# PO and CO

# M.Sc. (Environment & Safety)

# Faculty of Science – Under CBCS System

# (Implemented from Academic Year 2019-20)

## Programme Objectives (PO)

1. To provide knowledge about basic concepts of environment and safety.

2. To develop scientific attitude for decision making in environmental issues.

3. To develop problem solving ability for the environmental protection and safety management.

4. To evolve competence in the field of environmental health and safety management

# Course Objectives (CO)

## *SEMESTER – I*

| Semester | I | Total Credit | 4 |
|---|---|---|---|
| Course Code | CC101 | Credit Pattern | L-45, T-8, P-7 |
| Course Title | INTRODUCTION TO ECOLOGY AND ENVIRONMENT | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Differentiate biotic and a biotic components of the ecosystem & multidisciplinary nature of the Environmental Science. | | |
| 2. | Acquire the knowledge about environmental components, ecological succession, types of ecosystem, and ecological energetics. | | |
| 3. | Inculcate the concepts of population dynamics, population regulation, population structure and its characteristics. | | |
| 4. | Interpret the consequences of the upset of biogeochemical cycles & processes like bio accumulation & bio magnification of toxic chemicals. | | |

| Course Code | CC 102 | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| Course Title | NATURAL RESOURCES | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Infer about Earths structure & its composition. | | |
| 2. | Grasp the importance of natural resources its exploration, mismanagement & degradation. | | |
| 3. | Acquire knowledge about mineral resources: utilization of metallic minerals and non-metallic minerals, marine, soil, floral & faunal resources, their exploration & environmental consequences. | | |
| 4. | Interpret energy scenario, renewable and non-renewable energy resources, and concept of entropy. | | |

| Course Code | CC 103 | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| Course Title | FUNDAMENTALS OF SAFETY | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Interpret and make use of the concepts of Health and Occupational Safety while performing Safety Audit. | | |
| 2. | Summarize the role of Safety Committee & Legal requirements in Industrial Safety | | |
| 3. | Develop Material Safety Data Sheets and improve the safety measures in chemical industries | | |
| 4. | Assess the fire chemistry and implement the knowledge for fire fighting | | |

| Course Code | CC 104 | Credit Pattern | L-15, T-0, P-45 |
|---|---|---|---|
| Course Title | PRACTICAL- I | | |
| **Course Outcomes:** After completion of this course students will have capability to | | | |
| 1 | Develop methodology for sample collection, processing and preservation for environmental analysis. | | |
| 2 | Make use of glassware, their appropriate cleaning, preparation and standardization of solutions. | | |
| 3 | Plan analytical techniques/experiments/ classical methods with easy to run experiments. | | |
| 4 | Interpret the experimental results to study environmental processes. | | |

| Course Code | CC 105 | Credit Pattern | L-15, T-0, P-45 |
|---|---|---|---|
| Course Title | PRACTICAL- II | | |

| Course Outcomes: After completion of this course students will have capacity to | |
|---|---|
| 1 | Relate and demonstrate the basic laboratory instruments used in environmental analysis and understand the principle of measurements using those instruments. |
| 2 | Experiment with work safely and competently in an environmental laboratory settings, with confidence. |
| 3 | Identify and describe steps that are included in analysis, like sampling, sample processing, removal of interferences, detection of component of interest and data evaluation. |
| 4 | Interpret the chemical methods used to study environmental processes. |

| Course Code | DSE 101-(A) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| Course Title | ENVIRONMENTAL CHEMISTRY | | |

| Course Outcomes: After completion of this course students will have capacity to | |
|---|---|
| 1 | Demonstrate and relate chemical processes involved in the environment and concept of sampling and chemical analysis for monitoring of environmental pollution and related issues. |
| 2 | Apply basic chemical concepts to analyze and interpret different environmental problems related with the pollution of precious natural resources. |
| 3 | Make use, elaborate and Interpret wide range of chromatographic and other techniques involved in the study of environmental processes through sampling and analysis. |
| 4 | Elaborate, interpret and adapt reporting on a range of spectro-photometric and electro-analytical methods involved and used to study environmental processes. |

| Course Code | DSE 101 (B) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| Course Title | ECOLOGICAL FOOTPRINT & CARBON SEQUESTRATION | | |

