & Biostatistics they also able to understand different guidelines used in the pharmaceutical research and different statistics techniques and tools for the analysis of the pool of data generated in the research significantly and potentially .

PSO10- at the end of this semester students are able to use knowledge and skills empirically for the development and characterization of new formulationor to advance or upgrade the conventional formulation in order to meet the present requirement of the patients and pharmaceutical market and pharmaceutical industries .

Course outcome - After completion of course student is able to know, chemicals and Excipients their interactions ,analysis of various drugs in single and combination dosage forms Theoretical and practical skills of the dealing with different instruments used in the analysis and manufacturing of the pharmaceutical dosage forms . They are able to use various approaches for development of novel drug delivery systems and criteria for selection of drugs and polymers for the development of delivering system and The formulation and evaluation of Novel drug delivery systems. They can understand Industrial Management and GMP Considerations, Optimization Techniques , Pilot Plant Scale Up Techniques,Stability Testing, sterilization process & packaging of dosage forms, Different Regulatory guidance's and guidelines for filing and approval ,Process, Post approval regulatory requirements for actives , drug products, Clinical trials requirements for approvals for conducting clinical trials and Pharmacovigilence along with process of monitoring in clinical trials.

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(MPH 101T)

CO1 -.In this course students learn about different analytical techniques like IR spectroscopy, Spectroflourimetry, Flame emission spectroscopy ,Atomic absorption spectroscopy, fluorescence spectrophotometer, NMR spectroscopy, Mass Spectroscopy,NMR along with Principle, Instrumentation, Application and Interferences.

CO2 They also learn about different Spectra and their Interpretation and their empirical and Rational applications.

CO3 Different Chromatograpic techniques their : Principle, apparatus, instrumentation, chromatographic parameters,

CO4 Electrophoresis and Immunological assays techniques with their practical applications

DRUG DELIVERY SYSTEMS
(MPH 102T)

CO1-Different aspects of Sustained and Controlled drug delivery system their manufacturing and different evaluation parameters used to evaluate them

CO2- Students also learn about different methods to develop and characterize different drug delivery systems like Gastro-Retentive Drug Delivery Systems, Occular Drug Delivery Systems, Transdermal Drug Delivery Systems, Protein and Peptide Delivery

CO3- they also learn about one of the most complex drug delivery system for delivery of Vaccine .

MODERN PHARMACEUTICS (MPH 103T)

CO1- Preformation Concepts its application in formulation and development of pharmaceutical formulation , Students also used skills of Optimization techniques in order to develop best formulation which can meet the requirement of patients .

CO2 Student can understand and utilize the concept of Validation, cGMP & Industrial Management for the development of pharmaceutical formulation flawlessly

CO3 They can understand the theory ,concept and principle of Compression and compaction .They also understand the significance of consolidation parameters in Pharmaceutics

REGULATORY AFFAIRS
(MPH 104T)

CO1- Course designed to impart advanced knowledge and skills required to learn the concept of generic drug and their development, various regulatory filings in different countries, different phases of clinical trials and submitting regulatorydocuments : filing process of IND, NDA and ANDA.

CO2- Students are able to understand chemistry, manufacturing controls and their regulatory

Importance,the documentation requirements for Different regulatory bodies

CO3. Post approval regulatory requirements for actives and drug products,Submission of global documents in CTD/ eCTD formats,Clinical trials requirements for approvals for conducting clinical trials and Pharmacovigilence.

MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY &
TARGETED DDS) (NTDS)
(MPH 201T)

CO1- Students are able to learb Targeted Drug delivery ,Different approaches of Target drug delivery and different methods of Drug Targeting .

CO2- They are able to learn skills of development of Different method of the development and characterization of the Micro Capsules / Micro Spheres

CO3- Different methods for the development of Pulmonary Drug Delivery Systems and Nucleic acid based therapeutic delivery system.

ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS
(MPH 202T)

CO1-Students can understand The basic concepts in biopharmaceutics and pharmacokinetics.
Use of raw data and derive the pharmacokinetic models and
parameters the best describe the process of drug absorption,
distribution, metabolism and elimination.
CO2 The also understand the critical evaluation of biopharmaceutic studies involving drug product equivalency and design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
CO3 The can also learn and understand potential clinical pharmacokinetic problems and application of
basics of pharmacokinetic.

COMPUTER AIDED DRUG DEVELOPMENT

(MPH 203T)
CO1- Students are able to understand History of Computers in Pharmaceutical Research and Development
CO2-Skills to learn Computational Modeling of Drug Disposition, Preclinical Development ,Optimization Techniques in Pharmaceutical Formulation. ,Clinical Development And Artificial Intelligence (AI) , Robotics, Computational fluid dynamics(CFD)

COSMETICS AND COSMECEUTICALS
(MPH 204T)
CO1 Students are able to understand role of Key ingredients used in cosmetics and cosmeceuticals.
Different Key building blocks for various formulations. Along with Current technologies in the market
CO2 –They are also able to conceptually understand Various key ingredients and basic science to develop cosmetics and
cosmeceuticals
CO3-they can acquire Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.
CO4- Utility of Herbal Cosmetics and its development and characterization and design of cosmeceutical products.

MRM301T
Semester III
CO1 – Students are able to understand Research Methodology its practical application to understand research problem and development of hypothesis and its valication
CO2 –They are also able to use different tools of Biostatistics empirically in their research and development projects
CO3- They can understand Medical Research Different guidelines of CPCSEA for laboratory animal facility and Declaration of Helsinki: History, introduction, basic principles for all medical research

DEPARTMENT OF PHYSICS

PROGRAMME OUTCOME (PO):

In the past decades, it has been widely observed that students have developed apathy towards science subject in comparison to engineering and medical disciplines. The professional courses are much prominent as compared to basic sciences. However, today's progress in the field of science and technology is only due to the systematic research in the area of basic sciences. It is undoubtedly accepted fact that without the growth of basic sciences, especially the Physics discipline, the technology cannot grow further. Therefore, it is mandatory to establish a department for the study of course in Physics at the university level, where the excellence in academics can be thought of and maintained. In order to cater more viability of basic sciences in universities, which are prime centers for mass education in the country, the M.Sc.(Physics)course is run in the Barkatullah University Teaching Department.

PROGRAMME SPECIFIC OUTCOME (PSO):

The academic programs of the department have been designed to cater the scientific and technological manpower requirements at the national and international arena.The study curriculums for these courses have been designed in tune with the changing scenarios. It also incorporates latest technological developments, societal relevance, global interface and self- sustaining learning. In order to impart teaching where the students would achieve depth of knowledge, we supplement the class room teaching of the regular syllabi with tutorials pertaining to each theory paper. These tutorials consist of exploration of brainstorming ideas and problems associated with specific topics of relevance. Similarly, an experimental skill for the maintenance of sophisticated equipment is developed through designing new experiments and devices as a part of laboratory courses. The concept of minor / major projects has been introduced for students to adventure into preliminary research field both in theory and experiment. In the project, the student has to explore new developments from books and journals collecting literature / data, carry out some innovative work and write a dissertation on its basis. As co-curricular activity regular seminars, invited talks, visits of eminent dignitaries etc are arranged. The students are also encouraged through proper counseling to undergo summer trainings in the globally reputed research laboratories and multinational industries. The department can take a genuine pride on its students who are placed all over the country in many scientific organizations like DRDO, NDA, BARC, CSIR laboratories; academic institutes like several universities/colleges and celebrated MNCs. The skilled manpower developed by the department is also scattered across many countries all over the world.

The Master of Science in Physics program is evenly distributed across four semesters. The first three semesters consist of four theory and two practical papers. In the fourth semester one theory paper is replaced by project work. Each paper shall be of 100 Marks out of which 40 marks are allotted to internal assessment and 60 marks for University examination. Minimum pass marks are 14 for the internal assessment and 21 for the University examination. In addition, seminar and assignment will be 100 marks each and passing marks are 35 in each.

COURSE SPECIFIC OUTCOME (CSO) Ist SEMESTER

The first semester course has been designed to impart knowledge in core Physics subjects. The conventional papers like Mathematical Physics, Quantum Mechanics, Classical Mechanics and Analog-Digital Electronics are necessary to build the foundation for advanced course. The students are expected to understand the fundamental concepts and develop ability to solve numerical problems. In addition, General Physics and Electronic practical are included to develop experimental hand. The course contents are elaborated as follows-

COURSE OUTCOME (COs) PT -101 MATHEMATICAL METHODS IN PHYSICS

The first semester course has been designed to impart knowledge in core Physics subjects. The students are expected to understand the fundamental concepts and develop ability to understand Mathematical Methods in Physics. They will be able to understand and solve problems in Complex Variables, Differential Equations; Integral Transforms, Computational Methods in Physics and Tensors.

PT -101 MATHEMATICAL METHODS IN PHYSICS (Marks: Max.-60, Min. – 21)

UNIT-I: Complex Variables

Cauchy Riemann conditions, Analytic function, Line Integrals, Cauchy Integral Formula, Derivatives of Analytical functions and Fundamental theorem of Algebra. Taylor's series, Laurent's series, Integration and Differentiation of Power series, Zeroes of Analytical Functions, Singular Points-residues, Cauchy's residue theorem, poles.

UNIT-II: Differential Equations

Solutions of Differential Equation in series, Legendre, Bessel, Hermite, Leaguers functions and their generating functions, Recurrence relations and Orthogonal Properties, Confluent Hyper-geometric functions, Laplace, Poisson and wave equations and their solutions with boundary conditions.

UNIT-III: Integral Transforms

Fourier Transform, Transforms of Derivatives, convolution Theorem, Parseval's Theorem, Laplace Transform of simple function and derivatives, Properties of Substitutions, determination of Inverse Transform, Laplace Transforms solution of differential equations.

UNIT-IV: Computational Methods in Physics

Linear systems of Equation, Matrices, Matrix Inversion, Eigen Value problems, Interpolation, Numerical Differentiation and Integration, Numerical Solution of Ordinary Differentiation equations, Runga-Kutta and Matrix Methods

UNIT-V: Tensors

Tensors- Notations and Conversions, Contravarient tensors, Rank of the Tensors, Properties of the Tensors e.g. Addition, Subtraction and Product , Contraction, Cartesian tensors and their transformation properties, Eigen values of second rank tensors, Quotient law, Higher Rank Tensors with examples from piezoelectricity, stiffness and compliance.

COURSE OUTCOME (COs) PT -102 QUANTUM MECHANICS

The first semester course has been designed to impart knowledge in core Physics subjects. The students are expected to understand the fundamental concepts and develop ability to understand Quantum Mechanics. They will be able to understand Basic Concepts, Operators and Matrix Theory, Approximation Methods, Stationary Perturbation Theory, Time Dependent Perturbation Theory.

PT- 102: QUANTUM MECHANICS (Marks: Max.-60, Min. – 21)

UNIT-I: Basic Concepts

Uncertainty and complementarily, Schrodinger's wave equation. One dimensional square well potential, Barrier Problem, Linear Harmonic Oscillator, Spherically symmetric potential in three dimension, Hydrogen atom, Principle of in-distinguish ability of identical particles. Pauli's exclusion principle.

UNIT-II: Operators and Matrix Theory

Hilbert space, Bra and Ket notations, Equation of motion, Schrodinger, Heisenberg and Interaction Pictures, Creation, annihilation and number operators, Matrix theory and harmonic oscillators.Angular momentum, Commutation relations, Eigen values and Eigen functions of J^2 and $L_{Z,}$ Puali's Spin Matrices, Stern Gerlack Experiment, addition of angular momenta, Clebsch-Gordan coefficients.

UNIT-III: Approximation Methods

The WKB approximation, Classical limit, approximate solutions, asymptotic nature of the solutions, Solutions near a turning point, linear turning point, Connection at the turning point, asymptotic connection formulas, Application to Eigen value problems.

UNIT-IV: Stationary Perturbation Theory

Stationary Perturbation theory, Non-degenerate case, First order perturbation, second order perturbation of an oscillator, Degenerate case, Removal of degeneracy in second order, Zeeman Effect without electron spin, First order Stark effect in Hydrogen.

UNIT-V: Time Dependent Perturbation Theory

Time dependent Perturbation theory, Application to the theory of Scattering, Transition probability, Fermi's golden rule, Adiabatic and Sudden Approximations, Ionization of hydrogen atom

COURSE OUTCOME (COs) PT -103 CLASSICAL MECHANICS

The first semester course has been designed to impart knowledge in core Physics subjects. The students are expected to understand the fundamental concepts and develop ability to understand Classical Mechanics. They will be able to understand and solve the problems in Lagrangian Mechanics, Conservation and Variational Principle, Scattering and Collision, Rigid Body Motion and Canonical Equation.

PT-103 CLASSICAL MECHANICS (Marks: Max.-60, Min. – 21)

UNIT-I: Lagrangian Mechanics

Mechanics of a single & system of particles, Rocket equation, generalized coordinates. Galileo's relativity principle.The Lagrangian for a free particle.The Lagrangian for a system of particles.The Lagrangian for a system of particle.

UNIT-II:Conservation and Variational Principle

Laws of conservation as derived from homogeneity and isotropy of space and homogeneity of mass and principle of mechanical,Similarity, virial theorem, variational Principle, Lagrangian and Hamiltonian formalism, constraint Holonomia and non-Holonomic, D'Alembert Principle

UNIT-III :Scattering and Collision

Reduced mass, Motion is a central field, Kepler's problem, Scattering in the central field, scattering cross section. Rutherford formula.Elastic and inelastic collision.Small oscillations and normal modes, forced oscillation. Normal coordinates. Frequency of molecular vibration.Damped oscillation.Parametric resonance.

UNIT-IV:Rigid Body Motion

Motion of a rigid body.Eulers angles. Intertia tensors.Angular momentum of a rigid body.Precision Euler's equations.Symmetric and asymmetric top.Non-inertial frames and pseudo-forces.

UNIT-V:Canonical Equation

Canonical Equation.Hamilton's equations.Canonical transformations.Poisson brackets and Canonical transformations.Hamilton Jacobi theory.Action angle variables, Maupertuis principles.Adiabatic invariants.

BOOKS RECOMMENDED

1. Classical Mechanics	H.Goldstein (Addison & Wesley).
2. Classical Mechanics	Landau &Lifshitz (Pergamon Press)
3. Introduction to Classical Mechanics	Takwale&Puranik (Tata McGraw Hill)
4. Classical Mechanics	Rana and Jog (Tata McGraw Hill)

COURSE OUTCOME (COs) PT -104 ANALOG AND DIGITAL ELECTRONICS

The first semester course has been designed to impart knowledge in core Physics subjects. The students are expected to understand the fundamental concepts and develop ability to understand Analog and Digital Electronics. They will be able to understand and solve the problems in Differential and Operational Amplifier, Practical Operational Amplifier, Op-amp Oscillator, Logic Gates and Flip flop and Counters.

PT-104 ANALOG AND DIGITAL ELECTRONICS (Marks: Max.-60, Min. – 21)

UNIT-I: Differential and Operational Amplifier

Differential amplifier- circuit configurations; dual input, balanced output differential amplifier; DC analysis; AC Analysis, inverting and non inverting inputs; CMRR; constant current bias level translator Block diagram of a typical Op-Amp analysis, Open loop configuration inverting and non inverting amplifiers, Op-amp with negative feedback.

UNIT-II: Practical Operational Amplifier

Practical op-amp input offset voltage; input bias current, total output offset voltage, CMRR frequency response. DC and AC amplifier summing, scaling and averaging amplifiers, instrumentation amplifiers, integrator and differentiator.

