

**E-Business [BCA-504]**  
Semester-V

**Total Credit: 4** **Total Marks: 100**

Teaching Scheme (per week in hours)			Evaluation Scheme						
Lecture	Tutorial	Lab	Pre-final Examination	Final Examination	Practical Examination		Teacher Assessment		
					Internal	External	P	A	C/M
3	1	0	35	50	0	0	6	5	4

**Syllabus**

Unit No.	Unit Name	Course Contents	Lectures per unit
1	Introduction to E-Commerce	Benefits, Impact of E-Commerce, Classification of E-Commerce, Application of E-Commerce Technology, Business Models, Framework of E-Commerce., Business to Business, Business to Customer, Customer to Customer	8
2	Network Infrastructure	LAN, Ethernet ( IEEE 802.3), WAN, Internet, TCP/IP reference model, Domain names, Internet Industry Structure, FTP applications, Electronic Mail, WWW.HTTP, Web Browsers, HTML, Simple exercises in HTML, Common, Gateway Interface	8
3	Securing Business on Network	Security Policy, Procedures and Practices, Site Security, Firewalls, Securing Web Service, Transaction Security, Cryptology, Cryptological Algorithms, Public Key algorithms, Authentication Protocols, Digital Signatures, Security protocols for WebCommerce	8
4	Electronic Payment Systems	Online Electronic Payment Systems, Prepaid and Post Paid Electronic Payment Systems Information Directories and Search Engines, Internet Advertising, Models of Internet advertising, Sponsoring Content, Corporate Website, Weaknesses in Internet advertising, Web Auctions.	10
5	Launching Your E business	Marketing an E-Business, Search Engines and Directories, Public Relations, Consumer Communication, News Groups & Forums, Exchanging Links, Web Rings, E-Business Back end systems, Business Record Maintenance, Back up procedures and disaster Recovery plans	6
<b>Total</b>			<b>40</b>

**Text/Reference Books:**

- Electronic Commerce -Framework, technologies and Applications -Bharat Bhasker TMH Publications
- World Wide Web Design with HTML : C Xavier
- Simple exercises using iHTML
- Create a Web Site with minimum Details
- List out the Web sites dealing with E-Commerce
- Log on to Web Sites dealing with E- Commerce and list out the facilities available.
- Log on to a trade web site and make a trial order for purchase of an item.
- Assignments can be on live case studies in various facets of E-Commerce.



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**B TECH (7<sup>th</sup>/8<sup>th</sup> SEMESTER) ELECTRICAL AND ELECTRONICS ENGINEERING**

**OE-431/432 REMOTE SENSING AND GIS**

L	T	P	Cr
3	-	-	3

**Internal Evaluation: 25 Marks**  
**External Examination: 50 Marks**  
**Duration of Examination: 03 Hours**

**Course Objective:**

To equip students with the basic knowledge remote sensing data/ geographical information system and their usefulness in various civil engineering applications.