| Course Outcomes: The students | |
|---|---|
| 1. | Explain ecological footprint standards, reporting framework & economic applications |
| 2. | Estimate Carbon Footprint, GWP, Carbon Trading and Carbon Sequestration |
| 3. | Calculate Carbon sequestration, carbon footprint and ecological footprint |
| 4. | Elaborate mitigation and adaptation strategies for carbon footprints in India |

| Course Code | GE 101 (A) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| Course Title | FUNDAMENTALS OF MANAGEMENT | | |

| Course Outcomes: Students will be able to; | |
|---|---|
| 1. | Discuss management evolution and how it can affect future managers |
| 2. | Analyze and attain elementary level of skills in management process and functions: planning, organizing, leading, deciding, motivating and controlling. |
| 3. | Evaluate leadership styles to anticipate the consequences of each leadership style. |
| 4. | Describe concept of CSR. |

| Course Code | GE-101 (B) | Credit Pattern | L-45, T-7, P-8 |
|---|---|---|---|
| **Course Title** | **OFFICE AUTOMATION** | | |
| **Course Outcomes** | | | |
| After completion of this course the student will be able to: | | | |
| 1 | Distinguish basic concepts and computer terminology. | | |
| 2 | Identify operating system features. | | |
| 3 | Create appropriate documents with the help of Word Processor. | | |
| 4 | Design effective presentation. | | |
| 5 | Analyze any data with the help of spreadsheets. | | |

| Course Code | GE-101 (C) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **Indian Social Problems and Social Services** | | |
| **Course Outcomes** | | | |
| After completion of this course the student will be able to: | | | |
| 1 | Analyze social problems using sociological perspectives. | | |
| 2 | Describe how individual experiences of social problems relate to social structures and cultures using the sociological imagination. | | |
| 3 | Explain how social inequality and systems of power perpetuate social problems. | | |
| 4 | To understand all aspects of human social behaviour, including the behaviour of individuals as well as the social dynamics of small groups, large organizations, communities, institutions, and entire societies. | | |

| Course Code | GE 101 (D) | Credit Pattern | L-44, T-08, P-08 |
|---|---|---|---|
| **Course Title** | **Principles of Economics** | | |
| Course Outcomes: Students will be able to | | | |
| 1 | The student will identify the application of economics in his personal and professional life. | | |
| 2 | Expalain the economic factors and their implications in the working of different organisations | | |

| Course Code | GE101 (E) | Credit Pattern | L-45, T-15, P-0 |
|---|---|---|---|
| **Course Title** | **ENVIRONMENT AND DEVELOPMENT ( only for the students of other Department)** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Differentiate biotic and abiotic components of ecosystem & able to understand concept of habitat, interactions in between different components & their Interrelationships. | | |
| 2. | Develop ability of identification of local issues related with natural resources. | | |
| 3. | Adopt various pollution control techniques. | | |
| 4. | Able to know various environmental policies as well as National & International Organizations involved. | | |

| Course Code | AEC 101 | Credit Pattern | L-30, T-2, P-6 |
|---|---|---|---|
| **Course Title** | **Life Skills for Managers** | **Credits: 2** | |
| **Course Outcomes:** Students will be able to; | | | |
| 1 | Apply various soft Skills to life and business situations. | | |
| 2 | Develop managerial employability related skills. | | |
| 3 | Work on development of self-personality. | | |

# ***SEMESTER –II***

| **Semester** | **II** | **Total Credit** | **4** |
|---|---|---|---|
| **Course Code** | **CC 201** | **Credit Pattern** | **L-45, T-8, P-7** |
| **Course Title** | **WATER POLLUTION** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Classify the sources of water pollution and arrange sampling for water and waste water analysis. | | |
| 2. | Identify the issues associated with water pollution due to local industries. | | |
| 3. | Assess the water quality on studying the associated parameters. | | |
| 4. | Analyze the causes of ground water, thermal and marine pollution. | | |

| **Course Code** | **CC 202** | **Credit Pattern** | **L-45, T-8, P-7** |
|---|---|---|---|
| **Course Title** | **ENVIRONMENTAL ENGINEERING AND DESIGN** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Design water treatment plant. | | |
| 2. | Select appropriate method for water and wastewater treatment. | | |
| 3. | Grade the existing water and wastewater treatment methods. | | |

| **Course Code** | **CC 203 B** | **Credit Pattern** | **L-24, T-2, P-4** |
|---|---|---|---|
| **Course Title** | **REMOTE SENSING AND GIS** | | |
| **Course Outcomes:** The students will able | | | |
| 1. | Define remote sensing and GIS. | | |
| 2. | Explain EMR, Energy interactions and types of Aerial photographs. | | |
| 3. | Elaborate applications of GIS in Environmental science. | | |
| 4. | Make use of GIS for various applications. | | |

