Course Title: Construction Management and Entrepreneurship As per Choice Based Credit System (CBCS) scheme] SEMESTER:VI

Subject Code	15CV61	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS –04		**Total Marks - 100**	

Course Objectives: This course will enable students to

1. Understand the concept of planning, scheduling, cost and quality control, safety during construction, organization and use of project information necessary for construction project.
2. Inculcate Human values to grow as responsible human beings with proper personality.
3. Keep up ethical conduct and discharge professional duties.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Management: Characteristics of management, functions of management, importance and purpose of planning process, types of plans **Construction Project Formulation:** Introduction to construction management, project organization, management functions, management styles **Construction Planning and Scheduling:** Introduction, types of project plans, work breakdown structure, Grant Chart, preparation of network diagram- event and activity based and its critical path-critical path method, concept of activity on arrow and activity on node.	10 hours	L1,L2,L3
Module -2		
Resource Management: Basic concepts of resource management, class of labour, Wages & statutory requirement, Labour Production rate or Productivity, Factors affecting labour output or productivity. **Construction Equipments:** classification of construction equipment, estimation of productivity for: excavator, dozer, compactors, graders and dumpers. Estimation of ownership cost, operational and maintenance cost of construction equipments. Selection of construction equipment and basic concept on equipment maintenance **Materials:** material management functions, inventory management.	10 Hours	L1,L2,L3
Module -3		
Construction Quality , safety and Human Values: Construction quality process, inspection, quality control and quality assurance, cost of quality, ISO standards. Introduction to concept of Total Quality Management **HSE:** Introduction to concepts of HSE as applicable to Construction. Importance of safety in construction , Safety measures to be taken during Excavation Explosives , drilling and blasting , hot bituminous works , scaffolds / platforms / ladder , form work and equipment operation. Storage of materials. Safety through legislation, safety campaign. Insurances. **Ethics :** Morals, values and ethics, integrity, trustworthiness , work ethics, need of engineering ethics, Professional Duties, Professional and Individual Rights, Confidential and Proprietary Information, Conflict of Interest Confidentiality, Gifts and Bribes, Price Fixing, Whistle Blowing.	10 Hours	L1,L2,L3
Module -4		
Introduction to engineering economy : Principles of engineering economics, concept on Micro and macro analysis, problem solving and decision making. **Interest and time value of money:** concept of simple and compound interest, interest formula for: single payment, equal payment and uniform gradient series. Nominal and effective interest rates, deferred annuities, capitalized cost. **Comparison of alternatives :** Present worth, annual equivalent , capitalized and rate of return methods , Minimum Cost analysis and break even analysis	10 Hours	L1,L2,L3

Module -5		
Entrepreneurship: Evolution of the concept, functions of an entrepreneur, concepts of entrepreneurship, stages in entrepreneurial process, different sources of finance for entrepreneur, central and state level financial institutions. **Micro, Small & Medium Enterprises (MSME):** definition, characteristics, objectives, scope, role of MSME in economic development, advantages of MSME, Introduction to different schemes: TECKSOK, KIADB, KSSIDC, DIC, Single Window Agency: SISI, NSIC, SIDBI, KSFC **Business Planning Process:** Business planning process, marketing plan, financial plan, project report and feasibility study, guidelines for preparation of model project report for starting a new venture. Introduction to international entrepreneurship opportunities , entry into international business , exporting , direct foreign investment , venture capital	10 Hours	L1,L2,L3

Course Outcomes: After studying this course, students will be able to:

1. Understand the construction management process.
2. Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
3. Fulfill the professional obligations effectively with global outlook

Program Objectives:

- Engineering knowledge
- Problem analysis
- Interpretation of data

Question Paper Pattern:

- The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
- There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
- Each full question shall cover the topics as a module
- The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. P C Tripathi and P N Reddy, "Principles of Management", Tata McGraw-Hill Education
2. Chitkara, K.K, "Construction Project Management: Planning Scheduling and Control", Tata McGraw-Hill Publishing Company, New Delhi.
3. Poornima M. Charantimath , "Entrepreneurship Development and Small Business Enterprise", Dorling Kindersley (India) Pvt. Ltd., Licensees of Pearson Education
4. Dr. U.K. Shrivastava "Construction Planning and Management", Galgotia publications Pvt. Ltd. New Delhi.
5. Bureau of Indian standards – IS 7272 (Part-1)- 1974 : Recommendations for labour output constant for building works :

Reference Books:

1. Robert L Peurifoy, Clifford J. Schexnayder, Aviad Shapira, Robert Schmitt, "Construction Planning, Equipment, and Methods (Civil Engineering), McGraw-Hill Education
2. Harold Koontz, Heinz Weihrich, "Essentials of Management: An International, Innovation, and Leadership perspective", T.M.H. Edition, New Delhi
3. Frank Harris, Ronald McCaffer with Francis Edum-Fotwe, " Modern Construction Management", Wiley-Blackwell
4. Mike Martin, Roland Schinzinger, "Ethics in Engineering", McGraw-Hill Education
5. Chris Hendrickson and Tung Au, "Project Management for Construction - Fundamentals Concepts for Owners, Engineers, Architects and Builders", Prentice Hall, Pitsburgh
6. James L.Riggs , David D. Bedworth , Sabah U. Randhawa " Engineerng Economics" 4 ed tata Mc Graw hill.
7. S.C Sharma –"Construction Equipments and its management" – Khanna publishers

SOFTWARE ENGINEERING

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER – IV

Subject Code	15CS42	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Course objectives: This course will enable students to

- Outline software engineering principles and activities involved in building large software programs.
- Identify ethical and professional issues and explain why they are of concern to software engineers.
- Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation.
- Differentiate system models, use UML diagrams and apply design patterns.
- Discuss the distinctions between validation testing and defect testing.
- Recognize the importance of software maintenance and describe the intricacies involved in software evolution.
- Apply estimation techniques, schedule project activities and compute pricing.
- Identify software quality parameters and quantify software using measurements and metrics.
- List software quality standards and outline the practices involved.
- Recognize the need for agile software development, describe agile methods, apply agile practices and plan for agility.

Module 1	**Teaching Hours**
Introduction: Software Crisis, Need for Software Engineering. Professional Software Development, Software Engineering Ethics. Case Studies. **Software Processes**: Models: Waterfall Model **(Sec 2.1.1)**, Incremental Model **(Sec 2.1.2)** and Spiral Model **(Sec 2.1.3)**. Process activities. **Requirements Engineering**: Requirements Engineering Processes **(Chap 4)**. Requirements Elicitation and Analysis **(Sec 4.5).** Functional and non-functional requirements **(Sec 4.1)**. The software Requirements Document **(Sec 4.2)**. Requirements Specification **(Sec 4.3)**. Requirements validation **(Sec 4.6)**. Requirements Management **(Sec 4.7)**.	**12 Hours**
Module 2	
System Models: Context models **(Sec 5.1)**. Interaction models **(Sec 5.2)**. Structural models **(Sec 5.3)**. Behavioral models **(Sec 5.4)**. Model-driven engineering **(Sec 5.5)**. **Design and Implementation**: Introduction to RUP **(Sec 2.4)**, Design Principles **(Chap 17)**. Object-Oriented design using the UML **(Sec 7.1)**. Design patterns **(Sec 7.2)**. Implementation issues **(Sec 7.3)**. Open source development **(Sec 7.4)**.	**11 Hours**
Module 3	
Software Testing: Development testing **(Sec 8.1)**, Test-driven development **(Sec 8.2)**, Release testing **(Sec 8.3)**, User testing **(Sec 8.4)**. Test Automation **(Page no 42, 70,212, 231,444,695)**. **Software Evolution**: Evolution processes **(Sec 9.1)**. Program evolution dynamics **(Sec 9.2)**. Software maintenance **(Sec 9.3)**. Legacy system management **(Sec 9.4)**.	**9 Hours**

Module 4	
Project Planning: Software pricing **(Sec 23.1)**. Plan-driven development **(Sec 23.2)**. Project scheduling **(Sec 23.3)**: Estimation techniques **(Sec 23.5)**. **Quality management**: Software quality **(Sec 24.1)**. Reviews and inspections **(Sec 24.3)**. Software measurement and metrics **(Sec 24.4)**. Software standards **(Sec 24.2)**	**10 Hours**
Module 5	
Agile Software Development: Coping with Change **(Sec 2.3)**, The Agile Manifesto: Values and Principles. Agile methods: SCRUM (Ref "**The SCRUM Primer, Ver 2.0**") and Extreme Programming **(Sec 3.3)**. Plan-driven and agile development **(Sec 3.2)**. Agile project management **(Sec 3.4),** Scaling agile methods **(Sec 3.5)**:	**8 Hours**

Course Outcomes: After studying this course, students will be able to:

- Design a software system, component, or process to meet desired needs within realistic constraints.
- Assess professional and ethical responsibility
- Function on multi-disciplinary teams
- Use the techniques, skills, and modern engineering tools necessary for engineering practice
- Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

Graduate Attributes

- Project Management and Finance
- Conduct Investigations of Complex Problems
- Modern Tool Usage
- Ethics

Question paper pattern:

The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012.
(Listed topics only from Chapters 1,2,3,4, 5, 7, 8, 9, 23, and 24)
2. The SCRUM Primer, Ver 2.0, http://www.goodagile.com/scrumprimer/scrumprimer20.pdf

Reference Books:

1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill**.**
2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India

Web Reference for eBooks on Agile:

1. http://agilemanifesto.org/
2. http://www.jamesshore.com/Agile-Book/

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER – V

Subject Code	15CS51	IA Marks	20
Number of Lecture Hours/Week	4	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Course objectives: This course will enable students to

- Explain the principles of management, organization and entrepreneur.
- Discuss on planning, staffing, ERP and their importance
- Infer the importance of intellectual property rights and relate the institutional support

Module – 1	**Teaching Hours**
Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, brief overview of evolution of management theories,. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection	**10 Hours**
Module – 2	
Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control.	**10 Hours**
Module – 3	
Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study.	**10 Hours**
Module – 4	
Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, **Enterprise Resource Planning: Meaning and Importance- ERP** and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation	**10 Hours**
Module – 5	
Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India indusial policy 2007 on micro and small enterprises, case study (Microsoft), Case study(Captain G R Gopinath),case study (N R Narayana Murthy & Infosys), **Institutional support:** MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, **Introduction to IPR.**	**10 Hours**

Course outcomes: The students should be able to:

- Define management, organization, entrepreneur, planning, staffing, ERP and outline

their importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

Question paper pattern:

The question paper will have TEN questions.
There will be TWO questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer FIVE full questions, selecting ONE full question from each module.