<b>UNIT-I</b>	Remote sensing, Components of Remote sensing, Energy, Sensor, Interacting Body, Active and passive Remote Sensing, Platforms: Aerial and Space Platforms. Synoptivity and Repetitively. Electro Magnetic Radiation (EMR) and spectrum, Black Body Radiation, Planck's law, Stefan-Boltzman law. EMR Interaction with Atmosphere and Earth Materials, Atmospheric characteristics- Scattering of EMR, Raleigh, Mie, Non-selective and Raman Scattering. EMR Interaction with Water vapour and ozone, Atmospheric Windows, Significance of Atmospheric windows, EMR interaction with Earth Surface Materials, Radiance, Irradiance, Incident, Reflected, Absorbed and transmitted energy, Reflectance, Specular and diffuse reflection surfaces, Spectral Signature, Spectral Signature curves EMR Interaction with water, Soil and earth surface.
<b>UNIT-II</b>	Optical and Microwave Remote Sensing- Satellites, Classification based on orbits, Sun Synchronous and Geo Synchronous, Based on purpose, Earth Resources Satellites, Communication satellites, Weather satellites, Spy satellites, Satellite sensors. Resolution: Spectral, Spatial, Radiometric and Temporal Resolution, Description of Multispectral Scanning, Along and Across Track Scanners, Description of sensors in Landsat, SPOT, IRS series- Current Satellites, Radar-Speckle-Back Scattering, Side Looking Airborne Radar, Synthetic Aperture Radar, Radiometer, Geometrical characteristics.
<b>UNIT-III</b>	Geographic Information system, Components of GIS, Hardware, Software and Organizational Context. Data: Spatial and Non-Spatial, Maps: Types of Maps, Projection: Types of Projection, Data Input: Digitizer, Scanner, Editing, Raster and Vector data structure, Analysis using Raster and Vector data-retrieval, Reclassification, Overlaying, Buffering, Data Output, Printers and Plotters.
<b>UNIT-IV</b>	Visual Interpretation of Satellite Images, Elements of Interpretation, Interpretation Keys Characteristics of Digital Satellite Images, Image enhancement, Filtering, Classification, Integration of GIS and Remote Sensing, Application of Remote Sensing and GIS, Urban Applications, Water resources, Urban Analysis, Watershed Management, Resources Information systems.

**Recommended Books:**

- Lillesand T M, Kiefer R W and Chipman J W, Remote Sensing and Image Interpretation, JohnWiley & Sons, 2007
- Sabinne F F, Remote Sensing Principles and Interpretation, Waveland Press, 2007
- Burrough P A and McDonnell R, Principles of GIS, Oxford University Press, 1998
- Heywood D I, Cornelius S, Carver S, An Introduction to GIS, Pearson Education, 2006




एम. ए. वास्तु शास्त्र पाठ्यक्रम M.A. Vastu Shastra Syllabus Scheme			
प्रथम वर्ष, द्वितीय सत्र (1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester)			
Paper – IV			Paper Code
Subject	Vastu Defects & Remedies - 1 (वास्तु दोष एवं परिहार – 1)		VST-MA-204
ईकाई	Topics	Credits = 5	Marks = 60 + 40 = 100
ईकाई - 1	भवन के भीतर वास्तु विरूद्ध इण्टरियर और उसका परिहार वास्तु दोष विचार वास्तु दोष से उत्पन्न होने वाले कष्ट तथा उनके उपचार		
ईकाई - 2	गर्त विधि एवं गर्त में वास्तु पुरुष पूजन विधि वास्तु विरूद्ध नक्शे एवं उनका संशोधन विचार वास्तु दोष निवारण विधि		
ईकाई - 3	यामित्रादि दोष लग्न शुद्धि विचार दुष्ट लग्न परिहार		
ईकाई - 4	प्रतिष्ठा दोष विचार दिग्विचार गृहपिण्ड सारणी विचार		
ईकाई - 5	शिलान्यास पद्धति वास्तु शान्ति पद्धति विश्वकर्मप्रकाश के अनुसार वास्तु शान्ति की प्रविधि		
सन्दर्भ ग्रन्थ	वास्तुदोष कारण एवं निवारण - डॉ- शुकदेव चतुर्वेदी विश्वकर्मप्रकाश - विश्वकर्मा भारतीय वास्तुशास्त्र - डॉ- शुकदेव चतुर्वेदी भारतीय वास्तु विद्या - डॉ- बिहारी लाल शर्मा		




**B TECH (7<sup>th</sup>/8<sup>th</sup> SEMESTER) ELECTRICAL AND ELECTRONICS  
ENGINEERING**

**OE-431/432 ENVIRONMENTAL ASSESSMENT AND MODELING**

L	T	P	Cr
3	-	-	3

**Internal Evaluation: 25 Marks**  
**External Examination: 50 Marks**  
**Duration of Examination: 03 Hours**

**Course Objective:**

The main objective of this course is to introduce students to various methodologies required for environmental impact assessment of a project.