| **Course Code** | **CC 204** | **Credit Pattern** | **L-23, T-2, P-5** |
|---|---|---|---|
| **Course Title** | **COMPUTER APPLICATIONS** | | |
| **Course Outcomes:** The students will able | | | |
| 1. | Understand Computer Fundamentals in detail. | | |
| 2. | Manage the desktop, files, folders using control panel and other utilities. | | |
| 3. | Create & present data in Word, PowerPoint and Excel. | | |
| 4. | Use various features and tools of MSOffice, and use different formulas and functions. | | |

| **Course Code** | **CC 205** | **Credit Pattern** | **L-23, T-2, P-5** |
|---|---|---|---|
| **Course Title** | **Statistical Methods** | | |
| **Course Outcomes:** The students will get | | | |
| 1. | Conceptual clarity on statistical methods. | | |
| 2. | Ability to analyze and interpret data. | | |

| Course Code | CC 206 | Credit Pattern | L-15, T-0, P-45 |
|---|---|---|---|
| **Course Title** | **PRACTICAL- III** | | |
| **Course Outcomes: After completion of this course students will have capability to** | | | |
| 1 | Make use of water sampling methods, processing and preservation of water samples. | | |
| 2 | Determine water pollution levels using appropriate methodology/ instrumentation. | | |
| 3 | Perceive skills in analytical techniques/experimental for BOD,COD measurements. | | |
| 4 | Interpret the experimental results to study water pollution levels. | | |

| Course Code | CC 207 | Credit Pattern | L-15, T-0, P-45 |
|---|---|---|---|
| **Course Title** | **PRACTICAL- IV** | | |
| **Course Outcomes: After completion of this course students will have capability to** | | | |
| 1 | Make use of designing of water and waste water treatment plant. | | |
| 2 | Experiment with the maintenance of water and waste water treatment plant . | | |
| 3 | Adapt statistical methods for interpretation of results. | | |
| 4 | Perceive computer & GIS applications in the interpretation and presentation of results. | | |

| Course Code | DSE 201 (A) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Recognize, evaluate industrial and occupational hazards and propose control measures. | | |
| 2. | Correlate occupational health and hazards at the workplace. | | |
| 3. | Compare and contrast nutritional requirements with health issues. | | |
| 4. | Identify the importance of ergonomics, create design of work station for improving safety and productivity. | | |

| Course Code | DSE 201 (B) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **AQUACULTURE AND AGRICULTURE** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Demonstrate techniques and develop technologies in aquaculture practices. | | |
| 2. | Perceive the importance of coastal and fresh water aquaculture, global scenario, present status in India- prospects and scope. | | |
| 3. | Develop competitively, skills and technology required for sustainable development in agri ecosystem. | | |
| 4. | Identify and overcome the challenges encountered sustainability in agri-ecosystem. | | |

| Course Code | GE 201 (A) | Credit Pattern | L-45, T-9, P-6 |
|---|---|---|---|
| **Course Title** | **FUNDAMENTALS OF ACCOUNTING** | | |
| **Course Outcomes** | | | |
| | The students will able to learn: | | |
| 1. | Describe the concepts of Accounting and Finance. | | |
| 2. | Apply the financial and cost accounting techniques. | | |
| 3. | Analyse the financial and cost statements. | | |

| Course Code | GE 201 (B) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **MANAGEMENT INFORMATION SYSTEM** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Recognize types of MIS applications in organizations. | | |
| 2. | Discuss the development of management information systems in organizations. | | |
| 3. | Apply appropriate computerized information system techniques. | | |
| 4. | Evaluate MIS contributions to the strategic management of organizations. | | |
| 5. | Select significant tool for supporting management decision making. | | |

| Course Code | GE 201(C) | Credit Pattern | L-40, T-10, P-10 |
|---|---|---|---|
| **Course Title** | **SOCIAL WELFARE ADMINISTRATION** | | |
| **Course Outcomes: Students will be able to** | | | |
| 1 | Develop insight into the concept and process of social welfare administration. | | |
| 2 | Establish the qualities and skills of Social welfare Administration. | | |
| 3 | Understand the structure & functions of social welfare administration organization. | | |
| 4 | Understand the basic administrative processes and practices in India. | | |
| 5 | Understand the management of Non Governmental Organization. | | |
| 6 | Develop Project proposal writing skills. | | |