Text Books:

1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship - Kanishka Bedi- Oxford University Press-2017

Reference Books:

1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier – Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003

CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER – VI

Subject Code	15CS61	IA Marks	20
Number of Lecture Hours/Week	4	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Course objectives: This course will enable students to

- Explain the concepts of Cyber security
- Illustrate key management issues and solutions.
- Familiarize with Cryptography and very essential algorithms
- Introduce cyber Law and ethics to be followed.

Module – 1	**Teaching Hours**
Introduction - Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Mathematical Background for Cryptography - Modulo Arithmetic's, The Greatest Comma Divisor, Useful Algebraic Structures, Chinese Remainder Theorem, Basics of Cryptography - Preliminaries, Elementary Substitution Ciphers, Elementary Transport Ciphers, Other Cipher Properties, Secret Key Cryptography – Product Ciphers, DES Construction.	**10 Hours**
Module – 2	
Public Key Cryptography and RSA – RSA Operations, Why Does RSA Work?, Performance, Applications, Practical Issues, Public Key Cryptography Standard (PKCS), Cryptographic Hash - Introduction, Properties, Construction, Applications and Performance, The Birthday Attack, Discrete Logarithm and its Applications - Introduction, Diffie-Hellman Key Exchange, Other Applications.	**10 Hours**
Module – 3	
Key Management - Introduction, Digital Certificates, Public Key Infrastructure, Identity–based Encryption, Authentication–I - One way Authentication, Mutual Authentication, Dictionary Attacks, Authentication – II – Centalised Authentication, The Needham-Schroeder Protocol, Kerberos, Biometrics, IPSec-Security at the Network Layer – Security at Different layers: Pros and Cons, IPSec in Action, Internet Key Exchange (IKE) Protocol, Security Policy and IPSEC, Virtual Private Networks, Security at the Transport Layer - Introduction, SSL Handshake Protocol, SSL Record Layer Protocol, OpenSSL.	**10 Hours**
Module – 4	
IEEE 802.11 Wireless LAN Security - Background, Authentication, Confidentiality and Integrity, Viruses, Worms, and Other Malware, Firewalls – Basics, Practical Issues, Intrusion Prevention and Detection - Introduction, Prevention Versus Detection, Types of Instruction Detection Systems, DDoS Attacks Prevention/Detection, Web Service Security – Motivation, Technologies for Web Services, WS- Security, SAML, Other Standards.	**10 Hours**
Module – 5	
IT act aim and objectives, Scope of the act, Major Concepts, Important provisions, Attribution, acknowledgement, and dispatch of electronic records, Secure electronic records and secure digital signatures, Regulation of certifying authorities: Appointment of Controller and Other officers, Digital Signature certificates, Duties of Subscribers, Penalties and adjudication, The cyber	**10 Hours**

regulations appellate tribunal, Offences, Network service providers not to be liable in certain cases, Miscellaneous Provisions.	

Course outcomes: The students should be able to:

- Discuss cryptography and its need to various applications
- Design and develop simple cryptography algorithms
- Understand cyber security and need cyber Law

Question paper pattern:

The question paper will have TEN questions.
There will be TWO questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer FIVE full questions, selecting ONE full question from each module.

Text Books:

1. Cryptography, Network Security and Cyber Laws – Bernard Menezes, Cengage Learning, 2010 edition (Chapters-1,3,4,5,6,7,8,9,10,11,12,13,14,15,19(19.1-19.5),21(21.1-21.2),22(22.1-22.4),25

Reference Books:

1. Cryptography and Network Security- Behrouz A Forouzan, Debdeep Mukhopadhyay, Mc-GrawHill, 3rd Edition, 2015
2. Cryptography and Network Security- William Stallings, Pearson Education, 7th Edition
3. Cyber Law simplified- Vivek Sood, Mc-GrawHill, 11th reprint , 2013
4. Cyber security and Cyber Laws, Alfred Basta, Nadine Basta, Mary brown, ravindra kumar, Cengage learning

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2017-2018)
SEMESTER – V

Subject Code	17CS51	IA Marks	40
Number of Lecture Hours/Week	4	Exam Marks	60
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Module – 1	**Teaching Hours**
Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, brief overview of evolution of management theories,. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection	**10 Hours**
Module – 2	
Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control.	**10 Hours**
Module – 3	
Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study.	**10 Hours**
Module – 4	
Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, **Enterprise Resource Planning: Meaning and Importance- ERP** and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation	**10 Hours**
Module – 5	
Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India indusial policy 2007 on micro and small enterprises, case study (Microsoft), Case study(Captain G R Gopinath),case study (N R Narayana Murthy & Infosys), **Institutional support:** MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, **Introduction to IPR.**	**10 Hours**

Course outcomes: The students should be able to:

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

Question paper pattern:

The question paper will have TEN questions.
There will be TWO questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer FIVE full questions, selecting ONE full question from each module.

Text Books:

1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship - Kanishka Bedi- Oxford University Press-2017

Reference Books:

1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier – Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER – V

MANAGEMENT AND ENTREPRENEURSHIP (Core Course)

Subject Code	15EE51	IA Marks	20
Number of Lecture Hours/Week	04	Exam Hours	03
Total Number of Lecture Hours	50	Exam Marks	80

Credits – 04

Course objectives:

- To introduce the field of management, task of the manager, importance of planning and types of planning, staff recruitment and selection process.
- To discuss the ways in which work is allocation, structure of organizations, modes of communication and importance of managerial control in business.
- To explain need of coordination between the manager and staff, the social responsibility of business and leadership.
- Toexplaintheroleandimportanceoftheentrepreneurineconomicdevelopmentandtheconceptsof entrepreneurship.
- To explain various types of entrepreneurs and their functions, the myths of entrepreneurship and the factors required for capacity building for entrepreneurs
- To discuss theimportanceofSmallScaleIndustriesandtherelatedtermsandproblemsinvolved.
- To discuss methods for generatingnewbusinessideasandbusinessopportunitiesinIndiaandtheimportance of business plan.
- To introduce the concepts of project management and discuss capitol building process.
- To explain project feasibility study and project appraisal and discuss project financing
- To discuss about different institutions at state and central levels supporting business enterprises. ■

Module-1		**Teaching Hours**
Management: Definition, Importance – Nature and Characteristics of Management, Management Functions, Roles of Manager, Levels of Management, Managerial Skills, Management & Administration, Management as a Science, Art &Profession**.** **Planning:** Nature, Importance and Purpose Of Planning, Types of Plans, Steps in Planning, Limitations of Planning, Decision Making – Meaning, Types of Decisions- Steps in Decision Making.■		**10**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_4 – Analysing.	
Module-2		
Organizing and Staffing: Meaning, Nature and Characteristics of Organization – Process of Organization, Principles of Organization, Departmentalization, Committees – meaning, Types of Committees, Centralization Versus Decentralization of Authority and Responsibility, Span of Control (Definition only), Nature and Importance of Staffing, Process of Selection and Recruitment. **Directing and Controlling:** Meaning and Nature of Directing-Leadership Styles, Motivation Theories Communication – Meaning and Importance, Coordination- Meaning and Importance, Techniques of Coordination. Controlling – Meaning, Steps in Controlling.■		**10**
Revised Bloom's Taxonomy Level	L_2 – Understanding, L_3 – Applying, L_4 – Analysing.	
Module-3		
Social Responsibilities of Business: Meaning of Social Responsibility, Social Responsibilities of Business towards Different Groups, Social Audit, Business Ethics and Corporate Governance. **Entrepreneurship**: Definition of Entrepreneur, Importance of Entrepreneurship, concepts of Entrepreneurship, Characteristics of successful Entrepreneur, Classification of Entrepreneurs, Intrapreneur – An Emerging Class, Comparison between Entrepreneur and Intrapreneur, Myths of Entrepreneurship, Entrepreneurial Development models, Entrepreneurial development cycle, Problems faced by Entrepreneurs and capacity building for Entrepreneurship. ■		**10**
Revised Bloom's Taxonomy Level	L_3 – Applying.	