<b>UNIT-I</b>	Evolution of environmental impact assessment (EIA), EIA at project, Regional and policy level, Strategic EIA, EIA process, Screening and scoping criteria, Rapid and comprehensive EIA, Specialized areas like environmental health impact assessment, Environmental risk analysis, Economic valuation methods, Cost benefit analysis, Expert system and GIS applications, Uncertainties.
<b>UNIT-II</b>	Environmental policies and legislation, Legislative and environmental clearance procedures in India and other countries, Sitting criteria, Public participation, Resettlement and rehabilitation.
<b>UNIT-III</b>	Methodologies- Practical applications of EIA, EIA methodologies, Baseline data collection, Prediction and assessment of impacts on physical, Biological and socio economic environment, Environmental management plan, Post project monitoring, EIA report and EIS, Review process.
<b>UNIT-IV</b>	Environmental systems Modeling, Principles of modeling, Classification, Introduction to air quality models, Meteorology, Atmospheric stability and turbulence, Gaussian plume model and modification, Numerical models, Transport and fate of pollutant in aquatic system, Introduction to river, Estuarine and lake hydrodynamics, Stratification and eutrophication of lakes, Dissolved oxygen model for streams, Temperature models.

**Recommended Books:**

- Biswas A K, Environmental Impact Assessment for Developing Countries, Butterworth-Heinemann, 1994
- Rau G J and Wooten C D, Environmental Impact Analysis Handbook, McGraw-Hill, 1980
- Jain R K, Urban L V and Stacey G S, Environmental impact analysis: a new dimension in decision making, Van Nostrand Reinhold Co., 1981
- Thomann R V and Muller J A Principles of Surface Water Quality Modelling and Control, Harper & Row, 1987




**B.Sc. (Hons.) Biotechnology  
Generic Elective Subject**

**GENERIC ELECTIVE CHOICE PAPERS I: ENTREPRENEURSHIP DEVELOPMENT**

**UNIT I INTRODUCTION**

Meaning, Needs and Importance of Entrepreneurship, Promotion of entrepreneurship, Factors influencing entrepreneurship, Features of a successful Entrepreneurship.

**UNIT II ESTABLISHING AN ENTERPRISE**

Forms of Business Organization, Project Identification, Selection of the product, Project formulation, Assessment of project feasibility.

**UNIT III FINANCING THE ENTERPRISE**

Importance of finance / loans and repayments, Characteristics of Business finance, Fixed capital management: Sources of fixed capital, working capital its sources and how to move for loans, Inventory direct and indirect raw materials and its management.

**UNIT IV MARKETING MANAGEMENT**

Meaning and Importance, Marketing-mix, product management – Product line, Product mix, stages of product life cycle, marketing Research and Importance of survey, Physical Distribution and Stock Management.

**UNIT V ENTREPRENEURSHIP AND INTERNATIONAL BUSINESS**

Meaning of International business, Selection of a product, Selection of a market for international business, Export financing, Institutional support for exports.

**Project Report on a selected product should be prepared and submitted.**

**SUGGESTED READING**

1. Holt DH. Entrepreneurship: New Venture Creation.
2. Kaplan JM. Patterns of Entrepreneurship.
3. Gupta CB, Khanka SS. Entrepreneurship and Small Business Management, Sultan Chand & Sons.

**GENERIC ELECTIVE CHOICE PAPERS II: BIOETHICS AND BIOSAFETY**

**Unit 1**

Biosafety: Introduction; biosafety issues in biotechnology; Biological Safety Cabinets & their types; Primary Containment for Biohazards; Biosafety Levels of Specific Microorganisms

**Unit 2**

Biosafety Guidelines: Biosafety guidelines and regulations (National and International); GMOs/LMOs- Concerns and Challenges; Role of Institutional Biosafety Committees (IBSC), RCGM, GEAC etc. for GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication; Overview of International Agreements - Cartagena Protocol.

**Unit 3**





## Course Contents M.Sc. in Agronomy

- I. Course Title : Modern Concepts in Crop Production  
II. Course Code : Agron 501  
III. Credit Hours : 3+0

### IV. Aim of the course

To teach the basic concepts of soil management and crop production.