| Course Code | GE 201(D) | Credit Pattern | L-44, T-08, P-08 |
|---|---|---|---|
| **Course Title** | **Principles of Micro Economics** | | |
| Course Outcomes: Students will be able to | | | |
| 1 | Understand the micro variables and approach for microeconomic issues. | | |
| 2 | Analyse the process of factor price determination at micro level. | | |

| Course Code | GE 201 | Credit Pattern | L-45, T-15, P-0 |
|---|---|---|---|
| **Course Title** | **DISASTER MANAGEMENT ( Only for the students of other Departments)** | | |
| **Course Outcomes: After completion of this course students will have capacity** to | | | |
| 1. | Recognize the various global and regional environmental concerns/hazards due to natural causes and/or human activities, and the impact of these on various forms of life . | | |
| 2. | Obtain and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios | | |
| 3. | Describe and evaluate the environmental, social, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters. | | |
| 4. | Relate theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) | | |

| Course Code | AEC 201 (A) | Credit Pattern | L-22, T-4, P-4 |
|---|---|---|---|
| **Course Title** | **Foreign Languages ( GERMAN)** | | |
| **Course Outcomes: Students will be able to;** | | | |
| **1** | This course will crate platform for the students to get prepared for Star Deutch exam (A1 exam by Goethe Institute, Max Muller Bhavan) . the students will find it very easy to pursue for this exam after completion of this course and they will have overall idea about the German language as well teaching methods followed to learn any foreign language . | | |
| **2** | This course enables the students to understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concert type.<br>To enable to students to introduce him/herself and others and can ask and answer question about personal details such as where he /she lives, people he /she knows lives, people he /she knows and things he /she has<br>To make him/her interact in a simple way provided the other person talks slowly and clearly and is prepared to help.<br>To help him/her to use the basic grammar concepts correctly.<br>To enable the students to read and write simple text. The students learn 400-600 words of vocabulary. | | |

| Course Code | AEC 201 (B) | Credit Pattern | L-22, T-4, P-4 |
|---|---|---|---|
| **Course Title** | **Foreign Languages ( JAPANESE)** | | |
| **Course Outcomes: Students will be able to;** | | | |
| 1 | This course enables the students to understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concert type.<br>To enable to students to introduce him/herself and others and can ask and answer question about personal details such as where he /she lives, people he /she knows lives, people he /she knows and things he /she has<br>To make him/her interact in a simple way provided the other person talks slowly and clearly and is prepared to help.<br>To help him/her to use the basic grammar concepts correctly. | | |

| Course Code | AEC 201 (C) | Credit Pattern | L-22, T-4, P-4 |
|---|---|---|---|
| **Course Title** | **Foreign Languages ( FRENCH)** | | |
| **Course Outcomes: Students will be able to;** | | | |
| 1 | This course will create a platform for the students to get prepared for DELF (A1.1 exam by Alliance Francaise). The students will find it very easy to pursue for this exam after completion of this course and they will have overall idea about the French language as well teaching methods followed to learn any foreign language. | | |
| 2 | This course enables the students to understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concert type.<br>To enable the students to introduce him/herself and others and can ask and answer questions about personal details such as where he /she lives, people he /she knows lives, people he /she knows and things he /she has<br>To make him/her interact in a simple way provided the other person talks slowly and clearly and | | |

| | |
|---|---|
| | is prepared to help.<br>To help him/her to use the basic grammar concepts correctly.<br>To enable the students to read and write simple text. The students learn 400-600 words of vocabulary. |

| **Course Code** | **AEC 201 (D)** | **Credit Pattern** | **L-22, T-4, P-4** |
|---|---|---|---|
| **Course Title** | **SELLING AND NEGOTIATING SKILLS** | | |
| **Course Outcomes: Students will be able to;** | | | |
| 1 | Demonstrate selling process for industrial as well as consumer products. | | |
| 2 | Analyse and overcome problems that arise during negotiations. | | |

| **Course Code** | **AEC 2(E)** | **Credit Pattern** | **L-24, T-2, P-4** |
|---|---|---|---|
| **Course Title** | **FOREST MANAGEMENT** | | |
| **Course Outcomes:** The students will able | | | |
| 1 | Explain importance of forest with its ecological functions. | | |
| 2 | Develop a plan for forest management. | | |
| 3 | Describe forest conservation strategies. | | |

| **Course Code** | **AEC 201 (F)** | **Credit Pattern** | **L-22, T-2, P-6** |
|---|---|---|---|
| **Course Title** | **ORAL COMMUNICATION** | | |
| **Course Outcomes: Students should be able to** | | | |
| 1 | Communicate in English language. | | |
| 2 | Apply interpersonal skills. | | |
| 3 | Demonstrate skills required for conducting group discussions, presentations and speeches. | | |