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER – V

15EE51 MANAGEMENT AND ENTREPRENEURSHIP (Core Course) (continued)

Module-4		**Teaching Hours**
Modern Small Business Enterprises: Role of Small Scale Industries, Concepts and definitions of SSI Enterprises, Government policy and development of the Small Scale sector in India, Growth and Performance of Small Scale Industries in India, Sickness in SSI sector, Problems for Small Scale Industries, Impact of Globalization on SSI, Impact of WTO/GATT on SSIs, Ancillary Industry and Tiny Industry (Definition only). **Institutional Support for Business Enterprises:** Introduction, Policies & Schemes of Central–Level Institutions, State-Level Institutions.■		**10**
Revised Bloom's Taxonomy Level	L_3 – Applying.	
Module-5		
Project Management: Meaning of Project, Project Objectives & Characteristics, Project Identification-Meaning & Importance; Project Life Cycle, Project Scheduling, Capital Budgeting, Generating an Investment Project Proposal, Project Report-Need and Significance of Report, Contents, Formulation, Project Analysis-Market, Technical, Financial, Economic, Ecological, Project Evaluation and Selection, Project Financing, Project Implementation Phase, Human & Administrative aspects of Project Management, Prerequisites for Successful Project Implementation. New Control Techniques- PERT and CPM, Steps involved in developing the network, Uses and Limitations of PERT and CPM **.**■		**10**
Revised Bloom's Taxonomy Level	L_3 – Applying, L_4 – Analysing. L_2 – Understanding, L_4 – Analysing.	

Course outcomes:

At the end of the course the student will be able to:

- Explain the field of management, task of the manager, planning and the need of proper staff, recruitment and selection process.
- Discuss work allocation, the structure of organization, the modes of communication and importance of managerial control in business.
- To explain need of coordination between the manager and staff in exercising the authority and delegating duties.
- To explain the social responsibility of business and leadership
- Explain the concepts of entrepreneurship and the role and importance of the entrepreneur in economic development.
- Show an understanding of the role and importance of Small Scale Industries, business plan and its presentation.
- Discuss the concepts of project management, capitol building process, project feasibility study, project appraisal and project financing.
- Discuss the state /central level institutions / agencies supporting business enterprises.■

Graduate Attributes (As per NBA)

Engineering Knowledge, Problem Analysis, Life-Long Learning, Accomplishment of Complex Problems.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks. Each full question consisting of 16 marks.
- There will be two full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module. ■

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE) CHOICE BASED CREDIT SYSTEM (CBCS) SEMESTER – V				
15EE51 MANAGEMENT AND ENTREPRENEURSHIP (Core Course) (continued)				
Textbooks				
1	Principles of Management	P.C.Tripathi, P.N.Reddy	McGraw Hill,	6th Edition, 2017
2	Entrepreneurship Development And Small Business Enterprises	Poornima M.Charanthimath	Pearson	2nd Edition,2014
Reference Books				
1	Dynamics of Entrepreneurial Development and Management	Vasant Desai	Himalaya Publishing House	2007
2	Essentials of Management: An International, Innovation and Leadership perspective	Harold Koontz, Heinz Weihrich	McGraw Hill	10th Edition 2016

MANAGEMENT AND ENTREPRENEURSHIP (Core Course)
B.E., V Semester, Electrical and Electronics Engineering [As per Choice Based Credit System (CBCS) scheme]

Course Code	17EE51	CIE Marks	40
Number of Lecture Hours/Week	04	SEE Marks	60
Total Number of Lecture Hours	50	Exam Hours	03

Credits – 04

Course objectives:

- To introduce the field of management, task of the manager, importance of planning and types of planning, staff recruitment and selection process.
- To discuss the ways in which work is allocation, structure of organizations, modes of communication and importance of managerial control in business.
- To explain need of coordination between the manager and staff, the social responsibility of business and leadership.
- To explain the role and importance of the entrepreneur in economic development and the concepts of entrepreneurship.
- To explain various types of entrepreneurs and their functions, the myths of entrepreneurship and the factors required for capacity building for entrepreneurs
- To discuss the importance of Small Scale Industries and the related terms and problems involved.
- To discuss methods for generating new business ideas and business opportunities in India and the importance of business plan.
- To introduce the concepts of project management and discuss capitol building process.
- To explain project feasibility study and project appraisal and discuss project financing
- To discuss about different institutions at state and central levels supporting business enterprises. ■

Module-1		**Teaching Hours**
Management: Definition, Importance – Nature and Characteristics of Management, Management Functions, Roles of Manager, Levels of Management, Managerial Skills, Management & Administration, Management as a Science, Art &Profession**.** **Planning:** Nature, Importance and Purpose Of Planning, Types of Plans, Steps in Planning, Limitations of Planning, Decision Making – Meaning, Types of Decisions- Steps in Decision Making.■		**10**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_4 – Analysing.	
Module-2		
Organizing and Staffing: Meaning, Nature and Characteristics of Organization – Process of Organization, Principles of Organization, Departmentalization, Committees – meaning, Types of Committees, Centralization Versus Decentralization of Authority and Responsibility, Span of Control (Definition only), Nature and Importance of Staffing, Process of Selection and Recruitment. **Directing and Controlling:** Meaning and Nature of Directing-Leadership Styles, Motivation Theories Communication – Meaning and Importance, Coordination- Meaning and Importance, Techniques of Coordination. Controlling – Meaning, Steps in Controlling.■		**10**
Revised Bloom's Taxonomy Level	L_2 – Understanding, L_3 – Applying, L_4 – Analysing.	
Module-3		
Social Responsibilities of Business: Meaning of Social Responsibility, Social Responsibilities of Business towards Different Groups, Social Audit, Business Ethics and Corporate Governance. **Entrepreneurship**: Definition of Entrepreneur, Importance of Entrepreneurship, concepts of Entrepreneurship, Characteristics of successful Entrepreneur, Classification of Entrepreneurs, Intrapreneur – An Emerging Class, Comparison between Entrepreneur and Intrapreneur, Myths of Entrepreneurship, Entrepreneurial Development models, Entrepreneurial development cycle, Problems faced by Entrepreneurs and capacity building for Entrepreneurship.■		**10**
Revised Bloom's Taxonomy Level	L_3 – Applying.	

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER – V

17EE51 MANAGEMENT AND ENTREPRENEURSHIP (Core Course) (continued)

Module-4		**Teaching Hours**
Modern Small Business Enterprises: Role of Small Scale Industries, Concepts and definitions of SSI Enterprises, Government policy and development of the Small Scale sector in India, Growth and Performance of Small Scale Industries in India, Sickness in SSI sector, Problems for Small Scale Industries, Impact of Globalization on SSI, Impact of WTO/GATT on SSIs, Ancillary Industry and Tiny Industry (Definition only). **Institutional Support for Business Enterprises:** Introduction, Policies & Schemes of Central–Level Institutions, State-Level Institutions.■		**10**
Revised Bloom's Taxonomy Level	L_3 – Applying.	
Module-5		
Project Management: Meaning of Project, Project Objectives & Characteristics, Project Identification-Meaning & Importance; Project Life Cycle, Project Scheduling, Capital Budgeting, Generating an Investment Project Proposal, Project Report-Need and Significance of Report, Contents, Formulation, Project Analysis-Market, Technical, Financial, Economic, Ecological, Project Evaluation and Selection, Project Financing, Project Implementation Phase, Human & Administrative aspects of Project Management, Prerequisites for Successful Project Implementation. New Control Techniques- PERT and CPM, Steps involved in developing the network, Uses and Limitations of PERT and CPM **.**■		**10**
Revised Bloom's Taxonomy Level	L_3 – Applying, L_4 – Analysing. L_2 – Understanding, L_4 – Analysing.	

Course outcomes:

At the end of the course the student will be able to:

- Explain the field of management, task of the manager, planning and the need of proper staff, recruitment and selection process.
- Discuss work allocation, the structure of organization, the modes of communication and importance of managerial control in business.
- To explain need of coordination between the manager and staff in exercising the authority and delegating duties.
- To explain the social responsibility of business and leadership
- Explain the concepts of entrepreneurship and the role and importance of the entrepreneur in economic development.
- Show an understanding of the role and importance of Small Scale Industries, business plan and its presentation.
- Discuss the concepts of project management, capitol building process, project feasibility study, project appraisal and project financing.
- Discuss the state /central level institutions / agencies supporting business enterprises.■

Graduate Attributes (As per NBA)

Engineering Knowledge, Problem Analysis, Life-Long Learning, Accomplishment of Complex Problems.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks. Each full question consisting of 16 marks.
- There will be two full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module. ■

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE) CHOICE BASED CREDIT SYSTEM (CBCS) SEMESTER – V				
17EE51 MANAGEMENT AND ENTREPRENEURSHIP (Core Course) (continued)				
Textbooks				
1	Principles of Management	P.C.Tripathi, P.N.Reddy	McGraw Hill,	6th Edition, 2017
2	Entrepreneurship Development And Small Business Enterprises	Poornima M.Charanthimath	Pearson	2nd Edition,2014
Reference Books				
1	Dynamics of Entrepreneurial Development and Management	Vasant Desai	Himalaya Publishing House	2007
2	Essentials of Management: An International, Innovation and Leadership perspective	Harold Koontz, Heinz Weihrich	McGraw Hill	10th Edition 2016

TOTAL QUALITY MANAGEMENT

Course	Code	Credits	L-T-P	Assessment		Exam Duration
				SEE	CIA	
Total Quality Management	15ME664	03	3-0-0	80	20	3Hrs

COURSE LEARNING OBJECTIVES:

This course enables students to

1. Understandvarious approaches to TQM
2. Understandthe characteristics of quality leader and his role.
3. Developfeedback and suggestion systems for quality management.
4. Enhance the knowledge in Tools and Techniques of quality management

Module - 1

Principles and Practice: Definition, basic approach, gurus of TQM, TQMFramework, awareness, defining quality, historical review, obstacles, benefitsof TQM.

Quality Management Systems: Introduction, benefits of ISO registration, ISO 9000 series of standards, ISO 9001 requirements.