UNIT-III: Op-amp Oscillator

Oscillator principles; Oscillator types; frequency, stability; response; the phase shift oscillator; Wein bridge oscillator; LC tunable oscillators; multi-vibrators- monostable and astable; comparators; square wave and triangular wave generators,

UNIT-IV: Logic Gates

The transistor as a switch, OR, AND & NOT gates; NOR and NAND gates; Boolean Algebra; D'Morgan's theorem; Exclusive OR gate, Decoder/De-multiplexer, Data selector/ multiplexer; Encoder.

UNIT -V: Flip flop and Counters

Flip-flops; A 1-bit memory; RS flip-flops, JK Flip-flops; JK Master slave flip-flops; T flip-flops; D- flip-flops; Shift registers; Synchronous and asynchronous counters; cascade counters.

COURSE SPECIFIC OUTCOME (CSO) IInd SEMESTER

The course content of second semester are designed to illustrate few more core subjects like Electromagnetism, Condensed Matter Physics and Statistical Mechanics. In continuation with the first semester one paper contains topics of Advanced Quantum Mechanics. The practical courses are on General Physics and Electronics Instrumentation.

COURSE OUTCOME (COs) PT -201 ELECTROMAGNETISM

The course content of second semester are designed to illustrate few more core subjects like Electromagnetism, Condensed Matter Physics and Statistical Mechanics. The students are expected to understand the fundamental concepts and develop ability to understand

Electromagnetism. They will be able to understand and solve the problems in Polarization and Dielectric media, Boundary Problems, Magnetostatics, Electromagnetic Field and Relativistic Mechanics.

PT-201: ELECTROMAGNETISM(Marks: Max.-60, Min. – 21)

UNIT-I:Polarization and Dielectric media

Polarization, atomic and molecular polarizability, bound charges, field inside a dielectric, susceptibility, dielectric constant, electric displacement, Clausius-Mossotti relation, models of molecular polarizability, Electrostatic energy in dielectric media.

UNIT-II: Boundary Problems

Boundary value problem, Uniqueness of the solution of Laplace's equation, Boundary conditions for DE, Method of images, Images in dielectrics, Green's function for Poisson's equation.

UNIT-III: Magnetostatics

Macroscopic equation, boundary conditions on B & H, Methods of solving boundary value problems in magnetostatics, Uniformly magnetized sphere, Magnetized sphere in an external field, Permanent magnets, Spherical shell of permeable materials in a uniform field, Magnetic shielding.

UNIT-IV: Electromagnetic Field

Faraday's Law, Self and mutual inductance, Maxwell's equations scalar and vector potential, Lorentz and Coulomb Guages, Energy and Momentum of an Electromagnetic field, Poynting Theorem,Plane electromagnetic waves in a non-conducting medium, Linear and circular polarization, Stoke's parameters. Reflection and refraction of electromagnetic waves at a plane interface.

UNIT-V: Relativistic Mechanics

Relativistic Mechanics: Proper time velocity, energy, momentum, kinematics, dynamics, relativistic electrodynamics: magnetism, field transform, field tensor, relativistic potential.

COURSE OUTCOME (COs) PT -202 CONDENSED MATTER PHYSICS

The students are expected to understand the fundamental concepts and develop ability to understand Condensed Matter Physics. They will be able to understand and solve the problems in Crystallography, Mechanical Properties, Lattice Dynamics, Electronic and Thermal Properties and 3D lattice vibrations.

PT-202: CONDENSED MATTER PHYSICS (Marks: Max.-60, Min. – 21)

UNIT–I: Crystallography

Point and Space group, Crystal structures- Hexagonal closed packed, Diamond, cubic structure and Perovskite structures, Reciprocal lattice, Brillouin Zone, X- ray diffraction, Bragg's law, Lau's equation, Reciprocal lattice vector. Fourier analysis of the basis, Scattered wave amplitude, Structure and form factors.

UNIT–II: Mechanical Properties

Mechanics of deformed bodies for cubic crystals, stress strain tensors, Compliance and stiffness constants, elastic constants and energy density of cubic crystals, elastic waves in crystals and elastic isotropy.

UNIT–III: Lattice Dynamics

Normal modes of mono atomic and diatomic lattice vibrations, Dispersion relations, Phonon density of states, Quantum theories of specific heats, An-harmonic effect, Equation of state of solid s, Thermal expansion, Gruneisen relation.

UNIT–IV: Electronic and Thermal Properties

Sommerfeld free electron model, Density of states, Application of electronic specific heat, Wiedermann Franz Law, Boltzmann Transport equation, Relaxation time approximation and application ton electrical conductivity, Hall Effect.

UNIT–V: 3D lattice vibrations

Vibration of three dimension lattice, coupling parameter in variance relations, frequency dispersion curves and its experimental method of determination.Neutron scattering

COURSE OUTCOME (COs) PT -203 STATISTICAL MECHANICS

The students are expected to understand the fundamental concepts and develop ability to understand Statistical Mechanics. They will be able to understand Basic Concepts and solve the problems in M-B Distribution, B-E Statistics, Phase Transitions – I and Phase Transitions-II.

PT- 203: STATISTICAL MECHANICS (Marks: Max.-60, Min. – 21)

UNIT–I: Basic Concepts

Concept of statistical distribution, phase space, density of states, Lioville's theorem, micro-canonical, canonical and grand canonical ensembles, thermodynamic relations, partition function for micro canonical ensemble and applications to ideal gas.

UNIT-II:M-B Distribution Maxwell-Boltzman (M-B) distribution formula for velocity, equi-partition law of energy. Translational, Rotational and Vibrational partition functions, equation of state, entropy and specific heat of ideal gases.

UNIT–III:B-E Statistics Grand canonical partition function, Bose – Einstein (B-E) statistics, strong and weak degeneracy.Application of B-E statistics to specific heats of solids, Bose Einstein condensation and phase transition.Theory of Liquid Helium.Fermi Dirac (F-D) statistics, application to free electron theory of metal and thermionic emissions.

UNIT–IV:Phase Transitions - I

Fluctuations in ensembles, energy and density fluctuations, random one dimensional walk and Brownian motion, electrical noise (Nyquist theory), Phase transition of the second kind, Ising model on one dimension, structural phase change, critical exponent, scaling hypothesis, theory of critical phenomena, mean field theory.

UNIT–V:Phase Transitions-II

Landau theory of phase transition, critical indices, scale transformation and dimensional analysis, Correlation of space-time dependent fluctuations, fluctuations and transport phenomena, Brownian motion, Langewin theory, fluctuation dissipation theorem.The Fokker-Plank equation

COURSE OUTCOME (COs) PT -204 ADVANCED QUANTUM MECHANICS

The students are expected to understand the fundamental concepts and develop ability to understand Advanced Quantum Mechanics. They will be able to understand and solve the problems in Many Electron Problems, Scattering, Identical Particles, Radiation and Electromagnetic Potentials.

PT – 204 ADVANCED QUANTUM MECHANICS (Marks: Max.-60, Min. – 21)

UNIT–I: Many Electron Problems

The many electron atom,One electron approximation, Hartree method applied to ground state of Helium,The cohesive energy of metal, Single particle wave function, Hartree-Fock method, Coulomb correlation and Fermi Hole.

UNIT–II: Scattering

The general theory of scattering, General formula for approximation method and its application to derive scattering amplification and cross section. Validity of Born approximation, Rutherford scattering formula for Born approximation. Partial wave analysis, Radiative transitions in atoms, dipole transitions, Selection rules.

UNIT-III: Identical Particles

Identical particles; Symmetric and anti-symmetric wave functions; Collision of identical particles; Spin angular momentum; spin functions for a many electron system.

UNIT–IV: Radiation

Einstein coefficient, Atom field interaction, Spontaneous Emission Rates, the selection rules, quantum theory of radiation, quantization of Radiation field, Spontaneous and stimulated Radiations.

UNIT–V: Electromagnetic Potentials

Klein –Garden Equation, Dirac's relativistic equation: Free particle equation, matrices of alpha and beta. Free particle solutions negative energy states, charge and current densities. Electromagnetic potentials, Dirac's equation for a central field, The hydrogen atom.

COURSE SPECIFIC OUTCOME (CSO) IIIrd SEMESTER

In the third semester the students are expected to enhance the understanding of advanced level subject. The course contents of this semester include Nuclear Physics, Atomic and Molecular Physics, Advanced Condensed Matter Physics. The students have choice to opt for Digital System and Microprocessor or Semiconductor Devices paper. The practical session will include programming on microprocessor and computer as well.

COURSE OUTCOME (COs) PT -301 NUCLEAR PHYSICS

The students are expected to understand the fundamental concepts and develop ability to understand Nuclear Physics. They will be able to understand and solve the problems in Binding Energy, Nuclear Forces, Nuclear Reactions, Detectors, and Elementary Particles.

PT-301: NUCLEAR PHYSICS (Marks: Max.-60, Min. – 21)

UNIT–I: Binding Energy

Binding energy, Semi-empirical mass formula and Nuclear Stability, Gamow's theory of a-decay, Neutrino hypothesis, Fermi theory of beta-decay, gamma-decay, Internal Conversion, Interaction of charged particles with matter, Pair Production.

UNIT–II: Nuclear Forces

Ground and excited state of Deuteron, p-p, n-n, p-n scattering at low energies, charge independence and spin dependence of Nuclear Forces, Exchange Forces, Properties of Nuclear Forces, Liquid Drop, Shell and collective models of Nucleus.

UNIT–III: Nuclear Reactions

Different types of reactions and conservation laws, Energies of nuclear reactions, Iso-spin, Reaction-cross section, Scattering and reaction cross section, Compound Nucleus reaction, Fission, Reactors, Fusion processes, Characteristics of fusion.

UNIT–IV: Detectors

Betatron, Phase and Path stability, Synchro-cyclotron, synchrotron, Scintillation and Solid State Detectors, Cerenkov Detectors.

UNIT–V: Elementary Particles

Elementary particles, Conservation laws, Baryon and Lepto numbers, Iso-spin, hypercharge, Strangeness, Parity, Quark Model, Charm, Beauty and Truth, Quark Dynamics.

COURSE OUTCOME (COs)

PT -302 ATOMIC AND MOLECULAR PHYSICS

The students are expected to understand the fundamental concepts and develop ability to understand Atomic and Molecular Physics. They will be able to understand Basic Topics and solve the problems in Zeeman Effect, Types of Molecules, Diatomic Molecules and Raman Effect.

PT – 302 ATOMIC AND MOLECULAR PHYSICS (Marks: Max.-60, Min. – 21)

UNIT–I: Basic Topics

Quantum states of one electron atoms; Atomic Orbital; Hydrogen and Heliemspectrum; Spectra of alkali elements; Spin orbit interaction and fine structure in alkali spectra.

UNIT-II: Zeeman Effect

Normal and Anomalous Zeeman effect; Paschen-Beck effect; Stark effect; Electron spin Resonance, Nuclear Magnetic resonance, LS and JJ Coupling; Hyperfine structure (qualitative)

UNIT–III: Types of Molecules

Types of molecules; Diatomic linear symmetric top, asymmetric top and spherical top molecules; Rotational spectra of diatomic molecules as a rigid rotor; Energy levels and spectra of non-rigid rotor; intensity of rotational lines; Stark modulated microwave spectrometer (qualitative).

UNIT–IV: Diatomic Molecules

Vibrational energy of diatomic molecule; Diatomic molecule as a simple harmonic oscillator; Energy levels and spectrum; Morse potential energy curve; Molecules as vibrating rotator; Vibration spectrum of diatomic molecule.

UNIT–V: Raman Effect

Raman Effect-Quantum Theory, Molecular polarizability, pure rotational spectra of diatomic molecules, Vibration-rotation spectra, Experimental setup and simple applications.

COURSE OUTCOME (COs)

PT -303 ADVANCED CONDENSED MATTER PHYSICS

The students are expected to understand the fundamental concepts and develop ability to understand Advanced Condensed Matter Physics. They will be able to understand and solve the problems in Superconductivity, Magnetism, Dielectrics and Ferroelectrics, Semiconductors I and Semiconductors II.

PT–303: ADVANCED CONDENSED MATTER PHYSICS (Marks: Max.-60, Min. – 21)

UNIT-I: Superconductivity

Superconductivity characteristic features, Critical current, Persistent current and Meissner effect, Critical Magnetic fields, Magnetic Susceptibility, flux quantization, specific heat, Thermal conductivity, Isotope effect, Optical energy gap, Quasi particle tunneling and Josephson effects (d.c.&a.c.), Electron phonon interaction, cooper pairs, BCS theory, Type I and II superconductivity, Introduction to high temperature superconductivity.

UNIT–II: Magnetism

Langevin's Diamagnetic and paramagnetic equations, Quantum theory of Para Magnetism, Ferromagnetism, Curie point and the exchange integral, saturation magnetization and its temperature dependence, ferromagnetic domains and Bloch wall.

UNIT–III:Dielectrics and Ferroelectrics

Macroscopic electric field, local electric field, Dielectric constant and polarizability, classification of ferroelectrics, ferroelectric domains, Piezoelectricity.

UNIT–IV: Semiconductors I

Energy bands: Direct and indirect band gap semiconductors, Intrinsic carrier concentration, p-type, n-type semiconductors, Fermi level, Carrier transport at low field, electrical conductivity and Hall effect.

UNIT–V:Semiconductors II

Generation, recombination, carrier injection, Schokley-Read-Hall theory of Recombination, Thermionic emission, space charge effect, p-n junction.

COURSE OUTCOME (COs)

PT -304 DIGITAL SYSTEM AND MICROPROCESSOR

The students are expected to understand the fundamental concepts and develop ability to understand Digital System and Microprocessor. They will be able to understand and solve the problems in D/A, A/D Converter, Microprocessor, Microprocessor programming, Microprocessor Interfacing and Data Communication.

PT–304: DIGITAL SYSTEM AND MICROPROCESSOR (Marks: Max.-60, Min. – 21)

UNIT-I: D/A, A/D Converter

Signal processing elements, DAC weighted resistor network, R-2R ladder network, ADC-Simultaneous, Counter type, Successive Approximation, single and dual slope; ADC and DAC specifications.

UNIT-II: Microprocessor

Introduction to microprocessor systems, Architecture of 8085, Buses, Registers, Arithmetic logic unit, Trends in microprocessor developments.

UNIT-III:Microprocessor programming

Assembly and higher level languages, Micro and Macro instructions, Addressing schemes, Instruction set for 8085, Assembly language programming using data transfer, Arithmetic and logic instructions, Stack and subroutine, Assemblers, Interpreters and Compilers, debugging.

UNIT-IV:Microprocessor Interfacing

Interfacing, Dip switches, Seven segment display to 8085, General purpose programmable peripheral IC. 8255, Interfacing ADC and ACS case studies, Wave form generation; Temperature controller, 8085 Interrupts, Simple examples using SIM and RIM instructions.

UNIT-V:Data Communication

Basic concepts transmission format, Error Checks, Data Communication over telephone line), Standards in serial I/O. Software controlled serial I/O. 8085 SID and SOD lines.

COURSE OUTCOME (COs)

PT -305 SEMICONDUCTOR DEVICES

The students are expected to understand the fundamental concepts and develop ability to understand Semiconductor Devices. They will be able to understand basic concepts of semiconductors and solve the problems in Diode and Transistors, Unipolar Devices, Rectifiers and Converters and Machines and Motors.

PT–305: SEMICONDUCTOR DEVICES (Marks: Max.-60, Min. – 21)

Unit I: Semiconductors

Semiconductors: Valence bond model of semiconductor- intrinsic and extrinsic semiconductors, the energy band model; p-n junction, depletion region and capacitance; the diode equation, I-V characteristics, temperature dependence, electrical breakdown in p-n junctions.