# ***SEMESTER III***

| **Semester** | **III** | **Total Credit** | **4** |
|---|---|---|---|
| **Course Code** | **CC 301** | **Credit Pattern** | **L-45, T-8, P-7** |
| **Course Title** | **ENVIRONMENTAL EDUCATION, POLICY AND LEGISLATION** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Classify the various environmental policies, laws and institutions involved in the protection and conservation of environment. | | |
| 2. | Infer various strategies practiced across the globe for environmental conservation. | | |
| 3. | Evaluate the environmental provisions and acts regarding environmental protection. | | |
| 4. | Know environmental acts. | | |

| **Course Code** | **CC 302** | **Credit Pattern** | **L-45, T-8, P-7** |
|---|---|---|---|
| **Course Title** | **AIR AND NOISE POLLUTION** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Appraisal of present air pollution status. | | |
| 2. | Identify existing and potential sources of air pollution. | | |
| 3. | Identify and Classify existing sources of noise pollution. | | |

| **Course Code** | **CC 303** | **Credit Pattern** | **L-45, T-8, P-7** |
|---|---|---|---|
| **Course Title** | **DISASTER MANAGEMENT** | | |
| **Course Outcomes: After completion of this course students will have capacity to** | | | |
| 1 | Summarize the various global and regional environmental concerns due to natural causes and/or human activities, and the impact of these on various forms of life . | | |
| 2. | Identify, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios. | | |
| 3. | Integrate knowledge to manage different public health aspects of disaster events at a local and global levels. | | |
| 4. | Appraise work theoretically and practically in the process of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections. | | |

| **Course Code** | **CC 304** | **Credit Pattern** | **L-0, T-15, P-45** |
|---|---|---|---|
| **Course Title** | **SUMMAR INPLANT PROJET (SIP)** | | |
| **Course Outcomes: After completion of this SIP students will have capability to** | | | |
| 1 | Select and defend a topic of their SIP and effectively plan, execute, evaluate and discuss their innovative ideas and experiments. | | |
| 2 | Identify systematically the relevant theory and concepts, and relate these to appropriate methodologies and evidences. | | |
| 3 | Apply appropriate techniques and draw appropriate conclusions, develop communication and interpersonal skills. | | |
| 4 | Propose and present scientific approach to solve the problem. Interpret, discuss and communicate scientific results in written form. | | |

| Course Code | CC 305 | Credit Pattern | L-15, T-0, P-45 |
|---|---|---|---|
| **Course Title** | **PRACTICAL -V** | | |
| **Course Outcomes: After completion of this course students will be able to** | | | |
| 1 | Extend use of technical and analytical skills to quantify the level and effects of noise pollution. | | |
| 2 | Utilize the technical skills for air sampling, using high volume sampler and stack monitoring kit. | | |
| 3 | Develop analytical skills to quantify the level and effects of air pollution by conventional methods . | | |
| 4 | Elaborate and Integrate scientific processes to analyze soil samples for soil rating and fertilizer dose recommendation . | | |

| Course Code | CC 306 | Credit Pattern | L-15, T-0, P-45 |
|---|---|---|---|
| **Course Title** | **PRACTICAL -VI** | | |
| **Course Outcomes: After completion of this course students will** | | | |
| 1 | Make use of methods of Isolation of pure cultures of micro-organisms from environmental samples using appropriate microbial techniques. | | |
| 2 | Apply Screening of microbial cultures in the different areas of environment management and for further entrepreneurship development. | | |
| 3 | Evaluate dispersal of air pollutants by drawing wind rose diagram. | | |
| 4 | Elaborate and explore Soxlet extraction method as a separative technique. | | |

| Course Code | DSE 301 (A) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT SYSTEM** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Design EMP for particular industry. | | |
| 2. | Prépare Environnemental Impact Assessment report. | | |
| 3. | Design EMS for particular Industry. | | |
| 4. | Prepare Environmental Audit reports of industry. | | |