08 Hours

Module - 2

Leadership: Definition, characteristics of quality leaders, leadership concept,characteristics of effective people, ethics, the Deming philosophy, role ofTQM leaders, implementation, core values, concepts and framework,strategic planning communication, decision making,

08Hours

Module - 3

Customer Satisfaction and Customer Involvement:

Customer Satisfaction: customer and customer perception of quality, feedback, using customer complaints, service quality, translating needs intorequirements, customer retention,casestudies.

Employee Involvement – Motivation, employee surveys, empowerment,teams, suggestion system, recognition and reward, gain sharing, performanceappraisal, unions and employee involvement, case studies. 08 Hours

Module - 4

Continuous Process Improvement: process, the Juran trilogy, improvement strategies, types of problems, the PDSA Cycle, problem-solving methods, Kaizen, reengineering, six sigma, case studies.

Statistical Process Control : Pareto diagram, process flow diagram, cause and effect diagram, check sheets, histograms, statistical fundamentals, Control charts, state of control, out of control process, control charts for variables, control charts for attributes, scatter diagrams, case studies

Module - 5

Tools and Techniques: Benching marking, information technology, quality management systems, environmental management system, and qualityfunction deployment, quality by design, failure mode and effect analysis, product liability, total productive maintenance.

08 Hours

COURSE OUTCOMES:

Student will be able to

1. Explain the various approaches of TQM
2. Infer the customer perception of quality
3. Analyze customer needs and perceptions to design feedback systems.
4. Apply statistical tools for continuous improvement of systems
5. Apply the tools and technique for effective implementation of TQM.

TEXT BOOKS:

1. Total Quality Management: Dale H. Besterfield, Publisher -Pearson Education India, ISBN: 8129702606, Edition 03.
2. Total Quality Management for Engineers: M. Zairi, ISBN:1855730243, Publisher: Wood head Publishing

REFERENCE BOOKS:

1. Managing for Quality and Performance Excellence by James R.Evans and Williuam M Lindsay,9th edition, Publisher Cengage Learning.
2 A New American TQM, four revolutions in management, ShojiShiba, Alan Graham, David Walden, Productivity press, Oregon, 1990
3. Organizational Excellence through TQM, H. Lal, New age Publications, 2008

Reference Books:

1. Engineering Optimization Methods and Applications, A Ravindran, K, M.Ragsdell, Willey India Private Limited,2nd Edition,2006.
2. : Introduction to Operations Research- Concepts and Cases, F.S. Hillier. G.J. Lieberman, 9th Edition, Tata McGraw Hill. 2010.

Scheme of Examination:

Two question to be set from each module. Students have to answer five full questions, choosing at least one full question from each module.

BUSINESS, GOVERNMENT AND SOCIETY

Subject Code	: 14MBA14	IA Marks	: 50
No. of Lecture Hours / Week	: 04	Exam Hours	: 03
Total Number of Lecture Hours	: 56	Exam Marks	: 100
Practical Component	: 01 Hour / Week		

Objectives:

1. To enable students to understand the challenges and complexities faced by businesses and their leaders as they endeavor maximize returns while responsibly managing their duties to stakeholders and society.
2. To help students to understand the rationale for government interventions in market systems.
3. To help students develop an understanding of Social Responsibility and make their own judgments as to the proper balance of attention to multiple bottom lines.
4. To help students develop the skills needed to work through ethical dilemmas

Module 1: **(8 Hours)**

The Study of Business, Government and Society (BGS): Importance of BGS to Managers –Models of BGS relationships – Market Capitalism Model, Dominance Model, Countervailing Forces Model and Stakeholder Model – Global perspective – Historical Perspective.

Module 2: **(8 Hours)**

Corporate Governance: Introduction, Definition, Market model and control model, OECD on corporate governance, A historical perspective of corporate governance, Issues in corporate governance, relevance of corporate governance, need and importance of corporate governance, benefits of good corporate governance, the concept of corporate, the concept of governance, theoretical basis for corporate governance, obligation to society, obligation to investors, obligation to employees, obligation to customers, managerial obligation, Indian cases

Module 3: **(4 Hours)**

Public Policies: The role of public policies in governing business, Government and public policy, classification of public policy, areas of public policy, need for public policy in business and levels of public policy.

Module 4: **(8 Hours)**

Environmental concerns and corporations: History of environmentalism, environmental preservation-role of stakeholders, international issues, sustainable development, costs and benefits of environmental regulation, industrial pollution, role of corporate in environmental management, waste management and pollution control, key strategies for prevention of pollution, environmental audit, Laws governing environment.

Module 5: **(8 Hours)**

Business Ethics: Meaning of ethics, business ethics, relation between ethics and business ethics, evolution of business ethics, nature of business ethics, scope, need and purpose, importance, approaches to business ethics, sources of ethical knowledge for business roots of

unethical behaviour, ethical decision making, some unethical issues, benefits from managing ethics at workplace, ethical organizations

Module 6: **(6 Hours)**

Corporate Social Responsibility: Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Arguments for and against CSR, CSR in Indian perspective, Indian examples.

Module 7: **(14 Hours)**

Business Law: Law of contract - meaning of contract, agreement, essential elements of a valid contract. Law of agency- meaning, creation and termination of agency. Bailment and Pledge - meaning, rights and duties of bailor and bailee.

Negotiable Instruments Act 1881: Nature and Characteristics of Negotiable instruments, Kinds of Negotiable Instruments – Promissory Notes, Bills of Exchange and Cheques. Discharge and Dishonour of Negotiable Instruments.

Sale of Goods Act 1930: Definition of Sale, Sale v/s Agreement to Sell, Goods, Condition and Warranties, Express and Implied Condition, "Doctrine of Caveat Emptor", Right and duties of Unpaid Seller.

Meaning, scope and objectives of - Intellectual property law, law relating to patents, law relating to copyrights, law relating to trade mark.

Practical Components:

1. Students are expected to study any five CSR initiatives by Indian organizations and submit a report for the same.
2. A group assignment on "The relationship between Business, Government and Society in Indian Context and relating the same with respect the models studied in Module 1.
3. Case studies/Role plays related ethical issues in business with respect to Indian context.

RECOMMENDED BOOKS:

1. Business, Government, and Society: A Managerial Perspective, Text and Cases – John F. Steiner, 12/e, McGraw-Hill, 2011.
2. Business and Government – Francis Cherunilam, HPH.
3. Corporate Governance: principles, policies and practices – Fernando A. C, 2/e, Pearson, 2011.
4. Business Ethics and Corporate Governance - Ghosh B. N, Tata McGraw-Hill, 2012.
5. Business Law for Managers, Goel P. K, Biztantra, 2012.
6. Corporate Social Responsibility: A Study of CSR Practices in Indian Industry, Baxi C. V & Rupamanjari Sinha Ray, Vikas Publishing House, 2012.

REFERENCE BOOKS:

1. Business and Society - Lawrence and Weber, 12/e, Tata McGraw- Hill, 2010.
2. Business Ethics - Bajaj P. S & Raj Agarwal, Biztantra, 2012.
3. Corporate Governance - Keshoo Prasad, 2/e, PHI.

4. Corporate Governance, Ethics and social responsibility - Balachandran V, & Chandrashekharan V, 2/e, PHI, 2011.
5. Corporate Governance – Machiraju H. R, HPH.
6. Business Ethics and Corporate Governance – Prabakaran S, Excel BOOKS.
7. Corporate Goverance – Badi N. V, Vrinda Publications, 2012.
8. Civic Sense – Prakash Pillappa, Excel BOOKS, 2012.

BUSINESS LAW AND POLICY

Subject Code	: 16MBA24	IA Marks	: 20
No. of Lecture Hours / Week	: 03	Exam Hours	: 03
Total Number of Lecture Hours	: 56	Exam Marks	: 80
Practical Component	: 02 Hours / Week		

Objectives:

- To understand the legal environment of business and complexities faced by businesses.
- To learn various legal provisions under Indian Companies Act.
- To understand the importance of Corporate Social Responsibility

Course Outcome:

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

- Demonstrate awareness towards legal and regulatory context of business
- Recognize and appropriately respond to ethical, legal and strategic concerns relating to human resource and organizational management.
- Gain insights into various acts and understand the significance of corporate governance

Unit 1 **(10 Hours)**

Indian Contract Act, 1872-meaning of contract, agreement, essential elements of a valid contract. Law of agency-meaning, creation and termination of agency. Bailment and Pledge-meaning rights and duties of bailor and bailee.

Unit 2: **(10 Hours)**

Companies Act 1956- Meaning and features, kinds of companies, registration and incorporation, Memorandum of Association,& Articles of Association, Prospectus. Winding up of companies

Unit 3: **(10 Hours)**

Miscellaneous Acts-Meaning, scope and objectives of: (a) Intellectual Property Law (relating to patents, copyrights and trademarks): (b) Consumer Protection Act 1986 and (c) Environment Protection Act 1986,

Unit 4: **(10 Hours)**

Indian Partnership Act 1932 - THE NATURE OF PARTNERSHIP- Introduction of a partner-Admission of the partner -Retirement of a partner- Expulsion of a partner - Insolvency a partner - Liability of estate of deceased partner

Unit 5: **(8 Hours)**

Corporate Governance: Introduction, Definition, Issues in corporate governance, relevance of corporate governance, need and importance of corporate governance, benefits of good corporate governance. Obligation to society, investors, employees and customers, managerial obligation, Indian cases

Unit 6: **(8 Hours)**

Corporate Social Responsibility: Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Arguments for and against CSR, CSR in Indian perspective, Indian examples. Latest trends in CSR

Practical Components:

- Students are expected to study any five CSR initiatives by Indian organizations and submit a report for the same.
- A group assignment on the relationship between Business, Law and Society in Indian context
- Case studies/Role plays related ethical issues in business with respect to Indian context.
- Students to collect, analyse and discuss MA, AA & Prospectus of a company.
- Organize a programme on consumer awareness and consumer rights.