### V. Theory

#### Unit I

Crop growth analysis in relation to environment; geo-ecological zones of India.

#### Unit II

Quantitative agro-biological principles and inverse yield nitrogen law; Mitscherlich yield equation, its interpretation and applicability; Baule unit.

#### Unit III

Effect of lodging in cereals; physiology of grain yield in cereals; optimization of plant population and planting geometry in relation to different resources, concept of ideal plant type and crop modeling for desired crop yield.

#### Unit IV

Scientific principles of crop production; crop response production functions; concept of soil plant relations; yield and environmental stress, use of growth hormones and regulators for better adaptation in stressed condition.

#### Unit V

Integrated farming systems, organic farming, and resource conservation technology including modern concept of tillage; dry farming; determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integrated nutrient management; precision agriculture. Modern crop production concepts: soil less cultivation, Aeroponic, Hydroponic, Robotic and terrace farming. use of GIS, GPS and remote sensing in modern agriculture, precision farming and protected agriculture.

### VI. Teaching methods/activities

Classroom teaching with AV aids, group discussion, assignment and class discussion

### VII. Learning outcome

Basic knowledge on soil management and crop production

### VIII. Suggested Reading

- Balasubramaniyan P and Palaniappan SP. 2001. *Principles and Practices of Agronomy*. Agrobios.
- Fageria NK. 1992. *Maximizing Crop Yields*. Marcel Dekker.
- Havlin JL, Beaton JD, Tisdale SL and Nelson WL. 2006. *Soil Fertility and Fertilizers*. 7<sup>th</sup>





- Ed. Prentice Hall.
- Paroda R.S. 2003. *Sustaining our Food Security*. Konark Publ.
  - Reddy SR. 2000. *Principles of Crop Production*. Kalyani Publ.
  - Sankaran S and Mudaliar TVS. 1997. *Principles of Agronomy*. The Bangalore Printing & Publ.
  - Singh SS. 2006. *Principles and Practices of Agronomy*. Kalyani.
  - Alvin PT and kozlowski TT (ed.). 1976. *Ecophysiology of Tropical Crops*. Academia Pul., New York.
  - Gardner PP, Pearce GR and Mitchell RL. 1985. *Physiology of Crop Plants*. Scientific Pub. Jodhpur.
  - Lal R. 1989. *Conservation tillage for sustainable agriculture: Tropics versus Temperate Environments*. *Advances in Agronomy* 42: 85-197.
  - Wilsie CP. 1961. *Crop Adaptation and Distribution*. Euresia Pub., New Delhi.



## **SEMESTER- III<sup>rd</sup>**

**Course Code :- BST- 301**

**Subject :- Yogic Diet and Nutrition**

**Marks in examination: 70+30=100**

### **Unit – 1: Yogic Concept of Diet & Nutrition**

General Introduction of Ahara (Diet), concept of Mitahara; Definition and Classification in Yogic diet according to traditional Yoga texts; Concepts of Diet according to Gheranda Samhita, Hatha Pradeepika and Bhagavadgeeta; Pathya and Apathya in diet according to Yogic texts; Guna and Ahara; Importance of Yogic Diet in Yog Sadhana; Yogic Diet and its role in healthy living.

### **Unit – 2: The Nutrients and Energy**

Foods, Nutrition and Health The Recommended Dietary Allowances for Nutrients—Carbohydrates, Fats and Other Lipids, Proteins and Amino Acids, Energy Metabolism, Vitamins and Minerals, Water, Fluids, Electrolytes and Acid-base Balance. Nutrition for Fitness, Athletics and Sports. Disorders of Nutrition.

### **Unit – 3: Meal Planning and Management**

Food Guides for Selecting an Adequate Diet. Meal Planning for Various Age Groups. Meal Planning in Pregnancy and Lactating women. Indian Meal Patterns—Vegetarian & Non-Vegetarian. Fundamentals of Foods, Nutrition and Diet Therapy.