Unit II: Diode and Transistors

Zener and avalanche breakdowns; IMPATT, TRAPATT, PIN diode, Bi-polar Junction Transistors: Transistor action, the Ebres-Moll equations, CB, CE, CC configurations and characteristics, high frequency performance of transistor, alpha and beta cut-off frequencies, microwave transistor, switching transistor

Unit III: Unipolar Devices

Unipolar Devices: Metal-semiconductor contacts, the Schottky effect, JFET and MESFET, device characteristics, MOSFET, basic characteristics, charge-coupled devices (CCD), Optoelectronic Devices: Photovoltaic effect, the p-n junction solar cell, I-V characteristics, photo detectors: photoconductor, photodiode, avalanche photodiode; LEDs: radiative and non-radiative transitions; semiconductor LASERS, population inversion.

Unit IV: Rectifiers and Converters

Rectifying Circuit: Single Phase half wave, Bi-phase half wave, Three phase half wave, single phase Bridge, Three Phase Bridge rectifiers, Converters: Naturally commutated converters, Converter operation, Voltage source and Current source inverter, Inverter performance, Cyclo converter.

Unit V: Machines and Motors

Application: Variable speed DC drives, AC Machine, Synchronous Machine, Brushless Machine, Stepper Motors, Switched reluctance motor, Linear Motors, Switched mode power supplies, Series-resonant power supplies, Uninterrupted Power Supplies (UPS), Welding power supplies.

COURSE SPECIFIC OUTCOME (CSO) IVth SEMESTER

In the fourth semester, students study two compulsory papers viz., Electronic Devices and Instrumentation; Materials Science. They can choose either Fiber Optics and Laser Physics or Microwave and Optics Communication paper. There will be extensive project work on the topic of contemporary Physics or societal interest. Two practical, seminar and assignment will be the other components of study.

COURSE OUTCOME (COs) PT -401 ELECTRONICS DEVICES AND INSTRUMENTATION

The students are expected to understand the fundamental concepts and develop ability to understand Electronics Devices and Instrumentation. They will be able to understand basic concepts of semiconductors Devices and solve the problems in Photonic Devices, Measurement Properties, Instrumentation Design and Vacuum Techniques.

PT- 401: ELECTRONICS DEVICES AND INSTRUMENTATION (Marks: Max.-60, Min. – 21)

Unit-I:Semiconductor Devices

Semiconductor Diodes (p-n junction, Zener, Tunnel, Gunn), Transistors, Field Effect Devices, Device Structure, Device Characteristics, Frequency Dependence and Applications

Unit-II: Photonic Devices

Radiative and non-radiative transitions; optical absorptions;Principle, operation and applications of Optoelectronic Devices (Solar Cells, Photo-Detectors, Light Emitting Diode)

Unit-III: Measurement Properties

Data Interpretation and Analysis, Precision and Accuracy, Error Analysis, Propagation of Errors.

Unit-IV: Instrumentation Design

Linear and Nonlinear Curve Fitting, Chi-Square Test, Transducers, Properties. Signal Conditioning and Recovery, Noise Reduction, Shielding and Grounding.

Unit-V: Vacuum Techniques

Units of Pressure Management, Characteristics of Vacuum, Applications of Vacuum, Vacuum Systems, Vacuum Pumps, Vacuum Gauges, Pumping Speed for a Vacuum System.

COURSE OUTCOME (COs) PT -402 FIBER OPTICS AND LASER PHYSICS

The students are expected to understand the fundamental concepts and develop ability to understand Fiber Optics and Laser Physics. They will be able to understand basic concepts of Fiber Optics and solve the problems in Fiber Optics, Laser Theory and understand Types and Applications of Lasers.

PT- 402: FIBER OPTICS AND LASER PHYSICS (Marks: Max.-60, Min. – 21)

UNIT-I: Fiber Optics I

Propagation of light in optical fiber, basic structure and optical path of an Optical Fiber, Acceptance Angle, Numerical Aperture, Modes of Propagation, Attenuation in Optical Fiber, Absorption losses, Bending Losses, Radiation Losses, Pulse Dispersion, Materials Dispersion.

UNIT-II: Fiber Optics II

Chemical Vapor Deposition and Double Crucible Methods for fiber optics fabrication; Light Emitting Diode (LED) as a source; Fiber –LED coupling; Bandwidth and Spectral Emission of LED.

UNIT-III: Laser Theory I

Spontaneous and Stimulated emission, Einstein Coefficients, idea of light amplification: Threshold condition for light amplification, Pumping scheme, rate equation, three and four level Lasers; Monochromaticity, Directionality, Brightness, Coherence.

UNIT-IV:Laser Theory II

Active medium, Line shape broadening, Optical Resonance, Longitudinal and transverse modes in laser cavity,Oscillation gain and power output, Q-Switching, Mode locking, pulse shortening.

UNIT-V:Types and Applications of Lasers

Principles of Ruby, Nd: YAG, He-Ne, CO_2, Semiconductor and dye Laser; Nonlinear Optics (Harmonic Generation), Holography and its applications.

COURSE OUTCOME (COs)

PT -403 MICROWAVE AND OPTICS COMMUNICATION

The students are expected to understand the fundamental concepts and develop ability to understand Microwave and Optics Communication. They will be able to understand and solve the problems in Microwave Generators, Oscillators, Microwave Components and Fiber Optics Communication I & II.

PT-403: MICROWAVE AND OPTICS COMMUNICATION (Marks: Max.60, Min. 21)

UNIT I: Microwave Generators

Microwave Generators and wave guides: Failure of vacuum tubes at high frequency, Two cavity klystron, reflex klystron oscillator, magnetron oscillator, TWT amplifier.

UNIT II: Oscillators

Backward wave oscillator, GaAs oscillator; Propagation of EM waves through wave guide, TE, TM and TEM waves.

UNIT III: Microwave Components

Microwave components and Measurements: Microwave components: scattering matrix, attenuators, Tees, directional couplers, circulators, isolators, phase shifters, cavity resonators

Microwave measurements: Measurement of VSWR, phase shift, frequency, power, attenuation, dielectric constants of liquids and solids, Q of cavity.

UNIT IV: Fiber Optics Communication I

Principles of optical communication, single mode and multi mode fibers, step index, graded index, ray model, multi path dispersion, material dispersion, optical fiber as wave guide, fiber sources and detectors.

UNIT V: Fiber Optics Communication II

Manufacture and Measurements of fibers: Optical fiber cable, fiber joints, splices, couplers and connectors, measurement in optical fibers, attenuation measurement, dispersion measurement, refractive index profile measurement, transmission links, optical transmitters and receivers.

COURSE OUTCOME (COs) PT -404 MATERIALS SCIENCE

The students are expected to understand the fundamental concepts and develop ability to understand Materials Science. They will be able to understand and solve the problems in Phase Transition, Kinetics and Diffusion, Nanomaterials, X-Ray Diffraction and Microscopy Techniques.

PT 404 :MATERIALS SCIENCE (Marks: Max.-60, Min. – 21)

UNIT-I: Phase Transition

Relative stability of phase and phase rule, Single component and binary phase diagrams, Micro structural changes during cooling, Lever rule. Order, Disorder Transition.

UNIT-II: Kinetics and Diffusion

Nucleation Kinetics, Growth and transformation Kinetics, Application in transformation in steel, solidification and crystal growth; Diffusion in solids, Fick's law, Solution to Fick's second law, Kirkendal effect

UNIT-III: Nanomaterials

Basic concepts and applications, Types of Carbon based nanomaterials, Fullerenes, Carbon nanotubes, Single wall and multi-wall carbon tubes, Synthesis of carbon nanomaterials, Electronic and mechanical properties of nano-materials.

UNIT-IV: X-Ray Diffraction

X-ray Diffraction process and Diffractometer, applications of XRD, Principle of powder diffraction method, Interpretation of XRD data,accurate determination of lattice parameters; least-square method (Rietveld Analysis)

UNIT-V: Microscopy Techniques

Microstructure of materials, Scanning and Transmission Electron Microscopy techniques, compositional analysis by energy dispersive spectroscopy; surface analysis by Scanning Tunneling and Atomic Force Microscopy.

DEPARTMENT OF PHYSICAL EDUCATION

Programme Outcome

Courses in Physical education help individuals to become physically fit, develop character, learn skills and become knowledgeable about sport. Physical education modifies individuals in well-rounded people. This includes developing muscle strength, endurance, flexibility, agility and healthy competence. Physical education programmes also develop the characteristics of leadership among the students. Academic programmes of physical education also provide job opportunity to the students.

Programme Specific Outcome

Master of Physical Education

Students completing M. P. Ed. course are eligible to get job in the Institution of Higher Learning. After clearing the NET, the students can be appointed as Assistant Professors in Physical Education. The students also get opportunity to develop their career as sports officer, sport psychologists, coach or professional trainer.

Bachelor of Physical Education

Students taking this course are eligible to get appointment as physical education teacher and coaches in schools and private fitness centers. The qualified and competent students may be part of different sports academies run by state or central Government or private bodies. Besides, these students also run their own coaching center,

Bachelor of Physical Education and Sports

This teaching programmed provides opportunity to take admission after 10+2 education. The course is of three years duration. This course provides knowledge in the areas of different games – football, basketball, hockey, boxing, cricket etc. After acquiring skill in these specialized sport fields students become capable to become trainer, coach or they run their own fitness centers. This course also prepares the yoga instructor physical education teacher too.

Course Outcome

The courses related to physical education gives opportunity to learn various subjects , skills and specialization in sports.

1. Specialized knowledge in different sports : The courses available and taught in the different academic programmes of physical education imparts specific and technical knowledge in various sports areas. The students learn basic skills in the related sports and technical knowledge. These information prepare the students as expert in the respective sport areas.
2. Psychology of Physical Education: The course provides knowledge related to psychological factors important in sport. Motivation, emotion, learning principles, effect of audience, dealing in critical situations are well discussed through this course.
3. Anatomy and first aid: this paper gives knowledge about physical structure and functions of the entire body. This knowledge is useful to the students and they prepare themselves according to situation.

4. Health Education: This course provides the salient aspect of physical education and its importance for human being. The ways to maintain balanced physical health are discussed in detail.
5. Education Technology and Methods of Teaching in Physical education: this course covers the ways to teach physical education.
6. Contemporary Issues in Physical Education; The course aims to give knowledge to the students in the ares of physical education, fitness and wellness, sports nutrition, weight management etc.
7. Theory of Sports and Games and sports management: The course gives input regarding theories of the sports, and sports management.

Elective Papers: Elective papers are also offered to the students so they can choose their specialization on the basis of their own interest.

DEPARTMENT OF PSYCHOLOGY

PROGRAMME OUTCOME

Students of P.G. Programme in Psychology and Clinical Psychology will be able to develop critical thinking in the concern area , effective communication, effectively develop interpersonal interaction and learn strategies of effective intervention for attaining wellbeing and healthy development. They will also plan for higher studies like Ph. D. and Diploma programmes

PROGRAMME SPECIFIC OUTCOME

M.A. Psychology :

Students acquire knowledge and develop skill to understand the different aspects of Psychological issues related to understanding and modification of behaviour. They also develop a scientific approach to understand the various psychological issues. The students develop analytical skill to xplore the academic issues

M.A. Clinical Psychology:

The students will be able to know about various causes , symptoms of mental deases and also learn different psychological remedial practices to these psychological problems. The students also prepare them self for higher and specialized education in the area of Different specialization in Psychology.

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COURSE OUTCOME

M.A. Psychology

1. The students will get theoretical knowledge and practical implication in the areas of cognition, personality, social psychology, developmental psychology, psychopathology and health psychology.
2. The students develop critical thinking in the area of research and acquire skill for human assessment.
3. The Course will provide knowledge for developing positive health habits, good life styles and decreasing negative behavioural traits.
4. The students through their project work may learn on hand practice about psychological issues and its prevention.

M. A. Clinical Psychology

Course Out Come: 1. Students will develop theoretical knowledge about mental illness, its types, symptoms and antecedent factors. Besides, students will be able to diagnose causes of mental illness and may suggest some some psychological interventions.

2. Students will be able to learn counseling techniques required to the needy people facing various personal, professional and psychological challenges. The students will also give career counseling and remedial counseling to the psychologically affected people.
3. Students will get opportunity to do internship in the hospital setup for practical understanding about the causes and symptoms of mentally ill patients.

DEPARTMENT OF REGIONAL PLANNING AND ECONOMIC GROWTH

Programme outcomes, Programme specific outcomes and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students

Describe Course Outcomes (COs) for all courses and mechanism of communication within a maximum of 500 words

Department of Regional Planning and Economic growth is conducting two masters programme along with M.Phil and Ph.D. in Economics and Geography. Students from economics stream are getting placed in banks, educational institutes, qualifying civil services, insurance companies and so on. Similarly students from Geography streams are aiming to get absorbed in civil services, disaster management institutes, GIS and Remote sensing institutes etc.

The department has very strong history of producing IAS officers . Alumni of this department is well placed in institutions of repute such as RBI, SEBI, Universities, Defence services, Banks, Govt. Colleges, NGOs, etc.

Curricular of R.P.E.G. department is completely oriented towards developmental needs at every level. M.A. Economics with specialization in regional planning helps to understand socio –economic, sectoral and regional development problems at grass root level to national and international level within multilevel framework.

Program I M.A. Economics

Mission-To analyse and understand socio economic environmental issues from regional perspective

Programme Outcome - Students will get Masters degree and develop a complete approach and understanding of Economics in totality.

Program Specific Outcome

- Students develop skill to analyse economic issues at regional level.
- Students study the tools and develop a scientific approach to solve the problems

Course Outcome: I

1.Students develop conceptual understanding about the syllabus
2.Students understand the issues and develop an analytical approach

Course Outcome: II

students learn various quantitative tools and learn their applicability in research

Course Outcome:III

Students develop their skills for employbility through applied approach and practical work in the field

Programme II M.A. Georgraphy

Programme Outcome - Students will get Masters degree and develop a complete approach and understanding of Geography.

Programme Specific Outcome

- Students develop skill to analyse the various dimensions of geography.
- Students study the tools and develop a scientific approach to solve the problems

Course Outcome: I
1. Students develop conceptual understanding about the course content
2. Students understand the issues and develop an analytical and practical approach.

Course Outcome: II
1. Students learn various tools and learn their applicability in research and field work

Course Outcome: III
Students develop their skills for employability through applied approach and practical work in the field

M.Phil Programmes in Economics and Geography

Programme Outcome
Students will get M.Phil Degree in Economics and Geography.

Programme Specific Outcome

Both the Programmes aim to develop basic orientation towards research and analysis.
Course outcome

- Students analyse the issues in depth and develop a problem solving attitude through scientific research.
- Students get prepared to get employed in chosen fields.

Ph.D. Programmes in Economics and Geography

Programme Outcome
It aims to transform a raw student into a good researcher and contributor in chosen area of research.

DEPARTMENT OF SOCIOLOGY

UNIVERSITY INSTITUTE TECHNOLOGY

Program Outcomes, Program Specific Outcomes, Course Outcomes and Course Specific Outcomes for BE/MTech/MCA Offered by University Institute of Technology, Barkatullah University, Bhopal

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Program Outcomes:

Theprogramsofferedbythisinstitutehavebeendevelopincompetitivespirits, nurture individual thinking and groom the students in order to enable them to meet withthescientificandtechnologicalchallengesintheglobalarena.Wealsodeveloped professionally competent, environmentally and socially conscious, value imbibed and ethicalstudents.