RECOMMENDED BOOKS:

- Business, Government, and Society: A Managerial Perspective, Text and Cases – John F. Steiner, 12/e, McGraw-Hill, 2011.
- Business and Government – Francis Cherunilam, HPH.
- Corporate Governance: principles, policies and practices – Fernando A. C, 2/e, Pearson, 2011.
- Business Ethics and Corporate Governance - Ghosh B. N, Tata McGraw-Hill, 2012.
- Business Law for Managers, Goel P. K, Biztantra, 2012.
- Corporate Social Responsibility: A Study of CSR Practices in Indian Industry, Baxi C. V &Rupamanjari Sinha Ray, Vikas Publishing House, 2012.

REFERENCE BOOKS:

- Business and Society - Lawrence and Weber, 12/e, Tata McGraw- Hill, 2010.
- Business Ethics - Bajaj P. S & Raj Agarwal, Biztantra, 2012.
- Corporate Governance - Keshoo Prasad, 2/e, PHI.
- Corporate Governance, Ethics and social responsibility - Balachandran V, &Chandrashekharan V, 2/e, PHI, 2011.
- Corporate Governance – Machiraju H. R, HPH.
- Business Ethics and Corporate Governance – Prabakaran S, Excel BOOKS.
- Corporate Governance – Badi N. V, Vrinda Publications, 2012.
- Civic Sense – Prakash Pillappa, Excel BOOKS, 2012.

WORKPLACE ETHICS AND VALUE SYSTEMS

Subject Code	: 16MBA HR402	IA Marks	20
No. of Lecture Hours / Week	: 03	Exam Hours	03
Total Number of Lecture Hours	: 56	Exam Marks	:
80 Practical Component	: 02 Hours / Week		

Course Objectives:

- To understand the ethical practices at workplace.
- To address the ethical issues which arise in the work environment.
- To acquaint students with various ethical problems at work place.

Course Outcomes:

The students will be able to

- Learn the principles and practices of workplace ethics.
- Understand the concepts of corporate governance and ethics.
- Gain insights of Discrimination and Harassment at Workplace

Unit 1: **(8 Hours)**

Workplace Ethics: Introduction, Needs, Principles, Development of Personal Ethics, Workplace Ethics for Employees-Ethical behavior in workplace- Professionalism, Ethical violations by employees, Employee Attitude and Ethics, Employee Etiquettes. Benefits of ethics in Workplace-employee commitment, investor loyalty, customer satisfaction, profits

Unit 2; **(8 Hours)**

Professionalism at Workplace: Unethical Conduct for employees and employers. Factors leading to Unethical Behaviors. Different unethical behaviors. Measures to control unethical behaviors. Rewarding ethical behavior

Unit 3: **(10 Hours)**

Business Ethics and Corporate Governance: Overview of Business Ethics, Corporate Governance, Ethical issues in human resource management- The principal of ethical hiring, Firing, worker safety, whistle blowing, Equality of opportunity, Discrimination, Ethics and remuneration, Ethics in retrenchment. Ethical Dilemmas at workplace, Ethical issues in global business, corporate responsibility of employers.

Unit 4: **(10 Hours)**

Workplace Privacy & Ethics: Watching what you say and what you do in the workplace, Hardware, Software and Spyware, Plagiarism and Computer Crimes, Convenience and Death of Privacy, Defence of employee privacy rights.

Unit 5; **(12 Hours)**

Teamwork in the Workplace, Ethics, Discrimination and Harassment at Workplace & Ethics: Teams, Elements of team, Stages of team development, team meetings, team rules, and teams work and professional responsibility, rules of professional responsibility, ASME code of ethics.Discrimination, sexual harassment, creating awareness about workplace harassment, Vishaka Dutta vs. State of Rajasthan –Supreme Court directions, Compulsory workplace guidelines.

Unit 6: **(8 Hours)**8

Managing Change in Workplace through Ethics: Introduction to Change Management, Models of change, the Ethics of Managing Change, the role of ethics and responsibilities in leading innovation and change, ethics based model for change management, ethics and risks of change management

Practical Components:

- To solve case studies on Workplace Ethics
- To visit organizations and find out the problems and causes for unethical behavior at workplace.
- To visit organizations and find out the measures adopted to control unethical behavior of employees.
- To compare and contrast the various ethical codes of conduct practiced in organizations.
- To study the recent cases on breach of workplace privacy.

RECOMMENDED TEXT BOOKS:

- Ethical Theory and Business, Tom L. Beauchamp, Norman E. Bowie and Denis Arnold, 8th Edition.
- Business Ethics – Ethical Decision making and cases O.C. Ferrell, John Fraedrich, and Linda Ferrell, 9th Edition, Cengage Learning.
- How technology is compromising Workplace Privacy, Fredrick S Lane 111, AMACOM Div American Mgmt Assn, 2003
- Ethics in the Workplace, Dean Bredeson, Keith Goree, Cengage Learning, 2011.

REFERENCE BOOKS:

- Ethics in 21st Century, Mary Alice Trent, Oral Roberts University, longman.
- Ethics in workplace, Elizabeth P Tierney, Oak tree press
- Ethics in Workplace: System Perspective, William F Roth, Pearson, 2014.
- Ethics in the Workplace: Tools and Tactics for Organizational Transformation - Craig E.
- Johnson - SAGE Publications, 2007
- Business Ethics: Fairness and justice in the workplace - Volume 2 of Business
- Ethics, Fritz Allhoff, ISBN 1412902541, 9781412902540 - SAGE Publications, 2005

ORGANIZATIONAL LEADERSHIP

Semester	**IV**	**CIE Marks40**	
Course Code	**18MBAHR402**	**SEE Marks60**	
Teaching Hours / week (L:T:P)	**3-0-0**	**Exam Hours**	**03**

Credits : 03

Course Objectives:

1. To make students understand fundamental concepts and principles of organizational leadership.
2. To make students knowledgeable of the theoretical aspects and practical applications of leadership styles in an organization.
3. To make the students understand the basic concepts of leadership traits and ethics underlying leadership behavior besides developing better insights into one's own self.
4. To make students aware of organizational leadership, Leadership development and succession besides developing a better awareness of how they can be better facilitators for building effective teams as leaders themselves.

Unit 1:

Introduction to Leadership: Definition, Importance of leadership, Roles of a leader, Leadership theory paradigms, levels of analysis of leadership theory.

Unit 2:

Leadership traits and ethics: Personality traits and leadership, traits of effective leaders, Leadership attitudes, ethical leadership, Achievement motivation theory.

Unit 3:

Leadership behaviour and motivation, and contingency leadership: Leadership behaviour and styles, University of Michigan and Ohio studies, Leadership grid, Leadership and motivation, Content and process theories, Reinforcement theory, Contingency leadership theories and models, Leadership continuum theory, Normative leadership theory, Leadership substitute theory.

Unit 4:

Team Leadership: The use of teams in organizations, Types of teams, Decision making in teams, Leadership skills for effective team meetings, Ginnet's team effectiveness leadership model, virtual and self managed teams, the changing role of leadership in self-managed teams.

Unit 5:

Leader follower relations: Followers, Evolution of Dyadic theory, Leader member exchange theory, Fellowship, Delegation, Coaching, Managing conflict.

Organizational Leadership: Charismatic and transformational leadership, Stewardship and servant leadership, Leadership of culture and diversity, Creating high performance culture, Strategic leadership.

Unit 6:
Leadership development and succession: Development through self- awareness and self-discipline, Development through education, experience, and mentoring, succession, Leadership development programs, Evaluation of leadership development efforts, Leadership

Leadership development programs, Evaluation of leadership development efforts, Leadership.

COURSE OUTCOMES:
1.Comprehend & correlate organizational leadership styles which are happening around with fundamental concepts of team leadership.
2.Understand the overview of leadership behavior and motivation in organization.
3.Effectively use their skills for self-grooming on leadership traits and ethics that influences them to effectively work in groups to achieve organizational goals.
4.Demonstrate their acumen in applying their knowledge in organizational leadership and behavioral concept in real world/situation.

RECOMMENDED BOOKS:
1.Effective Leadership- Lussier/ Achus, Tjird edition, Thomson South Western, 2007.
2.Leadership-Enhancing the Lessons of experience, Hughes, Ginnet, Curphy, Fifth edition, Tata McGraw Hill, 2006.
3.Leadership-Research findings, Practice, and skills, Andrew J Durbrin, Fourth edition, Biztantra, 2007.

REFERENCE BOOKS:
1. Leadership in Organizations, Gary Yukl, Pearson Education, 6th Edition.
2. The Leadership Eperience, Richard L Daft, Cengage Learning, 2nd Edition, 2002.
3. Dynamics of leadership, Craig Watson, Jaico Publication.
4. The art of leadership, George Manning and Kent, 2nd edition, Mc- Graw Hill Education.

CONSTITUTION OF INDIA & PROFESSIONAL ETHICS

Subject Code :	**14CIP18/14CIP28**	**IA Marks :**	**25**
Hours/Week :	**02**	**Exam. Hours :**	**02**
Total Hours :	**25**	**Exam. Marks :**	**50**

Course Objectives :

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.