### **Unit – 4: Diet Therapy**

Changing Needs and Dietary Adaptation. Principles of Diet Therapy and Therapeutic Nutrition. Nutrition in different diseases. Nutrient Drug Interaction. Concept of Food In Yoga, Ayurveda and Sports.

### **Recommended Books:-**

1. Fundamental of Foods, Nutrition & Diet Therapy(5 th ed.),ISBN: 9788122419825, New Age Publications.
2. Maurice Edward Shils(2012).Modern Nutrition in Health and Disease(11th ed.).ISBN: 9781605474618,
3. Lippincott Williams & Wilkins Michelle McGuire, Kathy A. Beerman (2012).
4. Nutritional Sciences\_ From Fundamentals to Food (3rd ed.), ISBN: 9780840058201, Cengage Learning





**B TECH (7<sup>th</sup> / 8<sup>th</sup> SEMESTER) CHEMICAL ENGINEERING**  
**CHE-421/422/423/424 FOOD TECHNOLOGY**

**Internal Evaluation: 50 Marks**  
**External Examination: 50 Marks**  
**Duration of Examination: 03 Hours**

L	T	P	Cr
3	1	-	4

**Course Objective:**

The food industry is the largest industrial sector of the economy. Food engineers conceive, Design, And operate food processes, Equipment, And plants for efficient food production with minimal impact on the environment. Students specializing in food engineering learn to apply engineering principles and concepts to handling, Storing, Processing, Packaging, And distributing food and related products. In addition to engineering principles, The food engineering is intended to provide an understanding of the chemical, Biochemical, Microbiological, And physical characteristics of foods.

<b>UNIT-I</b>	Introduction, General aspects of food industry, World food demand and Indian scenario, Chemical composition of foods their properties and functions, Characteristic features of processed and natural food; Chemical and biochemical reactions in storage and handling of foods. Food additives, Standards, Deteriorative factors and their control, Preliminary processing methods, Conversion and preservation operation. Energy Engineering in Food Processing - Generation of Steam, Fuel Utilization, Electric Power Utilization, Process Controls in Food Processing, Systems for Heating and Cooling Food Products.
<b>UNIT-II</b>	Thermal Properties of Foods, Modes of Heat Transfer - Freezing Systems, Frozen-Food Properties, Freezing Time refrigeration system for food products Processing Systems, Microbial Survivor Curves, Influence of External Agents, Thermal Death Time , Spoilage Probability, General Method for Process Calculation Preservation by heat and cold dehydration, Concentration, Frying, Irradiation, Microwave heating, Sterilization and pasteurization, Fermentation and pickling, Packing methods.
<b>UNIT-III</b>	Separation processes in food processing- Electrodialysis Systems, Reverse Osmosis Membrane Systems, Membrane Performance, Ultrafiltration Membrane Systems, Concentration Polarization. Types of Reverse-Osmosis and Ultrafiltration Systems, Drying Processes, Dehydration Systems, Dehydration System Design, Sedimentation, Centrifugation, Mixing. Production and utilization of food products - soft and alcoholic beverages, Dairy products, Meat, Poultry and fish products, Treatment and disposal of food processing wastes.
<b>UNIT-IV</b>	Packaging - Introduction, Food Protection, Product Containment, Product Communication, Product Convenience, Mass Transfer in Packaging Materials. Innovations in Food Packaging , Food Packaging and Product Shelf-life, Food canning technology, Fundamentals of food canning technology, Test methods (Drop test etc.) for checking Integrity of food packaging. Heat sterilization of canned food, Containers - metal, Glass and flexible packaging, Canning procedures for fruits, Vegetables, Meats, Poultry marine products. Food laws, Legislation, Safety and quality control, MSDS for food industry.

**Recommended Books:**

- Potter Norman N, Hotchkiss Joseph, Food Science, CBS
- Toledo Romeo, Fundamentals of Food Process Engineering, CBS
- Charm Stanley, Fundamentals of Food Engineering
- Singh R Paul, Dennis R, Introduction to Food Engineering
- Heldman D R, Food Process Engineering, The AVI Publishing Co, Westport




## LAWS OF MINES AND MINERALS

L T P C  
4 1 0 4

### Objectives: Hours)

(48

- The Course on Mines and Minerals in India aims to give the students an overall view of the various laws relating to the mines and minerals in India. It is designed to give the students a clear picture of the various provisions of law regulating the exploitation of our natural resources.
- The Course will critically analyze the various laws on Mines and Minerals in India and deepen the students' understanding of the relation between conservation and development and judicious use of our precious resources.