| Course Code | DSE 301 (B) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **SAFETY LEGISLATION AND MANAGEMENT** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Interpret role and function of occupational Safety in Industry. | | |
| 2. | Discover certain laws concerning to Occupational health. | | |
| 3. | Prioritize the socio legal aspects of Occupational Health and Safety. | | |
| 4. | Conclude compensatory & Environmental Laws. | | |

| Course Code | GE 301 (A) | Credit Pattern | L-45, T-7, P-8 |
|---|---|---|---|
| **Course Title** | **Entrepreneurship Development** | | |
| **Course Outcomes: Students will be able to;** | | | |
| 1 | Describe the Concepts of Entrepreneur & Entrepreneurship Development. | | |
| 2 | Apply Entrepreneurship Development practices to start new enterprise. | | |
| 3 | Analyze issues involved in Entrepreneurship Development. | | |
| 4 | Evaluate Business Plan of new enterprise. | | |

| Course Code | GE-301(B) | Credit Pattern | L-48, T-8, P-4 |
|---|---|---|---|
| **Course Title** | **E-Commerce** | | |
| **Course Outcomes** | | | |
| After completion of this course the student will be able to: | | | |
| 1 | Integrate the knowledge of foundational functional areas of commerce in order to develop a holistic perspective on the role of IT in organizations. | | |
| 2 | Select and apply appropriate models to analyze the role of IT in an organization. | | |
| 3 | Recognize the business impact and potential of e-commerce. | | |
| 4 | Develop a holistic perspective on the role of IT in organizations. | | |

| Course Code | GE 301 (C) | Credit Pattern | L-40, T-10, P-10 |
|---|---|---|---|
| **Course Title** | **Fundamental of Counseling** | | |
| **Course Outcomes: Students will be able to;** | | | |
| 1 | Learn about conceptual understanding of the psychological foundation of human behaviour. | | |
| 2 | Gain the knowledge of various fields of counseling. | | |
| 3 | Identify and solve problems of individuals. | | |
| 4 | Work effectively as part of a team. | | |
| 5 | Understand various types of problems faced by people in the society. | | |
| 6 | Learn diverse perceptive on the functioning of human behaviour. | | |

| Course Code | GE 301 (D) | Credit Pattern | L-40, T-10, P-10 |
|---|---|---|---|
| **Course Title** | **Fundamentals of Macro Economics** | | |
| Course Outcomes: Students will be able to | | | |
| 1 | Identify the macro variables in any economy. | | |
| 2 | Describe the economic theories and variations in macro variables. | | |

| Course Code | GE 301-E | Credit Pattern | L-45, T-15, P-0 |
|---|---|---|---|
| **Course Title** | **SUSTAINABLE AGRICULTURE (Only for the students of other Departments)** | | |
| **Course Outcomes: After completion of this course students will be able to** | | | |
| 1. | Explain the importance of agriculture, components of agri-ecosystem, and will learn importance of biodiversity in agri-ecosystem. | | |
| 2. | Determine Irrigation water quality and water requirement for sustainability, and propose methods of soil & water conservation. | | |
| 3. | Understand & apply many ecological principles in soil health management, pest management and fertilizer management through an integrated approach. | | |
| 4. | Propose IPNM & IPM concepts, and recommend remedial measures required for restoration. | | |

| Course Code | AEC 301 (A) | Credit Pattern | L-24, T-3, P-3 |
|---|---|---|---|
| **Course Title** | **WILDLIFE MANAGEMENT** | | |
| **Course Outcomes: Students should be able to** | | | |
| 1 | Distinguish between various wildlife conservation projects. | | |
| 2 | Prepare a strategy for conservation of wildlife at local to international level. | | |
| 3 | Elaborate various conservation practices at national level. | | |

| Course Code | AEC 301 (B) | Credit Pattern | 22L, 8TP |
|---|---|---|---|
| **Course Title** | **FUNDAMENTAL OF TOURISM MANAGEMENT** | | |
| **Course Outcomes: Students will be able to;** | | | |
| 1 | Explain the concepts of travel and tourism. | | |
| 2 | Develop a tourism plan. | | |

| Course Code | AEC-301 (C) | Credit Pattern | L-22, T-2, P-6 |
|---|---|---|---|
| **Course Title** | **WRITTEN COMMUNICATION** | | |
| Course Outcomes Students should be able to: | | | |
| 1 | Apply writing skills for organizational purpose. | | |
| 2 | Develop writing skills for business communication. | | |
| 3 | Analyse various types of written communication. | | |