Module – 1

Introduction to the Constitution of India, The Making of the Constitution and Sailent features of the Constitution. **2 Hours**

Preamble to the Indian Constitution Fundamental Rights & its limitations. **3 Hours**

Module – 2

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. **2 Hours**

Union Executives – President, Prime Minister Parliament Supreme Court of India. **3 Hours**

Module – 3

State Executives – Governor Chief Minister, State Legislature High Court of State. **2 Hours**

Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments. **3 Hours**

Module – 4

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. **3 Hours**

Powers and functions of Municipalities, Panchyats and Co - Operative Societies. **2 Hours**

Module – 5

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. **2 Hours**

Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering. **3 Hours**

Course Outcomes :

After study of the course, the students are able to

- Have general knowledge and legal literacy and thereby to take up competitive examinations
- Understand state and central policies, fundamental duties
- Understand Electoral Process, special provisions
- Understand powers and functions of Muncipalities, Panchayats and Co-operative Societies, and
- Understand Engineering ethics and responsibilities of Engineers.

Text Books :

1. Durga Das Basu: **"Introduction to the Constitution on India",** (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.

Reference Books :

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma,**"Introduction to the Constitution of India"**, PHI Learning Pvt. Ltd., New Delhi, 2011.

CONSTITUTION OF INDIA, PROFESSIONAL ETHICS & HUMAN RIGHTS

Subject Code	15CPH18/15CPH28	IA Marks	10
Number of Lecture Hours/Week	02	Exam Marks	40
Total Number of Lecture Hours	25	Exam Hours	02

Course objectives:

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications

Module 1

Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. **2 Hours**

Preamble to the Indian Constitution Fundamental Rights & its limitations. **3 Hours**

Module 2

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. **2 Hours**

Union Executives – President, Prime Minister Parliament Supreme Court of India. **3 Hours**

Module 3

State Executives – Governor Chief Minister, State Legislature High Court of State. **2 Hours**

Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments. **3 Hours**

Module 4

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India **3 Hours**

Powers and functions of Municipalities, Panchyats and Co - Operative Societies. **2 Hours**

Module 5

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. **2 Hours**

Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering. **3 Hours**

Course outcomes:

After study of the course, the students are able to

- Have general knowledge and legal literacy and thereby to take up competitive examinations
- Understand state and central policies, fundamental duties
- Understand Electoral Process, special provisions
- Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, and
- Understand Engineering ethics and responsibilities of Engineers.
- Have an awareness about basic human rights in India

Text Books:

1. Durga Das Basu: **"Introduction to the Constitution on India",** (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.

Reference Books:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma,**"Introduction to the Constitution of India"**, PHI Learning Pvt. Ltd., New Delhi, 2011.
4. Latest Publications of Indian Institute of Human Rights, New Delhi.

* * * * * *

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

Constitution of India, Professional Ethics and Human Rights (CPH)

(Common to all branches)

[As per Outcome Based Education(OBE) and Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2018-19)

Course Code	**: 17CPH39/49**	**SEE Marks: 30**
Contact Hours/Week	**: 01 hr Theory /week**	**CIE Marks: 20**
Total Hours	**: 15**	**Exam: 02 hr**
Semester	**: III / IV**	**Credit: 1**

Course Learning Objectives: This course (**17CPH39/49**) will enable the students

- To assimilate and get familiarized with basic information about Indian constitution and provide overall legal literacy to the young technograts to manage complex societal issues in the present scenario.
- To identify their individual roles and ethical responsibilities towards society.
- To understand engineering ethics & responsibilities, through the learning of these topics students will be able to understand human rights/ values and its implications in their life.

MODULE- I

Introduction and Basic Information about Indian Constitution

- The Necessity of the Constitution, The Societies before and after the Constitution adoption.
- Introduction to the Indian constitution, The making of the Constitution, The Role of the Constituent Assembly - Preamble and Salient features of the Constitution of India. Fundamental Rights and its Restriction and limitations in different Complex Situations.
- Directive Principles of State Policy (DPSP) & it's present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

MODULE- II

Union Excutive and State Excutive

- Parliamentary System, Federal System, Centre-State Relations.
- Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism.
- State Executives – Governor , Chief Minister, State Cabinet, State Legislature, High Court and Subordinate Courts, Special Provisions (Article 370.371,371J) for some States.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

MODULE-III

Elections, Amendments and Emergency Provisions

- Elections, Electoral Process, and Election Commission of India, Election Laws.
- Amendments - Methods in Constitutional Amendments (How and Why) and Important Constitutional Amendments. Amendments – 7,9,10,12,42,44, 61, 73,74, ,75, 86, and 91,94,95,100,101,118 and some important Case Studies. Recent Amendments with explanation. Important Judgements with Explanation and its impact on society (from the list of Supreme Court Judgements).
- Emergency Provisions, types of Emergencies and it's consequences.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

Module- IV

Constitutional Provisions/ Local Administration/ Human Rights

- Special Constitutional Provisions for SC & ST, OBC, Special Provision for Women, Children & Backward Classes.
- Local Administration : Powers and functions of Municipalities and Panchyats System. Co – Operative Societies and Constitutional and Non-constitutional Bodies.
- Human Rights/values – Meaning and Definitions, Legislative Specific Themes in Human Rights and Functions/ Roles of National Human Rights Commission of India. Human Rights (Amendment Act)2006.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

MODULE- V

Professional / Engineering Ethics

- Scope & Aims of Engineering & Professional Ethics - Business Ethics, Corporate Ethics, Personal Ethics. Engineering and Professionalism, Positive and Negative Faces of Engineering Ethics, Code of Ethics as defined in the website of Institution of Engineers (India) : Profession, Professionalism, Professional Responsibility. Clash of Ethics, Conflicts of Interest.

Responsibilities in Engineering

- Responsibilities in Engineering and Engineering Standards, the impediments to Responsibility.Trust and Reliability in Engineering, IPRs (Intellectual Property Rights),
- Risks, Safety and liability in Engineering.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

Course Outcomes: On completion of this course, students will be able to,

CO1: Have general knowledge and legal literacy about Indian Constitution and there by it helps to take up competitive examinations & to manage/face complex societal issues in society.

CO2: Understand state and central policies(Union and State Excutive), fundamental Rights & their duties.

CO3: Understand Electoral Process, Amendments and special provisions in Constitution.

CO4: Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, with Human Rights and NHRC.

CO5: Understand Engineering & Professional ethics and responsibilities of Engineers.

Question paper pattern for SEE and CIE.

- The **SEE question paper will be set for 30 marks** and the pattern of the **question paper will be objective type (MCQ).**
- For the award of **20 CIE marks**, refer the University Scheme and Syllabus book**.**

Text Books

1) **Durga Das Basu (DD Basu):** "Introduction to the Constitution on India", (Students Edition.) Prentice –Hall EEE, 19th / 20th Edn., (Latest Edition) or 2008.
2) **Shubham Singles, Charles E. Haries, and Et al** : "Constitution of India and Professional Ethics" by Cengage Learning India Private Limited, Latest Edition – 2018.

Reference Books

1. **M.Govindarajan, S.Natarajan, V.S.Senthilkumar**, "Engineering Ethics", Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
2. **M.V.Pylee,** "An Introduction to Constitution of India", Vikas Publishing, 2002.
3. Latest Publications of **NHRC - Indian Institute of Human Rights**, New Delhi.

Web Links and Video Lectures

www.unacademy.com/lesson/future-perfect-tense/YQ9NSNQZ

https://successesacademy

B. E. AUTOMOBILE ENGINEERING
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
SEMESTER - III

CONSTITUTION OF INDIA, PROFESSIONAL ETHICS AND CYBER LAW (CPC)

Course Code	**18CPC39/49**	CIE Marks	40
Teaching Hours/Week (L:T:P)	(1:0:0)	SEE Marks	60
Credits	01	Exam Hours	02

Course Learning Objectives: To

- know the fundamental political codes, structure, procedures, powers, and duties of Indian government institutions, fundamental rights, directive principles, and the duties of citizens
- Understand engineering ethics and their responsibilities; identify their individual roles and ethical responsibilities towards society.
- Know about the cybercrimes and cyber laws for cyber safety measures.

Module-1

Introduction to Indian Constitution: The Necessity of the Constitution, The Societies before and after the Constitution adoption. Introduction to the Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly - Preamble and Salient features of the Constitution of India. Fundamental Rights and its Restriction and limitations in different Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building.

Module-2

Union Executive and State Executive: Parliamentary System, Federal System, Centre-State Relations. Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. State Executives – Governor, Chief Minister, State Cabinet, State Legislature, High Court and Subordinate Courts, Special Provisions (Articles 370.371,371J) for some States.

Module-3

Elections, Amendments and Emergency Provisions: Elections, Electoral Process, and Election Commission of India, Election Laws. Amendments - Methods in Constitutional Amendments (How and Why) and Important Constitutional Amendments. Amendments – 7,9,10,12,42,44, 61, 73,74, ,75, 86, and 91,94,95,100,101,118 and some important Case Studies. Emergency Provisions, types of Emergencies and its consequences.
Constitutional special provisions: Special Provisions for SC and ST, OBC, Women, Children and Backward Classes.

Module-4

Professional / Engineering Ethics: Scope & Aims of Engineering & Professional Ethics - Business Ethics, Corporate Ethics, Personal Ethics. Engineering and Professionalism, Positive and Negative Faces of Engineering Ethics, Code of Ethics as defined in the website of Institution of Engineers (India): Profession, Professionalism, and Professional Responsibility. Clash of Ethics, Conflicts of Interest. Responsibilities in Engineering Responsibilities in Engineering and Engineering Standards, the impediments to Responsibility. Trust and Reliability in Engineering, IPRs (Intellectual Property Rights), Risks, Safety and liability in Engineering

Module-5

Internet Laws, Cyber Crimes and Cyber Laws: Internet and Need for Cyber Laws, Modes of Regulation of Internet, Types of cyber terror capability, Net neutrality, Types of Cyber Crimes, India and cyber law, Cyber Crimes and the information Technology Act 2000, Internet Censorship. Cybercrimes and enforcement agencies.