Program Specific Outcomes:

The institute runs Following Courses

1.BE (Civil Engineering)
2.BE (Computer Science & Engineering)
3.BE (Electronics Engineering)
4.BE (Information technology)
5.BE (Mechanical Engineering)
6.M Tech (Computer Science & Engineering)
7.M Tech (Digital Communication)
8.M Tech (Information technology)
9.M Tech (Material Science)
10. M Tech (Nano Technology)
11. M Tech (Product Design)
12. MCA
13. M.Sc. (Chemistry)
14. M.Sc. (Mathematics)

These programs provide them the knowledgebasetoservethesociety and prepare students to accept the national and global challenges in the respective field of technology.

Course Outcomes:

BE courses are designed to build basic concepts of engineering and to train the students in the specific engineering streams to be absorbed by the various esteemed industries and corporate. These courses prepare them for further studies /research work in their specific engineering streams.

M.Tech/MCA courses aredesignedtodevelopandimprovisebasicconceptsofthe Engineering graduates and prepare them to undertake industry challenges and enrich teaching fraternity.

M.Sc. (Chemistry & Mathematics) is designed to develop and improvise basic concepts of the students and prepares them to undertake scientific challenges and enrich teaching fraternity.

Program Outcomes, Program Specific Outcomes, Course Outcomes and Course Specific Outcomes for M.Sc. (Mathematics) offered by Department of Mathematics, UIT, Barkatullah University, Bhopal

Program Outcomes:

The mission of the M.Sc. Mathematics is to provide graduate students with a strong foundation that leads to success in subsequent careers and education programs. This is achieved by developing the competitive spirits, nurture individual thinking and groom the students in order to enable them to meet with the scientific and technological challenges in the global arena. We also aim to develop professionally competent, environmentally and socially conscious, value imbibed and ethical students.

Program Specific Outcomes:

- Developing mathematical ability among students with acute and abstract reasoning.
- To provide broad and comprehensive knowledge of course of pure and applied mathematics.
- To enable students to cultivate a mathematician's habit of thought and reasoning.
- To enlighten students with mathematical ideas relevant to the course.
- To prepare students to work as professional mathematicians either in academic or elsewhere.
- To create, analyze and interpret mathematical models and to communicate sound arguments based on mathematical reasoning and careful data analysis.
- To provide them the knowledge base to serve the society through their active participation in scientific and educational institutions.
- Course Outcomes:
- At the completion of this course, the students will be able to
- Understand the area of pure and applied mathematics including geometry, algebra, mathematical analysis and discrete mathematics, numerical methods and differential equations.
- Solve problems in the advanced areas of mathematics.
- Explain why mathematical thinking is valuable in daily life.
- Read, analyse and write logical arguments to prove mathematical concepts.
- Perform research in conjunction with others as well as individually.
- To write programs from the underlying algorithms, and demonstrate the ability to employ good commenting and coding techniques.

DEPARTMENT OF WOMEN STUDY

Student Performance and Learning Outcomes

Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

M.A. Women's studies-the purpose of this course is to enlighten students about the conceptual and theoretical aspects Women's studies, gender issues, notion of women empowerment and various interdisciplinary approaches to study and understand women issues with different perspectives. The course has been planned with a view to train students with both abstract issues of theory as well as practical issues of fieldwork.

M.Phil - M. Phil Course will equip students interested in pursuing research on women issues with the critical and research tools needed for Women's studies in social sciences. It provides a systematic introduction to Women's studies, women's movements, feminist theories and various inter-disciplinary approaches to study and understand women issues with different perspective. Students are offered wide range of papers, research assignments and research project experience. After Completion of the course, the students would find their professional career in academic institutions pursuing teaching and inter – disciplinary research in women's issues, in non- governmental organisations in research consultancy firms.

Ph.D. women's studies -Ph.D. course work is designed s per the ordinance 11 and all relevant topics related to latest advancement were included in course.

DEPARTMENT OF YOGA

M.A./M.Sc. (YOGA)

PROGRAMME OUTCOME (PO):

Yoga's sky rocketing popularity on global level is driving a whole new generation of yoga professionals who are willing to contribute to the growing demand on national and international level. Yoga is a physical, mental and spiritual practice which originated in India. Yoga promotes holistic health as it is a physical, mental, emotional and spiritual discipline. It disciplines the mind and improves the power of concentration. Therefore, it is ideally suited for those who are involved in intellectual pursuits.

The concepts of positive health and lifelong learning are relatively new and need to be strengthened. Yoga is a discipline, based on meticulous practice and requires very modest infrastructure and money. The International Day of Yoga has been celebrated annually since 21 June since 2015, following its inception in the United Nations General Assembly in 2014. UGC NET aims to ensure minimum standards for the entrants in teaching professions and research for colleges and university level lectureship and for award of JRF for Indian nationals. Ministry of AYUSH, GOI, ICCR, CCRYN all have been paving the way to foster a considerable number of basic and applied scientific research on yogic techniques for in depth understanding and education of a sizable population of aspiring youngsters, preventive health care, complementary and alternative methods to medicine, holistic health and overall well-being through yogic practices.

In order to cater to the growing demand of yoga professionals in the country and on global scale, to impart special education in various areas like yoga, positive health, career, personality development etc. for the overall development of students, teachers and nonteaching staff of universities,M.A./ M.Sc. Human Consciousness and Yogic Science, an intensive and advance post- graduate Yoga course is being provided in Barkatullah University Teaching Department since 2001. The course aims at creating and developing highly specialized, intelligent and capable professional yoga practitioners, managers and teachers who are well versed with the Indian philosophy and foundations of yoga together with being proficient in various yogic practices and techniques including Shatkarmas, Asanas, Pranayamas, Mudras, Bandhas and Meditation in major yogic texts and with value based education.

The career options in this course include Yoga Therapists, instructors, gym manager cum instructors, Consultant Yoga Therapists, Panchkarma Therapists, marketing field worker, clinical psychologists, private tutor, master trainers in yoga educational institutions, yoga training courses and other training programs. They can teach in various Studios, Institutions/ Medical institutions, colleges/ universities, Institutions of Higher Learning, Corporate sector as yoga trainers, start their own yoga studios/ private yoga centres, clubs for teaching and consultancy, sports complexes, hospitals, resorts/ hotels, community health care centres, preventive health and diet care centrer. Students can apply for higher education and advance courses like M. Phil and Ph.D (Yoga).

PROGRAMME SPECIFIC OUTCOME (PSO):

The course will benefit Experienced yoga teachers or Senior yoga practitioners or Health practitioners including medical professionals and capable young yoga practitioners and aspirants who want to learn and use Yoga Techniques from Ashtanga Yoga, Hath Yoga, Ayurveda and Naturopathy, Yogic management of psychosomatatic diseases through yogic practices, yoga therapy, techniques, diet and nutrition.

The multi -pronged approach of the program has a lot to offer the humanity as we can all gain a lot from the bountiful dimensions of Yoga, enabling us to manifest our inherent divinity, the universal potentiality that lies dormant unless channelized. Today, yoga has been widely accepted as a scientific discipline among predominantly young, educated and urban global practitioners. Through Yoga we learn to master our body and mind to cultivate inner stillness and an ever growing realization of the innermost essence (soul).

The yogic journey guides us from the periphery/body to the center of our being/soul aiming to integrate and harmonize the various layers of our existence to achieve wholeness, health, and self-realization. The academic programs of the yoga department have been designed to cater to the physical, social, mental and spiritual aims of humanity.

The course will provide indepth knowledge of Indian Philosophy, Vedic texts, Upanishads, Bhagwat Geeta along with significance of Yoga Darshan, Sankhya, Astika and Nastika Darshans and all the aspects and levels of Human Consciousness. It will also benefit students by exposing them to modern scientific research and statistical methods in relation to yogic management of disease. The students will have indepth knowledge of scientific and yogic human anatomy and physiology.

COURSE SPECIFIC OUTCOME (CSO) Ist SEMESTER
COURSE OUTCOME MA/M.ScYG 101- Patanjala Yoga Darshan

- Students will understand the philosophical aspect of yoga.
- They will be apprised of the highest goal of human life – Kaivalya.
- They will be aware of the role, importance of techniques of Self control and Concentration.

COURSE OUTCOME MA/M.ScYG 102- Basic Study of Hathyoga (Hathpradipika & Gheranda Samhita)
- Students will get acquainted with Hathyoga and hathyoga related literature.
- They will be able to understand Asanas, Pranayamas, Bandhas and Mudras.
- They will get aware of Ghatayoga, Nada and Anusandhana.

COURSE OUTCOME MA/M.ScYG 103- Indian Philosophy
- Students will get acquainted with basic foundation of Indian Phylosophy.
- They will become aware of Astika and nastika Darshanas.
- They will be able to understand the role and significance of yoga darshana in philosophical ideology.

COURSE OUTCOME MA/M.ScYG 104- Elementary Sanskrit
- Students will get acquainted with importance of Sanskrit language.
- They will have knowledge of Sanskrit Grammer.
- They will become aware of importance of Shrimad Bhagwat Gita.

COURSE OUTCOME MA/M.ScYG 105- Practical 1
- Students will get acquainted with the practical procedure of yogic practices.
- They will possess the skill and have knowledge of performing Shatkarmas, Asanas, Pranayamas & Dhyana.
- Regular practice will ensure their complete development.

COURSE OUTCOME MA/M.ScYG 106- Practical 2
- Students will get acquainted with the qualities of an ideal trainer/ instructor and teacher.
- They will become efficient in performing the skills of Shatkarmas, Asanas, Pranayamas & Dhyana.
- Their presentation abilities will be developed.

COURSE SPECIFIC OUTCOME (CSO) 2nd SEMESTER
COURSE OUTCOME MA/M.ScYG 201- Yoga & Health
- Students will get acquainted with the important aspects and concepts of Yogic Lifestyle.
- They will understand the concept of Health & Disease.
- They will become aware of healthy lifestyle & positive outlook of Yoga.

COURSE OUTCOME MA/M.ScYG 202- Human Anatomy & Physiology
- Students will have knowledge of human anatomy.
- They will understand the functioning, integration and interdependence of various organ systems.
- They will understand and learn the impact of various yogic practices like Shatkarmas, Asanas, Pranayamas, Dhyana on different organs and systems of human body.

COURSE OUTCOME MA/M.ScYG 203- Human Consciousness & Yoga

- Students will understand the significance of consciousness in tradition of Indian Philosophy.
- They will understand the system and levels of development of Human Consciousness.
- They will become aware of scientific aspect of consciousness.

COURSE OUTCOME MA/M.ScYG 204- Elementary Theories of Naturopathy & Ayurveda

- Students will understand the theoretical foundations of Naturopathy.
- They will get acquainted with the basic foundations of Ayurveda.
- They will become aware of various methods & techniques of treatment of Naturopahy.

COURSE OUTCOME MA/M.ScYG 205- Practical 1

- Students will learn the advance yogic techniques.
- They will know the relevance and importance of shatkarmas, asanas & Pranayamas procedures.
- Regular yoga practice will definitely ensure physical, mental and social upliftment in student's lives together with improved concentration.

COURSE OUTCOME MA/M.ScYG 206- Practical 2

- Students will become aware of techniques of yoga therapy.
- They will know the implementation of Yogic practices in Yoga therapy.
- This will improve their presentation and demonstration skills.

COURSE SPECIFIC OUTCOME (CSO) 3rd SEMESTER

COURSE OUTCOME MA/M.ScYG 301- Therapeutic Basis of Yoga

- Students will understand the principle of yoga therapy in prevention of physical, mental and psychosomatic disorders.
- They will get acquainted with the format of Ideal yoga therapy in context of various disorders.
- They will become aware of causes and yogic diagnosis of various disorders.

COURSE OUTCOME MA/M.ScYG 302- General Psychology

- Students will study the field of human psychology.
- They will become aware of the principles of human mind, behavior, thought processes as per psychologists.
- They will become aware of causes and yogic diagnosis of various mental & psychological disorders.

COURSE OUTCOME MA/M.ScYG 303- Research & Statistical Methodology for the Science of Yoga & Human Consciousness

- Students will learn how research is done scientifically and the techniques of solving various research problems.
- They will understand the use and importance of application of research and statistical methods in yoga.
- They will learn the steps, procedure and format of research process and methodology.

COURSE OUTCOME MA/M.ScYG 304- Major Elective 1- Essay Writing (Based on Yogic Text)

- Students will learn, develop and demonstrate proficiency in written communication.
- After studying this course, you should be able to: understand what writing an assignment involves. Identify strengths and weaknesses.

COURSE OUTCOME MA/M.ScYG 304- Major Elective 2- Diet & Nutrition

- Students will become aware of facts about food and nutrition.
- They will get acquainted with the process of metabolism.
- They will understand the significance of caloric and nutrition values of components of the diet.

COURSE OUTCOME MA/M.ScYG 305- Practical 1

- Students will become aware of role and significance of yogic curriculum and practices in ensuring physical & mental health together with spiritual health.
- They will understand the importance of yogic experiments in scientific researches.
- They will learn the methods of testing and experimentation.

COURSE OUTCOME MA/M.ScYG 305- Practical 2

- Students will get acquainted with the method of application of shatkarmas in scientific research.
- They will become aware of methods of formulation and presentation of statistical results.

COURSE SPECIFIC OUTCOME (CSO) 4th SEMESTER

COURSE OUTCOME MA/M.ScYG 401- Applications of Yoga

- Students will know the role and importance of yoga in various fields.
- They will understand the genre of yoga in stress management.
- They will also understand the impact of yogic practices on personality development.

COURSE OUTCOME MA/M.ScYG 402- Major Elective 1- Classical Study of Traditional Yogic Text

- Students will learn various traditional yogic texts.
- They will observe the significance of shiv Samhita and Siddha Siddhanta Paddhati.
- They will also understand the importance of Hath yoga & Raja Yoga texts- Hath Ratnavali and Yoga Vashisth.

COURSE OUTCOME MA/M.ScYG 402- Major Elective 2- Mental Health

- Students will acquire and learn about mental health.
- They will understand the role of moral values in maintaining good health.
- They will know the importance of prayer in life.

COURSE OUTCOME MA/M.ScYG 403- Practical 1

- Students will be exposed to more advance levels of Shatkarmas and Yogic curriculum.
- They will learn to implement experimental aspect of Yoga in thesis dissertation.
- Students will be able to learn the spiritual significance of yogic kriyas and they will be able to use the same for the uplifting the society and curing the diseased.

COURSE OUTCOME MA/M.ScYG 404- Practical 2

- Regular lesson plans will be conducted.
- Students will learn to prepare present assignments and project development through project work.
- Student's presentation skills will be developed.

PROGRAMME OUTCOME (PO):

This intensive training course has to be completed by students in one year. This course aims at providing insight to prospective yoga teachers and practitioners a knowledge of basic hath yogic texts, practices and techniques along with an understanding of personal and social aspects of Hath Yogic curriculum. The candidates will become acquainted with various teaching methods for general and therapeutic yoga classes for group/ individual practice sessions with practical exposure of lesson plans.

PROGRAMME SPECIFIC OUTCOME (PSO):

The course aims at making students understand the physical, mental, emotional and spiritual benefits of Shatkarmas, Asanas, Bandhas, Pranayamas, Mudras and meditation techniques.