## ***SEMESTER-IV***

| **Course Code** | **CC 401** | **Credit Pattern** | **L-45, T-8, P-7** |
|---|---|---|---|
| **Course Title** | **ENVIRONMENTAL MICROBIOLOGY, BIOTECHNOLOGY AND TOXICOLOGY** | | |
| **Course Outcomes: After completion of this course students will have capacity to** | | | |
| 1. | Describe the importance of microbial diversity, benefits and harms of MOs with potential applications in the innovative environmental management technologies. | | |
| 2. | Describe and apply existing and emerging technologies like *in- situ, ex-situ,* & engineered bioremediation, phyto-remediation for environmental clean up and environmental pollution management. Appreciate the scientific, ethical and social issues associated with certain applications of biotechnology in agriculture and forest management. | | |
| 3. | Demonstrate an awareness about emerging concerns of reductions in fossil fuels through new biotechnological interventions in the harnessing renewable biomass energy. Describe and apply biotechnological solutions like bio-plastics, bio-fertilizers, bio-pesticides, bio-mining, biosensors to address present environmental concerns. | | |
| 4. | Identify and evaluate the toxic chemicals, mutagens, carcinogens and their relationships between exposure and dose-response relationships. Evaluate effects on living/physiological systems like neurotoxicity, nephro-toxicity, hepato-toxicity, and reproductive toxicity. | | |

| **Course Code** | **CC 402** | **Credit Pattern** | **L-45, T-8, P-7** |
|---|---|---|---|
| **Course Title** | **MANAGEMENT OF INDUSTRIAL AND CIVIC WASTE** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Justify the concept like Waste-to-Energy and 5R Principles of Solid Waste Management. | | |
| 2. | Select suitable method for sludge management at ETP and CETP. | | |
| 3. | Formulate the technologies for management of Hazardous waste including Biomedical & E-waste. | | |
| 4. | Interpret the hazards related to radioactivity & manage the Radioactive wastes as per regulations. | | |

| **Course Code** | **CC 403** | **Credit Pattern** | **L-0, T-15, P-45** |
|---|---|---|---|
| **Course Title** | **PROJECT (Lab/Survey)** | | |
| **Course Outcomes: After completion of this course students will be capable to** | | | |
| 1 | Develop Competence in scientific research designing, identifying environmental issues, planning accordingly and developing problem solving skills. | | |
| 2 | Choose methodology to collect samples/data, analyze and critically evaluate different technical solutions. | | |
| 3 | Perceive skills for project management and writing a scientific report critically and systematically. | | |
| 4 | Compile, interpret and presentation and explanation of their research findings to the audience effectively Contributing to team and group work for scientific investigation and reporting. | | |

| **Course Code** | **CC 404** | **Credit Pattern** | **L-15, T-0, P-45** |
|---|---|---|---|
| **Course Title** | **PRACTICAL-VII** | | |
| **Course Outcomes: After completion of this course students will be capable of** | | | |
| 1 | Applying standard Plate Count method for the enumeration of micro-organisms in the environmental samples. | | |
| 2 | Demonstrating Grams Staining and motility study to differentiate microbes. | | |
| 3 | Evaluating the enrichment culture technique for isolation of desired microbes. | | |
| 4 | Proposing cell/enzyme immobilization technique in industrial pollution management . | | |

| Course Code | CC 405 | Credit Pattern | L-15, T-0, P-45 |
|---|---|---|---|
| **Course Title** | **PRACTICAL-VIII** | | |
| **Course Outcomes: After completion of this course students will be capable of** | | | |
| 1 | Demonstrating Isolation, segregation, characterization and proper utilization of Municipal Solid Waste. | | |
| 2 | Determining quality of irrigation water for optimal utilization to avoid further environmental consequences. | | |
| 3 | Recommend gypsum requirement for the preparation of reclamation plans for saline alkali soils. | | |
| 4 | Propose dose of lime for reclamation of an acid soil, by performing laboratory experiments and computing results. | | |