Course Outcomes: On completion of this course, students will be able to,

- CO1: Have constitutional knowledge and legal literacy.
- CO2: Understand Engineering and Professional ethics and responsibilities of Engineers.
- CO3: Understand the the cybercrimes and cyber laws for cyber safety measures.

Question paper pattern for SEE and CIE:

- The SEE question paper will be set for 100 marks and the marks scored by the students will proportionately be reduced to 60. The pattern of the question paper will be objective type (MCQ).
- For the award of 40 CIE marks, refer the University regulations 2018.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year

Textbooks				
1	Constitution of India, Professional Ethics and Human Rights	Shubham Singles, Charles E. Haries, and et al	Cengage Learning India	2018
2	Cyber Security and Cyber Laws	Alfred Basta and et al	Cengage Learning India	2018
Reference Books				
3	Introduction to the Constitution of India	Durga Das Basu	Prentice –Hall,	2008.
4	Engineering Ethics	M. Govindarajan, S. Natarajan, V. S. Senthilkumar	Prentice –Hall,	2004

CONSTITUTION OF INDIA & PROFESSIONAL ETHICS

Subject Code :	**14CIP18/14CIP28**	**IA Marks :**	**25**
Hours/Week :	**02**	**Exam. Hours :**	**02**
Total Hours :	**25**	**Exam. Marks :**	**50**

Course Objectives :

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.

Module – 1

Introduction to the Constitution of India, The Making of the Constitution and Sailent features of the Constitution. **2 Hours**

Preamble to the Indian Constitution Fundamental Rights & its limitations. **3 Hours**

Module – 2

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. **2 Hours**

Union Executives – President, Prime Minister Parliament Supreme Court of India. **3 Hours**

Module – 3

State Executives – Governor Chief Minister, State Legislature High Court of State. **2 Hours**

Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments. **3 Hours**

Module – 4

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. **3 Hours**

Powers and functions of Municipalities, Panchyats and Co - Operative Societies. **2 Hours**

Module – 5

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. **2 Hours**

Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering. **3 Hours**

Course Outcomes :

After study of the course, the students are able to

- Have general knowledge and legal literacy and thereby to take up competitive examinations
- Understand state and central policies, fundamental duties
- Understand Electoral Process, special provisions
- Understand powers and functions of Muncipalities, Panchayats and Co-operative Societies, and
- Understand Engineering ethics and responsibilities of Engineers.

Text Books :

1. Durga Das Basu: **"Introduction to the Constitution on India",** (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.

Reference Books :

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma,**"Introduction to the Constitution of India"**, PHI Learning Pvt. Ltd., New Delhi, 2011.

ENVIRONMENTAL STUDIES

Subject Code :	**14CIV18/14CIV28**	**IA Marks :**	**25**
Hours/Week :	**02**	**Exam. Hours :**	**02**
Total Hours :	**25**	**Exam. Marks :**	**50**

Course Objectives :

1. Recognize major concepts in environmental sciences and demonstrate in-depth understanding of the environment.
2. Develop analytical skills, critical thinking, and demonstrate problem-solving skills using scientific techniques.
3. Demonstrate the knowledge and training for entering graduate or professional schools, or the job market.

Module – 1

Introduction : Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. **2 Hours**

Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development. **3 Hours**

Module – 2

Natural Resources, Water resources : Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. **2 Hours**

Energy : Different types of energy, Conventional sources & Non Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy. **3 Hours**

Module – 3

Environmental Pollution : Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. **2 Hours**

Global Environmental Issues : Population Growth, Urbanization, Land Management, Water & Waste Water Management. **3 Hours**

Module – 4

Air Pollution & Automobile Pollution : Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures. **3 Hours**

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods. **2 Hours**

Module – 5

Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices. **2 Hours**

Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education & Women Education. **3 Hours**

Course Outcomes :

Students will be able to,

1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community,
4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Text Books :

1. Benny Joseph (2005), **"Environmental Studies"**, Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), **"Environmental Studies",** Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, **"Environmental Studies – From Crisis to Cure"**, Oxford University Press, 2005,
4. Aloka Debi, **"Environmental Science and Engineering",** Universities Press (India) Pvt. Ltd. 2012.

Reference Books :

1. Raman Sivakumar, **"Principals of Environmental Science and Engineering",** Second Edition, Cengage learning Singapore, 2005

CONSTITUTION OF INDIA, PROFESSIONAL ETHICS & HUMAN RIGHTS

Subject Code	15CPH18/15CPH28	IA Marks	10
Number of Lecture Hours/Week	02	Exam Marks	40
Total Number of Lecture Hours	25	Exam Hours	02

Course objectives:

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications

Module 1

Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. **2 Hours**

Preamble to the Indian Constitution Fundamental Rights & its limitations. **3 Hours**

Module 2

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. **2 Hours**

Union Executives – President, Prime Minister Parliament Supreme Court of India. **3 Hours**

Module 3

State Executives – Governor Chief Minister, State Legislature High Court of State. **2 Hours**

Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments. **3 Hours**

Module 4

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India **3 Hours**

Powers and functions of Municipalities, Panchyats and Co - Operative Societies. **2 Hours**

Module 5

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. **2 Hours**

Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering. **3 Hours**

Course outcomes:

After study of the course, the students are able to

- Have general knowledge and legal literacy and thereby to take up competitive examinations
- Understand state and central policies, fundamental duties
- Understand Electoral Process, special provisions
- Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, and
- Understand Engineering ethics and responsibilities of Engineers.
- Have an awareness about basic human rights in India

Text Books:

1. Durga Das Basu: **"Introduction to the Constitution on India",** (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **"Engineering Ethics"** Thompson Asia, 2003-08-05.

Reference Books:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, **"Engineering Ethics",** Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma,**"Introduction to the Constitution of India"**, PHI Learning Pvt. Ltd., New Delhi, 2011.
4. Latest Publications of Indian Institute of Human Rights, New Delhi.

* * * * * *

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

Constitution of India, Professional Ethics and Human Rights (CPH)

(Common to all branches)

[As per Outcome Based Education(OBE) and Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2018-19)

Course Code	**: 17CPH39/49**	**SEE Marks: 30**
Contact Hours/Week	**: 01 hr Theory /week**	**CIE Marks: 20**
Total Hours	**: 15**	**Exam: 02 hr**
Semester	**: III / IV**	**Credit: 1**

Course Learning Objectives: This course (**17CPH39/49**) will enable the students

- To assimilate and get familiarized with basic information about Indian constitution and provide overall legal literacy to the young technograts to manage complex societal issues in the present scenario.
- To identify their individual roles and ethical responsibilities towards society.
- To understand engineering ethics & responsibilities, through the learning of these topics students will be able to understand human rights/ values and its implications in their life.

MODULE- I

Introduction and Basic Information about Indian Constitution

- The Necessity of the Constitution, The Societies before and after the Constitution adoption.
- Introduction to the Indian constitution, The making of the Constitution, The Role of the Constituent Assembly - Preamble and Salient features of the Constitution of India. Fundamental Rights and its Restriction and limitations in different Complex Situations.
- Directive Principles of State Policy (DPSP) & it's present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

MODULE- II

Union Excutive and State Excutive

- Parliamentary System, Federal System, Centre-State Relations.
- Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism.
- State Executives – Governor , Chief Minister, State Cabinet, State Legislature, High Court and Subordinate Courts, Special Provisions (Article 370.371,371J) for some States.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

MODULE-III

Elections, Amendments and Emergency Provisions

- Elections, Electoral Process, and Election Commission of India, Election Laws.
- Amendments - Methods in Constitutional Amendments (How and Why) and Important Constitutional Amendments. Amendments – 7,9,10,12,42,44, 61, 73,74, ,75, 86, and 91,94,95,100,101,118 and some important Case Studies. Recent Amendments with explanation. Important Judgements with Explanation and its impact on society (from the list of Supreme Court Judgements).
- Emergency Provisions, types of Emergencies and it's consequences.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

Module- IV

Constitutional Provisions/ Local Administration/ Human Rights

- Special Constitutional Provisions for SC & ST, OBC, Special Provision for Women, Children & Backward Classes.
- Local Administration : Powers and functions of Municipalities and Panchyats System. Co – Operative Societies and Constitutional and Non-constitutional Bodies.
- Human Rights/values – Meaning and Definitions, Legislative Specific Themes in Human Rights and Functions/ Roles of National Human Rights Commission of India. Human Rights (Amendment Act)2006.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

MODULE- V

Professional / Engineering Ethics

- Scope & Aims of Engineering & Professional Ethics - Business Ethics, Corporate Ethics, Personal Ethics. Engineering and Professionalism, Positive and Negative Faces of Engineering Ethics, Code of Ethics as defined in the website of Institution of Engineers (India) : Profession, Professionalism, Professional Responsibility. Clash of Ethics, Conflicts of Interest.

Responsibilities in Engineering

- Responsibilities in Engineering and Engineering Standards, the impediments to Responsibility.Trust and Reliability in Engineering, IPRs (Intellectual Property Rights),
- Risks, Safety and liability in Engineering.

(Duration: 03 Hours & RBT Levels: L1, L2 & L3)

Course Outcomes: On completion of this course, students will be able to,

CO1: Have general knowledge and legal literacy about Indian Constitution and there by it helps to take up competitive examinations & to manage/face complex societal issues in society.

CO2: Understand state and central policies(Union and State Excutive), fundamental Rights & their duties.