### Expected outcome:

- The students will get academic knowledge on Mines and Minerals gathered through the lectures, presentations, discussions, documentaries and movies as well as guest lectures from field experts.
- These Acts & Rules present the students with a clear picture of the legal provisions regarding the usage of our mineral resources.
- The Course on Law of Mines and Minerals (LMM) in India is designed in such a manner as to be a job oriented programme.

### Unit I

(12 Hours)

- Mines and Minerals: Importance and Significance.,
- India's contribution to World's Mineral Production
- Ownership of Minerals in India
- Power of the Parliament to regulate Mining.
- Vth Schedule of the Constitution of India
- Judgement (Samtha v. State of Andhra Pradesh, (1997) 8 SCC 191; AIR 1997 SC 3297





# MEWAR UNIVERSITY

## Unit II

(12 Hours)

- Indian Mineral scenario
- Royalty
- Foreign Trade and Investment
- Strategy Paper for the Ministry of Mines
- Shah Commission Enquiry Reports

## Unit III

(12 Hours)

- National Mines Policy - An Overview
- State Mineral Policy
- Reconnaissance Permit (RP);
- Mining Lease (ML)
- Forestry Clearance (FC)
- Environmental Clearance. (EC)

## Unit IV

(12 Hours)

- The Mines Act, 1952; (S.2 (1) (h), (j), (jj), (q), (2) A; S.5-9; S.16-18; S.19-21; S.23-27; S.28-36; S.40-45; S.49-52, S.63-70)
- The Mines Rules, 1955. (R.23-24; R.29A-29P; 29Q-29R; R30-R45; R46-R52; R53-R61; R73; R75-R78).

## Text Books

**T1** Sheshagiri Rao, P, Law of Mines and Minerals, 17th Edition, Asian Law House, 2010;

**T2** PK Basu Majumdar, Law of Mines & Minerals, Universal Law Publishing Co., 2011

## Reference Books

**R1** Vth Schedule, Constitution of India

**R2** National Mineral Policy 1993 and 2008

**R3** The Mines Rules, 1955.



## Semester – II

## Theory Courses

## CC-203 ORGANIZATION AND ADMINISTRATION IN PHYSICAL EDUCATION

**Unit – I: Organization and administration**

- Meaning and importance of Organization and Administration in physical education
- Qualification and Responsibilities of Physical Education teacher and pupil leader
- Planning and their basic principles,
- Program planning: Meaning, Importance, Principles of program planning in physical education.
- Functions of Planning, organizing, staffing, directing, communicating, co-ordination, controlling, evaluating and innovating.

**Unit- II: Office Management, Record, Register & Budget**

- Office Management: Meaning, definition, functions and kinds of office management
- Records and Registers: Maintenance of attendance Register, stock register, cash register, physical efficiency record, Medical examination Record.
- Budget: Meaning, Importance of Budget making,
- Criteria of a good Budget, Sources of Income, Expenditure, Preparation of Budget.

**Unit-III: Facilities, & Time-Table Management**

- Facilities and equipment management: Types of facilities Infrastructure-indoor, out door.
- Care of school building, Gymnasium, swimming pool, Play fields, Play grounds
- Equipment: Need, importance, purchase, care and maintenance.
- Time Table Management: Meaning, Need, Importance and Factor affecting time table.