Students will understand practical aspects of teaching methodology along with sitting arrangements, equipments required, verbal techniques, demonstration ability during lesson plans. The course is beneficial for yoga teachers or new yoga practitioners or Health practitioners and capable young yoga practitioners and who want to learn and use Yoga Techniques from Ashtanga Yoga, Hath Yoga, and Yogic management of psychosomatic diseases through yogic practices, yoga therapy, techniques, diet and nutrition. The course will benefit students in understanding the significance of Patanjal Yoga Darshan in Indian Philosophy along with importance of value based eduction and spiritual knowledge of yogic practices and ultimate goal of human life – Kaivalya. The students will have an in depth knowledge of scientific and yogic human anatomy and physiology. The course will also provide thorough understanding of role of yoga in stress and health management and removing misconceptions about yoga and its practices. This course will help students to become a better individual and benefit their family, society and nation as a whole.

The career options in this course include Yoga therapists, Gym instructors, Consultant Yoga Therapists, marketing field worker, private tutor, instructors in yoga educational institutions, yoga training courses and other training programs. They can also start teaching in various Studios, Institutions/ Medical institutions, corporate sector as yoga trainers, start their own yoga studios/ private yoga centres, sports complexes, hospitals, resorts/ hotels, community health care centres, preventive health and diet care centres. Students can apply for higher education and advance courses like MA/ MSc in yoga.

COURSE SPECIFIC OUTCOME (CSO) Ist SEMESTER

COURSE OUTCOME PG Diploma in Yogic Science – Paper 1- Yoga Parichya

- Students will get well versed with basic concepts of Ashtanaga Yoga, Hath Yoga, Raja yoga, Kundalini Yoga, Ghatastha Yoga and understand yogic human anatomy and physiology.
- They will be able to understand Asanas, Pranayamas, Bandhas and Mudras.
- Spiritual insight of hath yogic practices will be attained as they will become aware of Ghatayoga, Nada and Anusandhana.
- Any misconceptions regarding meaning of hath yoga and its practices will be removed.

COURSE OUTCOME PG Diploma in Yogic Science – Paper 2- Patanjala Yoga Sutra

- Students will understand the philosophical aspect of yoga.
- They will be apprised of the highest goal of human life – Kaivalya and concept of Ishwara.

- They will get acquainted with meaning of Chitta, its modifications, states of awareness, role of regular diligent practice and detachment through Kriya Yoga.
- They will be aware of the role, importance of techniques of Self control and Concentration.

COURSE OUTCOME PG Diploma in Yogic Science – Paper 3- Practical

- Students will get acquainted with the practical procedure of yogic practices.
- They will possess the skill and have knowledge of performing Shatkarmas, Asanas, Pranayamas& Dhyana.
- Regular practice will ensure their complete development.

COURSE SPECIFIC OUTCOME (CSO) 2nd SEMESTER

COURSE OUTCOME PG Diploma in Yogic Science – Paper 1- Mental Health

- Students will understand the concept of mental health and role of yoga in maintaining physical as well as mental health.
- They will understand the symptoms of a mentally healthy human being and their role & contribution to society and humanity at large.
- They will learn about meaning, types, causes & impact of stress and role of yoga in stress management.
- Students will also become aware of significance of value based education, prayer and faith in life. They will also undertstand the impact of negative approach & misconceptions in life and will thus learn the yogic techniques of dealing with the same.

COURSE OUTCOME PG Diploma in Yogic Science – Paper 2- Human Anatomy & Physiology

- Students will have knowledge of human anatomy.
- They will understand the functioning, integration and interdependence of various organ systems.
- They will understand and learn the impact of various yogic practices like Shatkarmas, Asanas, Pranayamas, Dhyana on different organs and systems of human body.

COURSE OUTCOME PG Diploma in Yogic Science – Paper 3- Practical

- Students will learn the advance yogic relaxation techniques.
- They will know the relevance and importance of shatkarmas, asanas & pranayamas procedures.
- Regular yoga practice will definitely ensure physical, mental and social upliftment in student's lives together with improved concentration.

DEPARTMENT OF YOGA

PG Diploma in Yoga Therapy

PROGRAMME OUTCOME (PO):

This advance and intensive training course has to be completed by students in one year. This course aims at training yoga therapists with hath yogic practices and techniques together with an understanding of their personal, mental, social and spiritual aspects. The aim of the course is to train students to develop skills of therapists, to serve the people of society by providing yoga therapy to patients who are suffering with various psychosomatic disorders.

The career options in this course include Yoga therapists, Gym instructors, Consultant Yoga Therapists, marketing field worker, private tutor, instructors in yoga educational institutions, yoga training courses and other training programs. They can also start teaching in various Studios, Institutions/ Medical institutions, corporate sector as yoga trainers, start their own yoga studios/ private yoga centres, sports complexes, hospitals, resorts/ hotels, community health care centres, preventive health and diet care centres. Students can apply for higher education and advance courses like MA/ MSc in yoga.

PROGRAMME SPECIFIC OUTCOME (PSO):

The main objective of this course is to develop the therapeutic, convincing and communicative ability of the students to deal with their patients in a healthy way so that they can share their knowledge and service sensitively and clearly so that their clients can live a healthy and better life with the help of yoga. The students will learn Shatkarmas, Asanas, Bandhas, Pranayamas, Mudras and meditation techniques and understand their physical, mental, emotional and spiritual benefits.The students will have an in depth knowledge of posture correction, scientific and yogic human anatomy and physiology of human body, systems of human body and various respiratory, excretory, nervous, hormonal imbalances and other diseases. The course will teach yoga therapists various techniques from Ashtanga Yoga, Hath Yoga, Naturopathy including Hydropathy, Mud Therapy, Magnet Therapy, Sun Therapy, Air Therapy, Accupressure, Acupuncture, Message Therapy, Fasting and Diet plans for alternative and yogic management of various Psychosomatatic diseases and maintaining physical, mental and emotional health of their clients.The students will have an insight of Yoga therapy as a bye product of yogic lifestyle and discipline, various methods, systems of therapy, contra indications of yogic practices, alteration in blood pressures, therapeutic purposes of Yogic Kriyas, Asanas, Pranayamas, Bandhas, Dharana, Dhyana, Levels of Consciousness and Personality Development. Students will have practical exposure through Yoga and Naturopathy Case Study and Dissertation. The course will benefit students in understanding the significance of Patanjal Yoga darshan in Indian Philosophy along with importance of value based eduction and spiritual knowledge of yogic practices and ultimate goal of human life – Kaivalya. The course will also provide thorough understanding of role of yoga in stress and health management and removing misconceptions about yoga and its practices. This course will help students to become a better individual and benefit their family, society and nation as a whole.

COURSE SPECIFIC OUTCOME (CSO) 1st SEMESTER

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 1- Basic Concepts of Yoga

- Students will get well versed with basic concepts hath yoga texts like Hath Pradipika & Gheranda Samhita and understand yogic human anatomy and physiology.
- Any misconceptions regarding meaning of hath yoga and its practices will be removed.
- Spiritual insight of hath yogic practices will be attained.

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 2- Fundamental of Human Anatomy & Physiology

- This course will give an insight of basic human anatomy and physiology ranging from smallest unit of body, cell to different organ systems of human body together with their functions and interdependence.
- Students will be able to correlate between the functioning of yogic anatomy on a subtle level as compared to scientific human anatomy.
- They will understand the significance of various yogic practices like Shatkarmas, Asanas, Pranayamas and Dhyana on Human body from anatomical & Physiological aspect.

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 3- Philosophical Basis of Yoga

- The students will be taught about the theoretical foundations of Yoga, yoga in traditional Indian philosophy.
- They will become aware of the ultimate goal or purushartha of Human life, Kaivalya and will get insight of Samkhya Philosophy, Patanjal Yoga Sutras, Ashtanga Yoga and various kleshas and causes of life and birth.

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 4- Scientific Foundations of Yoga

- The curse will impart knowledge about meaning of science, scientific research & methods of scientific research.
- Students will understand the scientific basis & impact of emotions & stress on physical & mental health.
- They will learn the correlation of yogic practices like shatkarmas, asanas, pranayamas etc and their role in posture maintenance, relaxation, various systems in body and conservation of energy through modern scientific researches in the field.

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 5- Practical

- Students will learn various yogic techniques.
- They will know the methods, precautions, contra indications and importance of shatkarmas, asanas & Pranayamas procedures.
- Regular yoga practice will definitely ensure physical, mental and social upliftment in student's lives together with improved concentration.

COURSE SPECIFIC OUTCOME (CSO) 2nd SEMESTER

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 1- Health & Disease

- Students will become aware of meaning & concept, determinants, important factors of holistic health and spirituality.
- They will get acquainted with the importance of a healthy well being in society as a whole together with the modern problems and obstacles in being healthy.
- Concept of various psychosomatic diseases, reasons of manifestation of the diseases, their symptoms and causes, diseases related to dysfunctioning of various organ systems of body will be dealt with.

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 2- Therapeutical Basis of Yoga

- Students will be learning about the meaning, definitions, methods, and various systems, nature of yoga therapy, its approach, limitations and principles of yoga therapy.
- They will become aware of therapeutic role of Shatkarmas, Asanas, Pranayamas, Bandhas, Mudras, Dharana& Dhyanas.
- They will receive an insight of nature of trial self and learn the techniques of resolving conflicts within the layers of consciousness and personality and treatment of psychosomatic diseases.

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 3- Basic Principles of Naturopathy

- Students will understand the theoretical foundations of Naturopathy.
- They will become aware of various methods & techniques of treatment of Naturopahy.

- They will be able to understand the physiological effects of the treatments.
- They will learn about the types of fasting, concept of diet, its types, nutrition& Therapeutic diet according to Naturopathy Principles.

COURSE OUTCOME PG Diploma in Yoga Therapy – Paper 4- Case Study/ Dissertation through Yoga and Naturopathy

- Students will be exposed to more advance levels of Shatkarmas, Asanas & Pranayamas.
- They will learn to implement experimental aspect of Yoga through thesis dissertation or case study.
- They will get an insight of formalization and implementation of yogic therapy for prospective clients in future.

Students will be able to learn the spiritual significance of yogic kriyas and they will be able to use the same for the uplifting the society and curing the diseased.

PG Diploma in Stress Management

PROGRAMME OUTCOME (PO):

This intensive Stress and anger management program aims at providing a comprehensive knowledge to prospective yoga practitioners and therapists about various causes, types, models, symptoms, measurement tools/ tests of stress and stressors, their effect on all human systems, hormones like adrenaline and cortisol hormone, fight or flight response, overall health and performance of an individual and remedies and stress management, relaxation techniques and right food choice.

The career options in this course include Yoga therapists, Gym instructors, Consultant Yoga Therapists, marketing field worker, private tutor, instructors in yoga educational institutions, yoga training courses and other training programs. They can also start teaching in various Studios, Institutions/ Medical institutions, corporate sector as yoga trainers, start their own yoga studios/ private yoga centres, sports complexes, hospitals, resorts/ hotels, community health care centres, preventive health and diet care centres.

Students can apply for higher education and advance courses like MA/ MSc in yoga.

PROGRAMME SPECIFIC OUTCOME (PSO):

The program aims at in depth knowledge on meaning, causes, types and perspective of stress, difference between anxiety, stress and depression and helping therapists understand and apply behavioral, Cognitive approaches of stress, its symptoms and personality types, modern models of stress, stress measurement and management tools and taking feedback from patients. The course will also provide the knowledge of drugs, medicines used in stress management and their limitations, role and limitations of yoga in overcoming stress. It will also expose the students to different physiological, psychological and psychosomatic aspects of stress, anger, anxiety and depression and their management through yogic practices, nutrition and dietary changes, naturopathy- hydrotherapy, mud therapy, air therapy, magnet therapy, massage therapy, reflexology, acupuncture, sports, recreational activities, RET, QRT, DRT, positive approach towards life, time management, counseling through various cultural and spiritual yogic techniques of yoga. The course will enhance student’s knowledge of concentration techniques and mental

purification through Swadhyay, value based education through yogic psychology of contentment and detachment and their significance in effective management of disorders.

COURSE SPECIFIC OUTCOME (CSO) Ist SEMESTER

COURSE OUTCOME PG Diploma in Yogic Science – Paper 1- Theoretical Foundation of Stress.

- Students will understand the scientific basis & impact of emotions & stress on physical & mental health.
- They will learn about meaning, types, symptoms, causes & impact of stress and role of yoga in stress management.
- The course will also provide thorough understanding of role of yoga in stress and health management and removing misconceptions about yoga and its practices.

COURSE OUTCOME PG Diploma in Yogic Science – Paper 2- Anatomy & Physiology in Relation to Stress.

- Students will learn about various organ systems of body and their functioning and interdependence.
- They will learn the physiology of stress, role of stress hormones like adrenaline, cortisol, impact of stress on BP, Heart, Muscles, flight or fight response.
- They will understand the concept of psychosomatic diseases and their management through yogic practices.

COURSE SPECIFIC OUTCOME (CSO) 2nd SEMESTER

COURSE OUTCOME PG Diploma in Yogic Science – Paper 1- Modern Practices in Management & Prevention of Stress.

- The students will have the knowledge of drugs, medicines used in stress management and their limitations, role and limitations of yoga in overcoming stress.
- Students will learn the effect of diet as a stressor or reliever, BMR, Cognitive Behavioral Therapy, Psychotheraphy.
- They will learn various techniques from Naturopathy including Hydropathy, Mud Therapy, Magnet Therapy, Sun Therapy, Air Therapy, Accupressure, Acupuncture, Message Therapy, positive thinking, planning, time management skills, proper psychological counseling & yogic management of various Psychosomatatic diseases and maintaining physical, mental and emotional health of their clients.

COURSE OUTCOME PG Diploma in Yogic Science – Paper 2- Yogic Way of Management & Prevention of Stress.

- Students will be introduced to the concepts of Karma Yoga, Raja Yoga, Bhakti Yoga, Ishwara, Swadhyaya, Kriya Yoga for effective management of stress through yogic practices.

They will have thorough understanding of reasons of spiritual upliftment and knowledge of ultimate goal of human life to help themselves or their patients in living a life of contentment and service to nation & humanity.

BARKATULLAH UNIVERSITY, BHOPAL
Certificate in Yogic Science

PROGRAMME OUTCOME (PO):

Certificate in Yogic Science course provides detailed knowledge to students about Yoga, basic yoga practices and benefits of yoga in daily life. This course helps learners in learning the effects of Yoga on health and overall personality of the practitioner. Students who are interested in yogic activities and have the sole aim to be physically fit are well suited to this course. Students must be good at time management and must be calm and composed to pursue this course.

The career options in this course include jobs in diverse fields such as Schools and Colleges, Health Centers, Ministry of Ayush etc. On completion of this program, professionals can opt for jobs with diverse profiles such as Yoga Instructors, Teachers, and Health Inspectors.

Students can also go for higher studies in Yoga Education after completion of this program.

PROGRAMME SPECIFIC OUTCOME (PSO):

The course will benefit aspiring yoga teachers, new yoga/ health/ medical and capable young yoga practitioners and general people who want to learn or use yoga techniques from Ashtanga Yoga, Hath Yoga, Raja Yoga and yogic management of various diseases & psychosomatatic disorders through practice of yoga & it 's techniques, diet and nutrition.

The course will also benefit the students understanding the significance of Patanjal Yoga darshan in Indian Philosophy along with importance of value based eduction and spiritual knowledge of yogic practices and ultimate goal of human life – Kaivalya.

The course will further give an insight to the students about human body, functioning of organs & systems of body & the effect of various yogic practices in maintaining complete health of an individual.

COURSE SPECIFIC OUTCOME (CSO):

COURSE OUTCOME CERTIFICATE IN YOGIC SCIENCE PAPER 1 - Yoga Parichaya

- Students will learn about Hath yoga & Ashtanaga Yoga as per important traditional hath yogic texts.
- They will get acquainted with the meaning of yoga, its types, parts of yoga, appropriate place, time, costume, factors promoting and diminishing the practice of yoga & various techniques of Shatkarmas, Asanas, Bandha, Kumbhakas.