| Course Code | DSE 401 (A) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **LAND AND WATER MANAGEMENT** | | |
| **Course Outcomes: After completion of this course students will be capable of** | | | |
| 1 | Identifying concept of optimal land use planning based on capabilities to prevent further degradation and relate these to appropriate methodologies of sustainable land management. | | |
| 2 | Discovering challenges and give suggestions to manage accelerated soil erosion, ground water recharging and water logging conditions, with the emphasis on prevention, control and reclamation of saline-alkali soils. Prepare a plan for reclamation of degraded area. | | |
| 3 | Demonstrating an understanding of the hydrology of streams and lake systems and concept of water shed management, and describing the processes of and importance of groundwater flow and aquifer systems. | | |
| 4 | Describing the challenges of maintaining surface and ground water quality, apply their knowledge base and research skills to current issues pertaining to water resource management, and remediation, with emphasis on related economic, social, and public policy dimensions. | | |

| Course Code | DSE 401 (B) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **SAFETY ENGINEERING** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Examine the safety in use of machinery & importance of guarding. | | |
| 2. | Choose the safety measures while handling & storage of materials. | | |
| 3. | Demonstrate the safety aspects when working at height. | | |
| 4. | Examine the Safety in Industrial Operation like Heat, Stress & Electrical Hazards. | | |

| Course Code | GE 401 (A) | Credit Pattern | L-45, T-8, P-7 |
|---|---|---|---|
| **Course Title** | **BUSINESS ETHICS** | | |
| **Course Outcomes:** Students will be able to; | | | |
| 1. | Describe ethical principles in business. | | |
| 2. | Analyze ethical and unethical issues. | | |
| 3. | Solve ethical dilemmas in the organization. | | |
| 4. | Build ethical culture in the organization. | | |

| Course Code | GE 401 (B) | Credit Pattern | L-45, T-11, P-0 |
|---|---|---|---|
| **Course Title** | **Basic Concepts of DBMS** | | |
| **Course Outcomes:** The students will able to | | | |
| 1. | Define DBMS Schemas and structure | | |
| 2 | Illustrate basic concepts of DBMS and various databases used in real applications | | |
| 3. | Solve simple as well as complex SQL query problems | | |
| 4. | Design ER-models to represent simple database application scenarios | | |
| 5. | Apply database design concepts in a given scenario | | |

| Course Code | GE 401 (C) | Credit Pattern | L-40, T-10, P10 |
|---|---|---|---|
| **Course Title** | **Basics of Social Legislation** | | |
| **Course Outcomes:** Students will be able to; | | | |
| 1 | Equip students with a comprehensive knowledge about the law, its bases and relationships with the human and institutional agencies. | | |
| 2 | Understand about the Indian Legal System and procedure. | | |
| 3 | Apply fundamental rights and duties given in Indian Constitution. | | |
| 4 | Understand the Legal Aid Services. | | |
| 5 | Help students to understand the legal systems and procedures of people welfare in India. | | |

| Course Code | GE 401 (D) | Credit Pattern | L-44, T- 08, P-08 |
|---|---|---|---|
| **Course Title** | **Indian Economy** | | |
| Course Outcomes: Students will be able to | | | |
| 1 | Identify the main issues in Indian economic development. | | |
| 2 | Critically analyse the Indian economic policy environment. | | |

| Course Code | GE 401 (E) | Credit Pattern | L-45, T-15, P-0 |
|---|---|---|---|
| **Course Title** | **Land and Watershed Management(Only for the students of other Departments)** | | |
| **Course Outcomes: After completion of this course students will be capable to** | | | |
| 1 | Identify concept of optimal land use planning based on capabilities to prevent further degradation and relate these to appropriate methodologies of sustainable land management. | | |
| 2 | Describe challenges and give suggestions to manage accelerated soil erosion, ground water recharging and water logging conditions, with the emphasis on prevention, control and reclamation of saline-alkali soils. | | |
| 3 | Demonstrate understanding of the hydrology of streams and lake systems and concept of water shed management, and describing the processes of and importance of groundwater flow and aquifer systems. | | |
| 4 | Describe the challenges of maintaining surface and ground water quality, apply their knowledge base and research skills to current issues pertaining to water resource management, and remediation, with emphasis on related economic, social, and public policy dimensions. | | |

| Course Code | AEC 401 | Credit Pattern | L-24, T-3, P-3 |
|---|---|---|---|
| **Course Title** | **SUSTAINABLE AGRICULTURE** | | |
| **Course Outcomes:** After studying this course the students will able to | | | |
| 1. | Understand the concept and importance of sustainability in agriculture with relation to current social, economic, and technical challenges and opportunities in sustainable food production. | | |
| 2 | Develop an appreciation for the impacts of agriculture on natural resources, energy, environment, and climate change and related solutions for these issues. Propose Integrated approaches in pest and fertilizer management. | | |