**Unit-IV: Competition Organization**

- Importance of Tournament,
- Types of Tournament and its organization structure - Knock-out Tournaments, League or Round Robin Tournaments, Combination Tournament and challenge Tournament.
- Organization structure of Athletic Meet
- Sports Event Intramurals & Extramural Tournament planning

**References:**

- Broyles, F. J. & Rober, H. D. (1979). *Administration of sports, Athletic programme: A Managerial Approach*. New York: Prentice hall Inc.
- Bucher, C. A. (1983). *Administration of Physical Education and Athletic programme*. St. Louis: The C.V. Mosby Co.
- Kozman, H.C. Cassidy, R. & Jackson, C. (1960). *Methods in Physical Education*. London: W.B. Saunders Co.
- Pandy, L.K. (1977). *Methods in Physical Education*. Delhi: Metropolitan Book Depo.




- Sharma, V.M. & Tiwari, R.H.: (1979). *Teaching Methods in Physical Education*. Amaravati: Shakti Publication.
- Thomas, J. P.(1967). *Organization & administration of Physical Education*. Madras: Gyanodayal Press.
- Tirunarayanan, C. & Hariharan, S. (1969). *Methods in Physical Education*. Karaikudi: South India Press.
- Voltmer, E. F. & Esslinger, A. A. (1979). *The organization and administration of Physical Education*. New York: Prentice Hall Inc.



**B TECH (4<sup>th</sup> SEMESTER) CHEMICAL ENGINEERING**  
**CHE-202 INDUSTRIAL POLLUTION ABATEMENT**

L	T	P	Cr
3	1	-	4

**Internal Evaluation: 50 Marks**  
**External Examination: 50 Marks**  
**Duration of Examination: 03 Hours**

**Course Objective:**

The aim of this course that the students will learn the essential principles used in Industrial pollution abatement and understand Important Issues in Industrial pollution abatement and pertinent environmental legislations. After undergoing this course the students will have the knowledge of surface water and ground water quality and the remediation technologies, The design processes for treatment of environmental Pollutants, Indoor air pollution and control, As well as global atmosphere change.

<b>UNIT-I</b>	Introduction, Industrial pollution, Different types of wastes generated in an industry, Different water pollutants, Air pollutants and solid wastes from industry, Their effects on living and non-living things, Environmental regulatory legislations and standards, Importance of Industrial pollution abatement, Concept of sustainable development, Green house gases, Global warming and climate change.
<b>UNIT-II</b>	Water Pollution, Identification, Quantification and analysis of wastewater, Classification of different treatment methods into physico-chemical and biochemical techniques, Physico-chemical methods, General concept of primary treatment, Liquid-solid separation, Design of a settling tank, Neutralization and flocculation, Biological methods, Concept of aerobic digestion, Design of activated sludge process, Concept of anaerobic digestion, Biogas plant layout, Different unit operations and unit processes involved in conversion of highly polluted water to potable standards.
<b>UNIT-III</b>	Air Pollution, Classification of air pollutants, Nature and characteristics of gaseous and particulate pollutants, Analysis of different air pollutants, Description of stack monitoring kit and high volume sampler, Atmospheric dispersion of air pollutants, Gaussian model for prediction of concentration of pollutant down wind direction, Concept of temperature inversion, Plume and its behavior, Concept of effective stack height, Operating principles and simple design calculations of particulate control devices like gravity settling chamber, Cyclone, Bag filters, Electrostatic precipitators and scrubbers, Brief concepts of control of gaseous emissions by absorption, Adsorption, Chemical transformation and combustion.
<b>UNIT-IV</b>	Solid Wastes, Analysis and quantification of hazardous and nonhazardous wastes, Treatment and disposal of solid wastes, Land filling, Leach ate Treatment, Incineration. Environmental Management System, Environment impact assessment, Its concept and constituents, Environmental audit, ISO-14000 system.

**Recommended Books:**

- Peavy H S, Rowe D R, And Tchobanoglous G, Environmental Engineering, McGraw Hill International
- Rao C S, Environmental Pollution Control Engineering, Wiley Eastern
- Metcalf & Eddy, Wastewater Engineering, Tata McGraw-Hill Education Private Limited
- Masters G M, Introduction to Environmental Engineering and Science, Prentice hall off India
- De Nevers N, Air Pollution Control Engineering, McGraw-Hill.