COURSE OUTCOME CERTIFICATE IN YOGIC SCIENCE PAPER 2 - Patanjala Yoga Sutra

- Students will have in depth knowledge of Patanjala Yoga Sutras, Raja Yoga, Samadhi &it's states, Chitta & it's states, significance of regular practice & detachment, Concept of Ishwara & AUM, various obstacles in yoga practice & techniques of concentration & purification of chitta to overcome those obstacles.
- They will understand the spiritual significance of yoga & have an insight of importance of Indian Philosophy & Literature in attaining Human Goals & living a life of contentment while dedicating oneself in service to humanity.
- They will understand the importance of moral values in living a life of fulfillment.

COURSE OUTCOME CERTIFICATE IN YOGIC SCIENCE PAPER 3 – Mental Health

- In this course, the students will learn the meaning of mental health & its contribution towards the personality of a human being, his behavior and role of yoga practice in maintaining good mental health, personality development & behavior modification.
- Students will also be able to understand the concept of hopelessness & yogic techniques of overcoming the same.
- Students will learn the importance of Prayer, Asanas, Pranayama, Balanced Diet, Vegetarian diet on Physical, Mental & Spiritual Health of the individuals.
- They will be able to make necessary positive changes in their own lives and will definitely bring difference in the lives of others around them too by promoting the yogic way of life.

COURSE OUTCOME CERTIFICATE IN YOGIC SCIENCE PAPER 4 – Human Anatomy & Physiology

- In this course, students will learn the concept of anatomy, various parts, and organ systems of human body, their functioning, and their interdependence.
- They will also understand the effect and role of various yogic practices like Shatkarmas, Asanas, Balanced & vegetarian diet, Deep Breathing, and Diaphragmatic Breathing on Human Body Parts & Systems & complete health.

COURSE OUTCOME CERTIFICATE IN YOGIC SCIENCE PAPER 5 – Teaching Practice with Practical

- Regular Yoga Practice will surely contribute to their overall health & physical, mental & spiritual development & will make them a better human being.
- They will have real teaching experience during teaching practice & practical.

They will understand the concept & skills of teaching to conduct individual & group yoga sessions independently.

DEPARTMENT OF ZOOLOGY AND APPLIED AQUACULTURE

LEARNING OUTCOME
M.F.Sc (MASTER OF FISHERIES SCIENCE)
SEMESTER I

SEMESTER I --- PAPER I

At the end of the programme students will be able to-

-To understand the identifying characteristics of freshwater and marine water fishes species.

-Investigate life forms found in fresh water and salt water.

-identify and interpret examples of adaptations to these environments.

-To understand behavioral habits, feeding behavior, migration, locomotion and reproduction of each group.

-To classify individual vertebrates by class, order, family, Genus and species.

- Be able to explain the structures and functions of Digestive System, Respiratory systems, Circulatory systems, Reproductive systems and Nervous system in fishes.

-To understand the food and feeding habits of different species of fishes and prawns.

-Be able to explain some of the hormones that act in the process of digestion, their site of production and target organs.

-Explain chemical digestion of carbohydrates, protein and lipids.

-To understand the Qualitative and Quantitative estimation of gut contents .

-Be able to explain the Gastro-somatic and Hepato-somatic indices .

- To understand the Accessory Respiratory Organs.

- Be able to explain the structures and functions of in Fishes.

- Be able to explain the structures and functions of Blood in Fishes.

- To understand the Reproductive Behavior and Sex determination in fishes.

-Be able to explain the Gonado – Somatic index, Gametogenesis, Ovulation and Fertilization in fishes.

- To understand the various Developmental stages of Fishes.

- To explain the osmoregulation its endocrine and hormonal control in fishes.

-Be able to describe the major division of fish and various sense organs in Fishes.

- Explain the structures and functions of Endocrine Glands and their Hormonal control in fishes.

-Explain how endocrine gland interacts with the nervous system.

-Explain the neuroendocrine systems in Prawns.

-Explain what biologicalrhythms are and the advantages of these rhythms.

-To explain the structures and functions of webarian-ossicles and sound production in fishes.

SEMESTER I ---- PAPER II

-To understand the Role of extrinsic and intrinsic factors in fishes and prawn reproduction.

-To understand the maturity assessment in fishes and prawns and maintenances of brooders.

-To understand the transportation of Broodstock of fishes and prawns.

-To understand the use of special diets for broodstock Development.

-To understand the use of Hormones and anesthesia in fish and prawn for breeding.

-To explain Induced breeding in fishes (Dry Bundh, Bangla bundh, Hypophysation, Stripping etc.)

- Be able to explain the various types of synthetic compounds, their chemical composition and mechanism of action in fish breeding.
-To understand the hybridization in fishes, their advantages and disadvantages.
-Be able to explain the evaluation of carp milt, volume of milt, spermatocrit value, sperm count value, motility value, utilization of cryopreserved milt.
-To understand the site selection and construction of fish and prawn hatcheries.
-To understand the various types of hatcheries and their operation.
-To understand the Basic factors to be remembered in the handling of brooders.
-To understand how, to provide a base for the collection and transportation of brooders to the hatchery.
-To understand the construction and their management.
-To understand the stocking density, survival rate and harvesting
-Describe the chemical compositions of natural waters, and explain how and why these compositions vary.
-To explain the sources of water river, reservoir and underground water.
-To explain the aeration their types, and their advantages and disadvantages.
-Understand the importance of water quality in fish hatcheries and nurseries.
-Learn the optimum water quality requirements for carp hatchery and nursery.
-know the measures to maintain optimum water quality parameters and measures to check fish diseases.
-To know the types of ornamental fishes (freshwater and marine water), their breeding of aquarium fishes.
-To explain oviparous, ovo- viviparous and viviparous fishes and their parental care.
-To describe the maintenance of brood fishes and various methods of breeding of aquarium fishes.
-To understand aquarium manufacturing their accessories, setting and maintenance of freshwater and marine water aquaria.

SEMESTER I PAPER III

-To explain the history and scope of aquaculture.
-To understand selection of site designing, layout, construction of aqua farms, soil properties, types of ponds their orientation, shape, size and depth of pond, design of embankments, water supply and drainage system- open channels, inlet structures, drainages and sluices.
-To explain Hatchery construction and design and their types.
-To explain Aerators their principle, deigns, requirements and their types.
-To explain Aquaculture apparatus like pump, automatic feeders demand feeders and weed control apparatus.
-To explain design and construction of cages, pens, flow-through and recirculatory systems.
-To understand the preparation and management of nursery, rearing and stocking ponds.
-To explain the types of Aquatic weeds, algal blooms, insects, predatory and weed fishes and their control and also the types of fertilizer and (organic, inorganic and biofertilizer) their application.
-Fish health monitoring (physico-chemical parameters, Feeding strategies and growth monitoring).
-To understand the freshwater Aquaculture- Culturable species of finfish and shellfish , their identification, Developmental stages, and commercial importance.
- To explain Methods of carp culture and catfish culture, their history , present status and global scenario.

- To understand the brackish water Aquaculture- Culturable species of finfish and shellfish , their identification, Developmental stages, and commercial importance and their seed production.
-To understand the Marine water Aquaculture- Culturable species of finfish and shellfish , their identification, Developmental stages, and commercial importance and their seed production.
-To understand the Fish culture in Lagoons (Pulicat and Chilka) and Backwater and Also propagation of seaweeds for commercial importance.
- To understand the All Culture Systems (Mono, Poly, composite; intensive, Semi-intensive , Extensive, Cage , Pen, Raceways Cultures and IntegratedFish Farming Like Trapa/paddy/cattle/poultry/duck/piggery-cum-fish culture and also the pearl culture.
-To understand the Sewage water treatment and Sewage-fed-fish culture, culture methods, fish species and constraints.

SEMESTER I PAPER IV

-To understand the simple sugars (Carbohydrates) monosaccharide's, polysaccharides, oligosaccharides, their structure and functionsand also source and functions, gross energy requirement and factors altering energy requirements.
-To understand the Proteins – amino acids their structure and functions, source and functions, nitrogen balance, amino acids and their quantitative requirements. and Lipids Like fatty acids, phospholipids, cholesterol and steroids, their structure, functions, oxidation and synthesis and also sources and functions, essential fatty acids, phospholipids and steroids lipids requirements, negative aspects of lipids.
-To understand theNucleic acids – Purines and pyramidines, their structure and functions and the Enzymes classification, structure, functional relationship, kinetics, inhibitors, coenzymes and co-factor.
- To understand Vitamins – water and fat soluble vitamins, functions, deficiency, hypo and hyper-vitaminosis and Minerals their importance, deficiency and hyper dosage syndromes in fishes.
-To understand Nutritional requirements of larvae, adults and broodstock.
- To understand Feed formulation strategies and methods, types of feed and their ingredients, (conventional and non-conventional) and the Formulation of feed for larvae, fry, fingerlings, adult and brood stock.
- To understand Antinutritional factors in feed ingredients and their effects on finfish and shellfish, methods of removal of antinutrients and the Binders, antioxidants, attractants, mould inhibitors and anabolic agents.
- To understand Micro-particulate and micro-encapsulated diets and the Formulation of nutritionally balanced and cost effective diets.
-To understand Feed manufacture process – types of machinery, feed mills and their management and Processing and manufacture of different types of feeds.
-Farm made aqua feeds, probiotics and Extrusion feed technology – principles, machineries and processing.
-To understand Quality control, feed storage, feeding strategies, ration and frequency and dispensing methods.
-To understand Natural food organisms, their culture and importance.
-To understand Azolla culture – taxonomy and distribution, composition, environmental factors, growth and production and its role as a biofertilizer.
- To understand Rotifer culture – methods, media, species, factors affecting production and its applications.

- To understand Artemia culture – taxonomy, distribution, collection method, lifecycle and culture.
-To understand Microalgal culture – methods, culturable species (Spirulina, Chlorella, etc.), factors affecting production and its application.

Learning outcome

At the end of the programme students will be able to-

Semester I

Paper I – Biosystematics, Taxonomy and Evolution

Understand basic concepts of biosystematics and taxonomy.
Describe species concept and theories of biological classification.
Describe taxonomic characters and use of taxonomic keys in identification of new species.
Understand different biodiversity indices such as Shannon-Weiner index, similarity and dissimilarity index and dominance index.

Paper II – Structure and function of Invertebrate

Understand the basic concept of invertebrates.
Understand the concept of coelom.
Describe different patterns of feeding and digestion in invertebrates.
Describe respiratory organs, respiratory pigments and its mechanism in aquatic and terrestrial invertebrates.
Describe the nervous system of invertebrate in different phylums.
Explain invertebrate larval forms, their evolutionary significance and concept of minor phylum.

Paper III – Quantitative Biology, Biodiversity and Wildlife

Make appropriate use of statistics in biology.
Define the principal concepts of statistics.
Able to write technical reports containing statistical results.
Explain the concept of biodiversity, causes for its loss and conservation efforts to be made.
Understand the medicinal importance of plants in their surrounding.
Know the wildlife of India and role of protected areas in its conservation.

Paper IV – Biomolecules and Structural Biology

Describe the use of biomaterial and nanoparticles in biomedical procedures.
Understand biological processes such as DNA replication, recombination, biosynthesis of lipid, amino acids, nucleotids protein synthesis.
Understand structure and function of important biological molecules such as carbohydrate, protein and enzymes.
Relate some basic chemistry principals with biology like free energy, resonance, isomerisation and thermodynamic principals.

Semester II

Paper I- General and comparative animal physiology and Endocrinology

Understand different respiratory pigments present in different phylogenetic groups.
Understand comparative physiology of nervous system, digestion, osmoregulation in different animal groups.
Understand how animals use bioluminescense and pheromones as means of communication.

Explain physiology of pregnancy, diagnosis test, parturition and lactation.
Explain phylogeny and ontogeny of different endocrine gland.

Paper II- Population ecology and Environmental physiology
Describe population, population growth and its regulation.
Recognise aquatic and terrestrial adaptations and their significance.
Explain the interaction between two species.
Describe the concept of Environmental Impact Assessment (EIA) and sustainable development.
Explain the concept of homeostasis and physiological mechanisms of body temperature regulation.

Paper III – Tools and techniques in biology
Explain the working principle and use of different tools used in biology like microscope, colorimeter, spectrophotometer, ultracentrifuge etc.
Use computer aided techniques for data representation and analysis.
Know how cells and organs are preserved for long time by cryo techniques.
Understand the use of radioisotopes in biology.
Describe various histological and cell culture techniques.
Understand cytological and molecular biology techniques like southern and northern hybridization, DNA sequencing and PCR etc.

Paper IV – Molecular cell biology and genetics
Understand the concept of bio membrane, structure and transport across it.
Describe the concept of cell signalling and communication.
Understand the mechanism of sex determination in Drosophila and mammals, dosage compensation and Human Genome Project (HGP).
Know the history of transgenic animals and their benefits.

Semester III
Paper I – Comparative anatomy of vertebrates, gene development and differentiation
Describe the origin of chordates and vertebrates.
Describe the vertebrate morphology.
Explain the structure of lateral line system and flight adaptations in different vertebrates.
Know the aquatic adaptation in birds and mammals.
Understand hormonal regulation of pregnancy and parturition.
Explain cell commitment and germ cell determination.
Know stem cell origin, types and their use in treating disorders.

Paper II – Animal behaviour and neurophysiology
Understand basics of animal behaviour and how animals perceive the environment.
Explain neural and hormonal control of behaviour and communication.
Describe various ecological aspects of animal behaviour.
Understand reproductive and social behaviour like courtship, parental care, herding and many more.
Describe resting potential and action potential.

Paper III (A) – Cellular structure and molecular organization
Describe the structure, reproduction and chromosome organization of yeast.
Explain cell cycle control in mammal and Xenopus.

Understand cytochemistry of different cell organelles like golgi complex, peroxisomes and nucleolus.
Differentiate between normal cells and cancer cells.
Have a general idea of onchogens and proto onchogens and tumor suppressor genes.

Paper III (B) – Wildlife conservation
Understand the importance and values of wildlife wealth of India and threats to it.
Understand modern approach for wildlife conservation and the protected areas and management of wildlife in India.
Explain the physical and biological parameters of habitat.
Understand remote sensing and GIS.
Explain various population estimation methods like faecal analysis, pug mark identification and bird census etc.
Describe common diseases in wild and captive animals and their management.
Know different tools and techniques used in wild life like camera traps and wildlife telemetry.

Paper III (C) – Ichthyology : Structure and function
Describe the origin and evolution of fishes and their classification.
Understand the physiological functions of fish like digestion, respiration, excretion and osmoregulation.
Explain the luminous organs, colouration and sound producing organs of fishes.
Explain different degree of adaptations and migration in fishes.
Understand the reproductive system and life cycle of fish.

Papaer IV (A) – Cell biology
Describe the molecular organization of eukaryotic chromosome.
Explain the concept of specialized chromosomes and DNA methylation.
Understand eukaryotic gene, gene families and mutations.
Explain the eukaryotic transcription and transcriptional control.
Describe development of Drosophila.
Have basic idea of homeotic selector gene and homeotic mutation.

Paper IV (B) – Wildlife and ecotoxicology
Explain biotic and abiotic factors and different communities of ecosystem.
Describe energy flow, productivity and interactions in environment.
Know the recycle and reuse technology for solid and liquid waste.
Know the role of remote sensing in environmental conservation.
Understand different kinds of pollution and their impact on environment.
Understand the basics of toxicology.
Know food toxicants and effect of their control methods on environment.
Understand the effect of agrochemicals on environment and their alternatives.
Describe occupational health hazard.