**M.Sc. Zoology  
SEMESTER-III**

**Discipline Specific Elective**

**Paper III: DSE1 (M3ZOO-ET01): FISH BIOLOGY (EVOLUTION & FUNCTIONAL ANATOMY OF FISH) (THEORY)**

**UNIT-I**

General characters, evolution and phylogeny of fishes, study of Origin and adaptive radiations of various groups.

General account and phylogenetic significance of: a) Ostracoderms b) Placoderms.

Classification of fishes, with distinguishing characters of principal sub-divisions- Elasmobranchs, Teleostei, Holocephali, Dipnoi.

**UNIT-II**

Body form and locomotion of fishes- General principles and methods, functioning, types and modes of locomotion, integumentary system of fishes, Exoskeleton: Skin and Scales- Origin, derivatives and uses of Scales. Structure modification and functions of fins in various types of fishes. Theories of origin of median and paired fins, types of endoskeleton of fishes.

**UNIT-III**

Food and feeding habits of fishes, alimentary canal of fishes, physiology of digestion. Blood vascular system and circulation of blood. Respiratory organs, physiology of respiration and regulation of breathing organs. Air breathing organs.

**UNIT-IV**

Structure, function and physiology of swim bladder. Weberian apparatus. Excretory organs found in fishes Physiology of excretion Osmo-regulation in fishes.

**UNIT-V**

Nervous system and sense organs -functions and physiology, endocrine gland, hormones and reproductive behavior. Gonads, reproduction, development and hatching, Viviparity.

**Suggested Literature:**

1. Biology of Fishes, Bone, Q. and Moore, R., Talyor and Francis Group, CRC Press, U.K.
2. The Physiology of Fishes, Evans, D. H. and Claiborne, J. D., Taylor and Francis Group, CRC Press, UK
3. The Senses of Fish Adaptations for the Reception of Natural Stimuli, von der Emde, R., Mogdans, J. and Kapoor, B. G., Narosa Publishing House, New Delhi, INDIA



## MINING GEOLOGY -III

UNIT I	Geological Mapping: Definition of map, scale of map, types, map symbols; Surface and underground geological mapping. Computer based geological data plotting and preparation of map.
UNIT II	Diastrophism ; Earthquakes causes, and effects; Seismic belts, Interior of earth; Volcanoes: products and distribution; Mountains: types, mountain building, and plate tectonics its causes and effects.
UNIT III	Study of important metallic, nonmetallic and fuel minerals of India. Their geographical distribution, mode of occurrence, economic importance giving emphasis on occurrences in Rajasthan. Metallic minerals i.e. Lead, Zinc, Copper, Iron, Nickel, Gold, Aluminium, Manganese, Tungsten, Uranium; Non-Metallic minerals i.e. Limestone, Talc, Rock-Phosphate, Gypsum, Kyanite, Marble, Granite, Sandstone, Garnet, Corundum, Diamond, Fluorite, Quartz, Feldspar, Calcite, Topaz, Kyanite, Olivine; Fuel minerals i.e. Coal, lignite and Petroleum.
UNIT IV	Geological discontinuity- Folds – genesis, classification, identification in field, impact on landscape, mineraldeposits, mining and tunnelling. Faults – mechanism of faulting, classification, impact of faulting on topography, significance of faults in mining engineering and tunnelling. Joints.

### PRACTICALS-

- 1) Structural models under hand specimen.
- 2) Metallic minerals under hand specimen.
- 3) Non-metallic economic minerals under hands specimen.
- 4) Plotting of geological section along given section line in the given geologic map.
- 5) Stereo-net plotting of ore body planes with the help of dip and strike data obtained by borehole drilling.
- 6) Find the apparent dip in given direction with the help of stereo-net.
- 7) Find the amount and direction of plunge of the ore body by given strike-dip data with the help of stereo-net.
- 8) Construction of Clinometers and Brunton compass

### Recommended books-

1. S. Sinha Roy. Geology of Rajasthan, Geological Society of India, Bangalore.
2. Krishnaswamy. Indian mineral resources, Oxford Pub.