Paper IV (C) – Pisci culture and economic importance of fishes
Understand collection of fish seed from natural resources and dry and wet bundh breading of camps.
Know the drugs useful in induced fish breading??
Understand the management of hatcheries.
Explain different types of culture like composit fish culture, prawn and pearl culture.

Understand the concept of coastal fisheries in India and role of fisheries in rural development.
Know the methods of fish preservation and about fish products.

DEPARTMENT OF ZOOLOGY AND APPLIED AQUACULTURE

LEARNING OUTCOME
M.F.Sc (MASTER OF FISHERIES SCIENCE)
SEMESTER I

At the end of the programme students will be able to-

SEMESTER I --- PAPER I

FIN FISH AND SHELLFISH BIOLOGY

-To understand the identifying characteristics of freshwater and marine water fishes species.
-Investigate life forms found in fresh water and salt water.
-identify and interpret examples of adaptations to these environments.
-To understand behavioral habits, feeding behavior, migration, locomotion and reproduction of each group.
-To classify individual vertebrates by class, order, family, Genus and species.
-Be able to explain the structures and functions of Digestive System, Respiratory systems, Circulatory systems, Reproductive systems and Nervous system in fishes.
-To understand the food and feeding habits of different species of fishes and prawns.
-Be able to explain some of the hormones that act in the process of digestion, their site of production and target organs.
-Explain chemical digestion of carbohydrates, protein and lipids.
-To understand the Qualitative and Quantitative estimation of gut contents .
-Be able to explain the Gastro-somatic and Hepato-somatic indices .
-To understand the Accessory Respiratory Organs.
- Be able to explain the structures and functions of in Fishes.
- Be able to explain the structures and functions of Blood in Fishes.
- To understand the Reproductive Behavior and Sex determination in fishes.
-Be able to explain the Gonado – Somatic index, Gametogenesis, Ovulation and Fertilization in fishes.
- To understand the various Developmental stages of Fishes.
- To explain the osmoregulation its endocrine and hormonal control in fishes.
-Be able to describe the major division of fish and various sense organs in Fishes.
- Explain the structures and functions of Endocrine Glands and their Hormonal control in fishes.
-Explain how endocrine gland interact with the nervous system.
-Explain the neuroendocrine systems in Prawns.
-Explain what biologicalrhythms are and the advantages of these rhythms.
-To explain the structures and functions of webarian-ossicles and sound production in fishes.

SEMESTER I ----

PAPER II FISH BREEDING AND HATCHERY TECHNOLOGY

-To understand the Role of extrinsic and intrinsic factors in fishes and prawn reproduction.
-To understand the maturity assessment in fishes and prawns and maintenances of brooders.
-To understand the transportation of Broodstock of fishes and prawns.
-To understand the use of special diets for broodstock Development.
-To understand the use of Hormones and anesthesia in fish and prawn for breeding.
-To explain Induced breeding in fishes (Dry Bundh, Bangla bundh, Hypophysation, Stripping etc.)
- Be able to explain the various types of synthetic compounds, their chemical composition and mechanism of action in fish breeding.
-To understand the hybridization in fishes, their advantages and disadvantages.
-Be able to explain the evaluation of carp milt, volume of milt, spermatocrit value, sperm count value, motility value, utilization of cryopreserved milt.
-To understand the site selection and construction of fish and prawn hatcheries.
-To understand the various types of hatcheries and their operation.
- To understand the Basic factors to be remembered in the handling of brooders.
- To understand how, to provide a base for the collection and transportation of brooders to the hatchery.
-To understand the construction and their management.
-To understand the stocking density, survival rate and harvesting
- Describe the chemical compositions of natural waters, and explain how and why these compositions vary.
- To explain the sources of water river, reservoir and underground water.
-To explain the aeration their types, and their advantages and disadvantages.
-Understand the importance of water quality in fish hatcheries and nurseries.
-Learn the optimum water quality requirements for carp hatchery and nursery.
-know the measures to maintain optimum water quality parameters and measures to check fish diseases.
-to know the types of ornamental fishes (freshwater and marine water), their breeding of aquarium fishes.
-To explain oviparous, ovo- viviparous and viviparous fishes and their parental care.
-To describe the maintenance of brood fishes and various methods of breeding of aquarium fishes.
-To understand aquarium manufacturing their accessories, setting and maintenance of freshwater and marine water aquaria.

SEMESTER I

PAPER III AQUACULTURE

-To explain the history and scope of aquaculture.
- To understand selection of site designing, layout, construction of aqua farms, soil properties, types of ponds their orientation, shape, size and depth of pond, design of embankments, water supply and drainage system- open channels, inlet structures, drainages and sluices.
-To explain Hatchery construction and design and their types.
-To explain Aerators their principle, deigns, requirements and their types.
-To explain Aquaculture apparatus like pump, automatic feeders demand feeders and weed control apparatus.
-To explain design and construction of cages, pens, flow-through and recirculatory systems.

- To understand the preparation and management of nursery, rearing and stocking ponds.
-To explain the types of Aquatic weeds, algal blooms, insects, predatory and weed fishes and their control and also the types of fertilizer and (organic, inorganic and biofertilizer) their application.
- Fish health monitoring (physico-chemical parameters, Feeding strategies and growth monitoring).
-To understand the freshwater Aquaculture- Culturable species of finfish and shellfish , their identification, Developmental stages, and commercial importance.
- To explain Methods of carp culture and catfish culture, their history , present status and global scenario.
- To understand the brackish water Aquaculture- Culturable species of finfish and shellfish , their identification, Developmental stages, and commercial importance and their seed production.
-To understand the Marine water Aquaculture- Culturable species of finfish and shellfish , their identification, Developmental stages, and commercial importance and their seed production.
-To understand the Fish culture in Lagoons (Pulicat and Chilka) and Backwater and Also propagation of seaweeds for commercial importance.
- To understand the All Culture Systems (Mono, Poly, composite; intensive, Semi-intensive , Extensive, Cage , Pen, Raceways Cultures and IntegratedFish Farming Like Trapa/paddy/cattle/poultry/duck/piggery-cum-fish culture and also the pearl culture.
-To understand the Sewage water treatment and Sewage-fed-fish culture, culture methods, fish species and constraints.

SEMESTER I

PAPER IV FISH NUTRITION AND FEED TECHNOLOGY

-To understand the simple sugars (Carbohydrates) monosaccharide's, polysaccharides, oligosaccharides, their structure and functionsand also source and functions, gross energy requirement and factors altering energy requirements.

-To understand the Proteins – amino acids their structure and functions, source and functions, nitrogen balance, amino acids and their quantitative requirements. and Lipids Like fatty acids, phospholipids, cholesterol and steroids, their structure, functions, oxidation and synthesis and also sources and functions, essential fatty acids, phospholipids and steroids lipids requirements, negative aspects of lipids.
-To understand theNucleic acids – Purines and pyramidines, their structure and functions and the Enzymes classification, structure, functional relationship, kinetics, inhibitors, coenzymes and co-factor.
- To understand Vitamins – water and fat soluble vitamins, functions, deficiency, hypo and hyper-vitaminosis and Minerals their importance, deficiency and hyper dosage syndromes in fishes.
-To understand Nutritional requirements of larvae, adults and broodstock.
- To understand Feed formulation strategies and methods, types of feed and their ingredients, (conventional and non-conventional) and the Formulation of feed for larvae, fry, fingerlings, adult and brood stock.
- To understand Antinutritional factors in feed ingredients and their effects on finfish and shellfish, methods of removal of antinutrients and the Binders, antioxidants, attractants, mould inhibitors and anabolic agents.

- To understand Micro-particulate and micro-encapsulated diets and the Formulation of nutritionally balanced and cost effective diets.
-To understand Feed manufacture process – types of machinery, feed mills and their management and Processing and manufacture of different types of feeds.
-Farm made aqua feeds, probiotics and Extrusion feed technology – principles, machineries and processing.
-To understand Quality control, feed storage, feeding strategies, ration and frequency and dispensing methods.
- To understand Natural food organisms, their culture and importance.
- To understand Azolla culture – taxonomy and distribution, composition, environmental factors, growth and production and its role as a biofertilizer.
- To understand Rotifer culture – methods, media, species, factors affecting production and its applications.
- To understand Artemia culture – taxonomy, distribution, collection method, lifecycle and culture.
- To understand Microalgal culture – methods, culturable species (Spirulina, Chlorella, etc.), factors affecting production and its application.

SEMESTER II
SEMESTER I PAPER I FISHERIES RESOURCE MANAGEMENT
- To understand Inland fisheries resource of India, scope for their exploitation and production.
- To understand the River systems (all)Major river systems (Ganga, Brahamputra,Indus, Narmada, Tapti, East and West coast rivers) and their fisheries.
- To understand Lakes – Origin, classification, distribution, ecology and fisheries with special reference to Upper and Lower lakes, Dal lake and Bhimtal.
- To understand Reservoirs – Large, medium and small reservoirs of India (Govind Sagar, Hirakund, Mettur, Rehand and Nagarjuna Sagar), their ecology and fisheries. Fish ways, fish passes and fish ladders, measures to increase the production of reservoirs.
- To understand Recent advancements in reservoir management and present status of reservoirs of M.P. (Newly constructed Reservoirs of Narmada,Gandhi Sagar, Tawa, Bargi, Halali).
- To understand Brackishwater resources of India and scope for their exploitation and production.
-To understand Brackishwater lakes (Chilka and Pulicat), their ecological characteristics (soil, water and biota) and fisheries. Impact of aquatic pollutions on fish health and fisheries with special reference to Ganga and Narmada rivers and Chilka lake.
- To understand Estuaries – Origin distribution and classification, scope for exploitation and production and the Fisheries of estuaries – Hoogly-Matlah, Godavari, Krishna, Adyar and Vellar.
- To understand Backwater fisheries (Kerala).
- To understand Marine fisheries resources, scope for their exploitation and production.
- To understand Coastal capture fisheries – inshore and offshore fisheries of Indian ocean, Exclusive Economic Zone (EEZ).
- To understand Fisheries of important finfishes – Sardine, Indian mackerel, Bombay duck, Tuna, Pomfret, Perches and Mulletsand also the Fisheries of important shellfishes – Shrimps (white & tiger), Lobsters, Crabs and Molluscs (Pearl oysters and edible oysters).
- To understand Fisheries of minor groups of fishes – Eels, catfishes, silver bellies, ribbon fishes, seer fishes, elasmobranches and soles.
- To understand the Anthropogenic activities and their effects on fisheries.

- To understand Threatened and endangered fish species of India and the Measures for management and conservation.
- To understand Laws for safeguarding biodiversity and management.
- To understand the Different types of traditional and mechanical vessels and their operations.
- To understand Fishing craft materials (wood, steel, FRP and ferrocement), boat designing, construction and maintenance, prevention from fauling and wood borersn and the Different types of deck equipment (derricks, boom, Gallows blocks), lifting gears (winches, power block, hauler, wire rope etc.).
- To understand Fish finding equipment (sonar, ecosounder, ecofinder, nat zoned) and application of satellite imaging, inboard and outboard motors (OBM) and their operations.
- To understand Basic principles of navigation and seamanship. Reading tide tables, compass and signaling. Use of radar and radio telephone, global positioning system (GPS).
- To understand Different types of gear materials – twine, rope, yam, mesh size regulation their Design and fabrication of fishing gears.
- To understand Principles and operations of different gears of inland water (hook and line, gill net, drag net, cast net and fishing traps) and the Principles and operations of different gears of marine water (Shore seine, purse seine, boat seine, trawl net and jigging), modernization of fishing methods; Turtle Exclusive Device (TED).

SEMESTER II

PAPER II HARVEST AND POST HARVEST TECHNOLOGY

- To understand Chemical composition of fish and shrimp – moisture, ash, carbohydrates, proteins and lipids and their estimation.

To understand Rigor mortis – freshness test, biochemical change and spoilage and Role of microbes in food spoilage, microbial analysis of (Vibrio, Salmonella,Shigella, Staphylococcus etc.) fish and fish products.

- To understand Fish food poisoning – characteristics and chemical features of food poisoning caused by Vibrio, Salmonella, Brucella, Shigella and Staphylococcus sp.
- To understand -Methods of fish preservation – drying, smoking, chilling, freezing, salting and canning. Handling and transportation of fresh fish and Methods of ice production, storage and calculation of ice requirement for fish storage.
- To understand Freezing methods – Air-blast, plate freezer and cryogenics, freezing curve, flow chart, grading, packing and storage of frozen products, drip loss and thawing of frozen fish.
- To understand Canning – with special reference to tuna, mackerel etc., types of cans, polypacks and bases (brine, oil, sauce etc.), canning of freshwater fish.
- To understand Composition of the muscle proteins and their role in emulsification and elasticity formation. Factors influencing elasticity formation and theories of gel formation and Minced meat from different varieties of freshwater and marine fishes. Improvement of colour of meat by bleaching and certain additives.
- To understand Byproducts – fish meal, fish oil, isinglass, fish finrays, chitosan, surgical sutures and other-Value added products – fish fingers, fish flakes, soup, powder, breaded and battered minced products etc.

.Standards of sanitation and hygiene, concepts of food safety in fish industry.

SEMESTER II

PAPER III AQUATIC BIOLOGY

- To understand Definition, principles and role of ecology in aquatic ecosystem and Abiotic and biotic characteristics of freshwater, brackishwater and marine environment.
- To understand Adaptations in fishes.
- To understand Oceanography in relation to fishery science and Chemical composition of seawater; waves, tides and influence of tides on fishery.
- To understand Primary productivity, gross and net productivity, qualitative and quantitative analysis of plankton.
- To understand Plankton, Benthos, macrovegetations and their role in aquatic ecosystem in relation to fisheries.Methods of collection, preservation and identification of major types of benthos and macrovegetations of freshwater.
- To understand Energy flow, ecological efficiency, ratios within trophic levels, organic particulate matters and their role in productivity.
- To understand -Influence of physical factors of the sea on the transformation of matter in marine environment.
- To understand Food web structure, utilization and transfer of energy from one trophic level to other and Food conversion and its application to ecology.
- To understand The biomass and trophic dynamism in pelagic communities.
- To understand Types of microbes – non-cellular, prokaryotic and eukaryotic microbes and their structure.
- To understand Isolation, culture and identification techniques of microbes and their enumeration methods (SPC, MPN, TCC and biomass determination).
- To understand Microbial physiology – Diffusion, osmosis, transport (active and passive) and group translocation, microbial nutrients and culture media (Natural, synthetic and differential media).
- To understand Factors affecting growth of microbes, population growth curve, its mathematical expression and microbial control (physical and chemical).
- To understand Cynobacteria and antagonistic characteristics of microbes and their evaluation.
- To understand Waste waters and their treatment (Primary, Secondary and Tertiary)and the Determination of Biological and Chemical Oxygen Demand (BOD & COD).
- To understand Pollutants- Sewage, pesticides, oils, metals ,radioactive wastes, Biomedical wastes etc. Common transport processes of pollutants in aquatic Environment; dispersal of pollutants, algal blooms and their management, Methods of pollution surveys.
- To understand Biodegradable materials (cellulose, hemicelluloses, liginin, xenobiotics and recalcitrants) and their degradation.
-To understand Types of pollutions and measures for their abatement.

SEMESTER II

PAPER IV FISH HEALTH MANAGEMENT

-To understand Stress Physiology: stress response, stress hormones and stress adaptations in fishes.
- To understand Epizootiological, post-mortem and clinical diagnosis.
- To understand Bacteriological methods and Mycotic methods of fish disease diagnosis.
-To understand Histopathological, immune-histopathological and haematological methods of fish disease diagnosis.
- To understand Nutritional fish diseases – symptoms, diagnosis and remedial measures.
-To understand Neoplastic fish diseases – classification, origin, diagnosis, types and factors involved and their possible control.

- To understand Protozoan fish diseases – symptoms, classification, distribution, life cycle of potent parasitic fish protozoans and their remedial measures.
- To understand Crustacean fish diseases – symptoms, classification, distribution and life cycle of potent crustacean parasites and their remedial measures.
- To understand Helminth fish diseases – symptoms, classification, distribution and life cycle of potene parasitic fish helminthes and their remedial measures.
- To understand Viral pathogens of finfish and shellfish, their general biology and taxonomy, isolation and identification.
- To understand Bacterial fish diseases – bacterial pathogens, their characteristics and distribution, symptoms, prophylactic and therapeutic measures.
- To understand Fungal fish diseases – mycotic pathogen and their characteristics, life cycle of potent aquatic fungi, symptoms prophylactic and therapeutic measures.
- To understand Aquatic pathogens in relation to human health (zoonosis) EUS and WSS.
- To understand Mode of transmission of microbial diseases.
- To understand Immune system – Non-specific (innate immune response) and specific immune systems, cellular and molecular interaction.
- To understand Structure, type and function of fish immunoglobulin and theories of antibody formation.
- To understand Antigenicity, precipitation, agglutination, immobilization and autoimmunity.
- To understand Hybridoma technology – mono and polyclonal antibodies and their applications; antagonism and antimicrobial agents.
- To understand Haematopoetic tissue, primaty and secondary lymphoid organs, inflammation, encytation and granuloma formation.
- To understand General principles of fish vaccination and optimizing factors for vaccination.
- To understand Strategies for fish vaccination, production of non-adjuvant (live or dead), vaccines and their applications, route of vaccine administration.
- To understand Adjuvants – present scienario of adjuvants and their role in immunomodulation of fish, production of adjuvant vaccine.
- To understand Present status and future prospects of phage therapy in aquaculture.

SEMESTER IV

SEMESTER I

PAPER I BIOSTATISTICS AND INSTRUMENTATION

- To understand Elementary statistics – Definition, scope, objectives and applications of statistics in fisheries. Collection, presentation and interpretation of data.
- To understand Mean, Mode and Median, Standard Deviation, Standard Error, Variance, ANOVA and measures of dispersion and central tendency.
- To understand Population statistics- Concept of sample and population, characteristics of a sample, probability calculation in relation to fisheries, normal and binomial distribution.
- To understand Test of significance based on t-test, X2 test (chi squre test), f-test, linear regression, correlation, fitting of curves (first degree), index number.
- To understand Sample survey, census, sampling techniques, statistical tools used in fishery economics, need for empirical and quantitative analysis.
- To understand Structure, principles and applications of compound microscope, Structure, principles and applications of dark – field and phase – contrast microscope and fluoresecent microscope.

- To understand Structure, principles and applications of electron microscope – Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM) and the Preparation of specimen for microscopy, autoradiography.
- To understand Structure, principles and applications of centrifuges.
- To understand Spectrophotometer – structure, principles and applications, determination of Optical Density (OD) of various samples and the UV-VIS spectrophotometer and fluroscence spectroscopy.
- To understand Structure, principles and applications of Atomic Absorption Spectrometer (AAS) and the Electron Spin Resonance (ESR) and mass spectrometers.
- To understand Structure, principles and applications of paper, gas and ion exchange chromatography and Structure, principles and applications of High Performance Liquid Chromatography (HPLC), molecular sieve and affinity chromatography.
- To understand Structure, principles and applications of paper, Gel Polyaccralamide Gel Electrophoresis (PAGE) & Sodium Dodecile Sulphate (SDS-PAGE) vertical (submarine), gradient gel electrophoresis.
- To understand Principles and applications of ELISA and PCR.
- To understand Fundamentals of computers and Internet: applications and advantages.
- To understand Disk Operating System (DOS) commands, Microsoft (MS) Excel as a means to calculate mean, mode, median, standard deviation, regression and plot curve fitting.

SEMESTER IV

PAPER II FISHERIES ECONOMICS AND EXTENSION

-To understand Definition and scope of economics in relation to fisheries and Law of equimarginal return, production, economics of composite, integrated, intensive and semi-intensive culture system.
- To understand Exhaustible resource – the theory of optimal depletion, uncertainly and depletion, renewable resources- a model of optimal use, the common property problem.
-Role of economics in the study of resource and environmental problems.
- To understand Economics of fish hatcheries and grow-out.
- To understand Law of demand and supply, price determination, price rise causes, consequences and remedies.
- To understand Markets – definition, functions, structure of fish markets in India.
- To understand Problems of fish marketing in India, Export of fish and fishery products, trends and problems, role of MPEDA in export of fish and fishery products.
- To understand Economics of fish farm vis-à-vis level of management.
- To understand Fish seed industry – production and marketing of fish and shellfish seed (spawn, fry, fingerling and PL-20) in India.
- To understand Administration – fishery administration at the Centre and States, its functions and organizational set up.
- To understand Fisheries legislation of Government of India and different States, Historical background and present status of legislation.
- To understand Exclusive Economic Zone (EEZ) and Coastal Regulation Zone (CRZ), their effect in fishery economy.
- To understand -Financial assistance – Financial assistance available to the fishery sector from Government, commercial banks, NABARD, its structure and functions in relation to fisheries economics, co-operatives and other institutional organizations.
- To understand Project formulation, monitoring, evaluation and calculation of profitability.
-To understand Historical perspective, concept, philosophy, principles and objectives of extension. Collection of facts, situation analysis and

- To understand Participation of organizations and involvement of people in programme planning an d Importance of extension programme and characteristics of a good programme.
- To understand Leadership and teamwork in extension.
- To understand raining strategy in transfer of technology in aquaculture, role of farmer, extension-and research linkage.
- To understand Concept and function of communication and his/her importance in extension work.
- To understand Communication models and channels, feed back in communication their Role and effects of communication channels in extension education and problem of communication – types and nature.
- To understand Innovations and their rate of adoption, characteristics of adoption categories.

SEMESTER IV -----PAPER III (a) MOLECULAR BIOLOGY

- To understand General organization of a cell, structural organization of plasma membrane and its functions. Molecular organization and biogenesis of mitochondria , chloroplast, endoplasmic reticulum, ribosomes, golgi apparatus and lysosomes.
- To understand Nucleus and its organization, chromatin material and nucleosome.
- To understand Mitosis and meiosis – mechanism (Maturation Promoting Factors MPFs), control, genetic and biochemical aspects of cell division.
- To understand Nature of geetic materials, chemical composirion of DNA and RNA configuration of DNA, types of RNA, their structure and functions.
- To understand Extrachromosomal genetic materials – Mitogen, Chlorogen and their expression like Plasmid, transposons and retrospons and their significance.
- To understand Replication – auto catalytic nature of replication, mode of replication, mechanism of replication, enzymes and proteins involved in replication, inhibition of replication.
- To understand Replication of genetic RNA, Recombination in bacteria.
- To understand Modern concept of gene, cistron, muton, recon, fine structure of gene.
- To understand Housekeeping genes, split genes, pseudogenes and oncogenes.
- To understand Genetic code – properties of genetic code, assignment of codon, chain initiation and chain termination codon, synonym codon, degeneracy of codon, frame shift mutation and Wobble's hypothesis.
- To understand Central dogma-one gene-one polypeptide hypothesis, concepts of flow of informations.
- To understand Transcriptions- mechanism and its regulation, reverse transcription.
- To understand Translation – mechanism and regulation.
- To understand Introduction and history of mutation and mutation theory and Mutation at phenotypic level, range, stage, frequency and induced mutation.
- To understand Mutation at biochemical and molecular levels and mutagens and to understand Practical application of mutation in aquatic organisms.

SEMESTER IV--------PaperIII(b) SUSTAINABLE AQUACULTURE

- To understand Present scenario and problems their Trends in global and Indian aquaculture; different farming systems, intensive systems and constraints - environmental degradation and disease outbreaks.

- To understand Sustainability and development: Systems approach and its application in aquaculture with special reference to resource-poor systems; Role of aquatic resources in food and nutrition; Aquatic resource and livelihood systems.
- To understand Environmental issues: Exotic species introduction; escapement; contamination of indigenous gene pool;
- To understand salinization of soil and water; environmental impact; over exploitation of wild stocks; mangrove deforestation.
- To understand Socio-economic issues: Conflicts over water and land use; conflicts of interest between aqua farmers and fishermen; resistance from local public; anti-dumping duties.
- To understand Strategies for sustainability: Sustainability concept; food security; biosecurity; organic farming; integrated farming; responsible aquaculture; rotational aquaculture; bioremediation; role of biotechnology, traceability.
- To understand Application of renewable energy in aquaculture - solar energy, wind, and tidal energy, Seed certification, Sustainable use of antibiotics.
- To understand Economic viability: export vs. domestic marketing, value addition.
- To understand Guiding principles to sustainable aquaculture development: Coastal Aquaculture Guidelines Source Book, FAO Code of Conduct for Responsible Fisheries; Holmenskollen Guidelines for Sustainable Aquaculture.

SEMESTER IV ----PaperIII(c) LIVE FEED CULTURE

- To understand Study the nutritional requirement of fishes and shell fishes. Body composition of fish and shellfish.
- To understand Varieties of live feed and their importance.
- To understand Natural food for different fishes and shellfishes and the Necessity of live food for larval development and culture of fish and shell fishes.
- To understand Prospects of live feed culture.Nutritive value of live feed.
- To understand Major Classes and genera of Cultured Algal species and the Various Physico-Chemical Parameters affecting the Algal growth.
- To understand Growth dynamics.
- To understand Algal culture techniques: Batch culture, Continuous culture, Semicontinous culture; Algal production and outgrowth, Harvesting and preserving micro algae.
- To understand Nutritional value of microalgae, use of micro algae in aquaculture, Replace diet for live algae.
- To understand Culture of Rotifers: Introduction, Morphology, Biology Life History of Rotifers and Strain differences.
- To understand General rotifer culture: Various factors affecting culture of Rotifer, Preparation of Stock culture and the utritional value of cultured rotifer, harvesting and cultured rotifers.
- To understand Artemia culture: Introduction, Biology and Ecology of Artemia and the Culture of Naupli, Its nutritional quantity and its application.
- To understand Production of copepods: Introduction Lifecycle, Biometric, Nutritional quality, Culture techniques, Use of resting eggs, Application in Larviculture and Nematode culture.
- To understand Trochophora larvae: Introduction, Production of Trochophora larvae, Quality controlled of the produced Trochophora larvae, Cryopreservation.
- To understand Cladocerans Culture: Biology and Life cycle of cladocerans, Nutritional value of cladocerans, Feeding and nutrition of cladocerans, Mass culture of cladocerans, Production and use of resting eggs , use of cladocerans.

- To understand Duckweed culture: Introduction, The plants and its habitat, Growing Duckweed and its nutritive value, Growth Conditions, Management system for Duckweed culture, use of Duckweed in fish nutrition.
- To understand Azolla culture: Introduction, Classification, Characteristics (Importance and environment requirements), Production, Chemical composition, Use as aqua feed.
- To understand Sea weed Culture: Introduction, Uses of Seaweed, Sea weed Resource in India, Methods of Sea weed Farming in India.

SEMESTER IV--------Paper IV(a) FISH GENETICS AND BIOTECHNOLOGY
- To understand Principles of genetics – Mendelism and gene interaction.
- To understand Structure and evolution of fish chromosomes and karyotypes.and Different techniques used in cytogenetic.
- To understand Sex linked genes, sex limited phenotypes and pleiotropy and Genetic makers.
- To understand Basic need for genetic improvement like Inbreeding and cross breeding – selection methods, basis of selection and its effects.
- To understand Hybridization in fishes.
- To understand Sex control, sex reversal, role of steroids in sex reversal.
- To understand Chromosomal manipulation – polyploidy, androgenesis, gynogenesis, cryopreservation of gametes.
- To understand Principles of genetic engineering.Recombinant DNA – construction of recombinant DNA, gene cloning methods, cloning vectors (plasmids, bacteriophage and cosmids) and restriction enzymes.
- To understand Isolation and synthesis of gene and gene transfer using vector and vectorless system.
- To understand Sequencing of nucelic acid by Maxam Gilbert and Sangar's methods.
-To understand -Southern, Northern and Western blotting methods and PCR.
- To understand Isolation, purification and hybridization of DNA, RNA and their use in gene transfer.
- To understand Transgenic fish and shellfish – basic principles and their applications in aquaculture and Methods of gene transfer in sea urchin.
- To understand Introduction to cell culture, asceptic techniques and equipment required.
- To understand Cell – disaggregation (enzymatic and mechanical methods), viable cell count, PBS and physical requirements for fish cell culture.
- To understand Primary cell culture, sub-culture and fish cell lines – advantages, disadvantages, characteristics and kinetics of fish cell lines and applications of selected fish cell lines Culture of lymphocytes, neutrophils and other blood cells and their uses.
- To understand Culture media – serum, serum-free and chemically defined media.

SEMESTER IV--------Paper IV(b) AUACULTURE AND ECOSYSTEM MANAGEMENT
- To understand Aquaculture and ecosystem relationship ,Ecosystems and productivity, biotic interaction within ecosystems and ecological homeostasis.
- To understand Climate, Weather elements of concern in aquaculture, Green house gases, global warming and their impact.Impact of environment on aquaculture: Raw water source, physical and chemical characteristics, contaminants and pollutants (algae, pathogens, heavy metals, pesticides) and their effect on productivity.
- To understand Impact of aquaculture on environment, Waste water discharge, its quality and quantity; impacts of effluents on ecosystems, chemical degradation of soil and water.
- To understand Environment monitoring, Problems and preventive measures of antibiotic and drug residues, salination of soil and water, Eutrophication, Environment impact

assessment and environmental audit, Biosensors in aquatic environment, toxicity assessment, Ecolabelling and traceability.

- To understand Environment management, Introduction of exotics and escape of farmed fish, Pathogens in aquatic environment, Safety of aquaculture products, Role of microbes in aquatic environment; assessment of probiotic impact in aquaculture.

SEMESTER IV--------Paper IV(c) ORNAMENTAL FISH CULTURE AND MANAGEMENT

- To understand World trade of ornamental fish and export potential. Different varieties of exotic and Indigenous Fishes and the Basic knowledge on profile of ornamental fishes in world.
- To understand Introduction to aquarium and aquarium accessories.
- To understand Basic knowledge and profile of some selected indigenous Indian ornamental Fishes.
- To understand Design and construction of public fresh water and marine aquaria.
- To understand Construction of ornamental fish unit.
- To understand Aerators, filters and lighting, Bio filters in aquarium.
- To understand Profiles of some selected aquarium plants. Morphology, multiplication of aquarium plants – different methods and Management of ornamental aquatic plants
- To understand Breeding of ornamental fish with reference to selected egg layer species.
- To understand Introduction hatchery management system for egg layers.
- To understand Nursery management of egg layers.
- To understand Special emphasis on Breeding of Gold fish.
- To understand Ornamental Fish-diseases and their management.
- To understand Live Food culture for tropical ornamental fish.
- To understand Feeding for breeding and maintenance of ornamental fish.
- To understand Health management in Ornamental Fish Farming.