CO3: Understand Electoral Process, Amendments and special provisions in Constitution.

CO4: Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, with Human Rights and NHRC.

CO5: Understand Engineering & Professional ethics and responsibilities of Engineers.

Question paper pattern for SEE and CIE.

- The **SEE question paper will be set for 30 marks** and the pattern of the **question paper will be objective type (MCQ).**
- For the award of **20 CIE marks**, refer the University Scheme and Syllabus book**.**

Text Books

1) **Durga Das Basu (DD Basu):** "Introduction to the Constitution on India", (Students Edition.) Prentice –Hall EEE, 19th / 20th Edn., (Latest Edition) or 2008.
2) **Shubham Singles, Charles E. Haries, and Et al** : "Constitution of India and Professional Ethics" by Cengage Learning India Private Limited, Latest Edition – 2018.

Reference Books

1. **M.Govindarajan, S.Natarajan, V.S.Senthilkumar**, "Engineering Ethics", Prentice –Hall of India Pvt. Ltd. New Delhi, 2004
2. **M.V.Pylee,** "An Introduction to Constitution of India", Vikas Publishing, 2002.
3. Latest Publications of **NHRC - Indian Institute of Human Rights**, New Delhi.

Web Links and Video Lectures

www.unacademy.com/lesson/future-perfect-tense/YQ9NSNQZ

https://successesacademy

B. E. AUTOMOBILE ENGINEERING
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
SEMESTER - III

CONSTITUTION OF INDIA, PROFESSIONAL ETHICS AND CYBER LAW (CPC)

Course Code	**18CPC39/49**	CIE Marks	40
Teaching Hours/Week (L:T:P)	(1:0:0)	SEE Marks	60
Credits	01	Exam Hours	02

Course Learning Objectives: To

- know the fundamental political codes, structure, procedures, powers, and duties of Indian government institutions, fundamental rights, directive principles, and the duties of citizens
- Understand engineering ethics and their responsibilities; identify their individual roles and ethical responsibilities towards society.
- Know about the cybercrimes and cyber laws for cyber safety measures.

Module-1

Introduction to Indian Constitution: The Necessity of the Constitution, The Societies before and after the Constitution adoption. Introduction to the Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly - Preamble and Salient features of the Constitution of India. Fundamental Rights and its Restriction and limitations in different Complex Situations. Directive Principles of State Policy (DPSP) and its present relevance in our society with examples. Fundamental Duties and its Scope and significance in Nation building.

Module-2

Union Executive and State Executive: Parliamentary System, Federal System, Centre-State Relations. Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism. State Executives – Governor, Chief Minister, State Cabinet, State Legislature, High Court and Subordinate Courts, Special Provisions (Articles 370.371,371J) for some States.

Module-3

Elections, Amendments and Emergency Provisions: Elections, Electoral Process, and Election Commission of India, Election Laws. Amendments - Methods in Constitutional Amendments (How and Why) and Important Constitutional Amendments. Amendments – 7,9,10,12,42,44, 61, 73,74, ,75, 86, and 91,94,95,100,101,118 and some important Case Studies. Emergency Provisions, types of Emergencies and its consequences.

Constitutional special provisions: Special Provisions for SC and ST, OBC, Women, Children and Backward Classes.

Module-4

Professional / Engineering Ethics: Scope & Aims of Engineering & Professional Ethics - Business Ethics, Corporate Ethics, Personal Ethics. Engineering and Professionalism, Positive and Negative Faces of Engineering Ethics, Code of Ethics as defined in the website of Institution of Engineers (India): Profession, Professionalism, and Professional Responsibility. Clash of Ethics, Conflicts of Interest. Responsibilities in Engineering Responsibilities in Engineering and Engineering Standards, the impediments to Responsibility. Trust and Reliability in Engineering, IPRs (Intellectual Property Rights), Risks, Safety and liability in Engineering

Module-5

Internet Laws, Cyber Crimes and Cyber Laws: Internet and Need for Cyber Laws, Modes of Regulation of Internet, Types of cyber terror capability, Net neutrality, Types of Cyber Crimes, India and cyber law, Cyber Crimes and the information Technology Act 2000, Internet Censorship. Cybercrimes and enforcement agencies.

Course Outcomes: On completion of this course, students will be able to,

- CO1: Have constitutional knowledge and legal literacy.
- CO2: Understand Engineering and Professional ethics and responsibilities of Engineers.
- CO3: Understand the the cybercrimes and cyber laws for cyber safety measures.

Question paper pattern for SEE and CIE:

- The SEE question paper will be set for 100 marks and the marks scored by the students will proportionately be reduced to 60. The pattern of the question paper will be objective type (MCQ).
- For the award of 40 CIE marks, refer the University regulations 2018.

Sl. No.	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year

Textbooks				
1	Constitution of India, Professional Ethics and Human Rights	Shubham Singles, Charles E. Haries, and et al	Cengage Learning India	2018
2	Cyber Security and Cyber Laws	Alfred Basta and et al	Cengage Learning India	2018
Reference Books				
3	Introduction to the Constitution of India	Durga Das Basu	Prentice –Hall,	2008.
4	Engineering Ethics	M. Govindarajan, S. Natarajan, V. S. Senthilkumar	Prentice –Hall,	2004

Course Title: Remote Sensing and GIS

Open Elective 1

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER:V

Subject Code	15CV563	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
	CREDITS – 03	**Total Marks-100**	

Course Objectives: This course will enable students to

1. Understand the basic concepts of remote sensing
2. Analyze satellite imagery and extract the required units.
3. Extract the GIS data and prepare the thematic maps
4. Use the thematic maps for various applications

Modules	**Teaching Hours**	**Revised Bloom's Taxonomy (RBT) Level**
Module -1		
Remote Sensing: Basic concept of Remote sensing, Data and Information, Remote sensing data collection, Remote sensing advantages & Limitations, Remote Sensing process. Electromagnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, and vegetation), Resolution, image registration and Image and False color composite, elements of visual interpretation techniques.	8 hours	L1, L2,L3
Module -2		
Remote Sensing Platforms and Sensors: Indian Satellites and Sensors characteristics, Remote Sensing Platforms, Sensors and Properties of Digital Data, Data Formats: Introduction, platforms- IRS, Landsat, SPOT, Cartosat, Ikonos, Envisat etc. sensors, sensor resolutions (spatial, spectral, radiometric and	8 Hours	L2,L3,L4

temporal). Basics of digital image processing- introduction to digital data, systematic errors(Scan Skew, Mirror-Scan Velocity, Panoramic Distortion, Platform Velocity , Earth Rotation) and non-systematic [random] errors(Altitude, Attitude), Image enhancements(Gray Level Thresholding, level slicing, contrast stretching),image filtering.		
Module -3		
Geographic Information System: Introduction to GIS; components of a GIS; Geographically Referenced Data, Spatial Data- Attribute data-Joining Spatial and attribute data, GIS Operations: Spatial Data Input – Attribute data Management, Geographic coordinate System, Datum; Map Projections: Types of Map Projections, Projected coordinate Systems. UTM Zones.	8 Hours	L2,L3,L4
Module -4		
Data Models: Vector data model: Representation of simple features – Topology and its importance; coverage and its data structure, Shape file; Relational Database, Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data conversion.	8 Hours	L3,L4,L5
Module -5		
Integrated Applications of Remote sensing and GIS: Applications in land use land cover analysis, change detection, water resources, urban planning, environmental planning, Natural resource management and Traffic management. Location Based Services And Its Applications.	8 Hours	L3,L4,L5,L6

Course outcomes: After studying this course, students will be able to:

1. Collect data and delineate various elements from the satellite imagery using their spectral signature.
2. Analyze different features of ground information to create raster or vector data.
3. Perform digital classification and create different thematic maps for solving specific problems
4. Make decision based on the GIS analysis on thematic maps.

Program Objectives:

- Engineering knowledge
- Problem analysis
- Interpretation of data

Question paper pattern:

- The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
- There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
- Each full question shall cover the topics as a module
- The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. Narayan Panigrahi, **"Geographical Information Science** ", ISBN 10: 8173716285 / ISBN 13:9788173716287, University Press 2008.
2. Basudeb Bhatta, **"Remote sensing and GIS"** , ISBN:9780198072393, Oxford University Press 2011
3. Kang – Tsurg Chang, **"Introduction to Geographic Information System".** Tata McGraw Hill Eduction Private Limited 2015.
4. Lillesand, Kiefer, Chipman, "Remote Sensing and Ima ge Interpretation", Wiley 2011.

Reference Books:

1. Chor Pang Lo and Albert K.W Yeung, "Concepts & Tech niques of GIS", PHI, 2006
2. John R. Jensen, "Remote sensing of the environment" , An earth resources perspective – 2nd edition – by Pearson Education 2007.

- Anji Reddy M., "Remote sensing and Geograperhical i nformation system", B.S. Publications 2008.
- Peter A. Burrough, Rachael A. McDonnell, and Christopher D. Lloyd, "Principals of Geo physical Informa tion system", Oxford Publications 2004.
- S Kumar, "Basics of remote sensing & GIS", Laxmi pu blications 2005.

Course Title: Water Supply and Treatment Engineering

As per Choice Based Credit System (CBCS) scheme]
SEMESTER:VI

Subject Code	15CV64	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS –04		**Total Marks- 100**	

Course objectives: This course will enable students to

1. Analyze the variation of water demand and to estimate water requirement for a community.
2. Evaluate the sources and conveyance systems for raw and treated water.
3. Study drinking water quality standards and to illustrate qualitative analysis of water.
4. Design physical, chemical and biological treatment methods to ensure safe and potable water Supply.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Introduction: Need for protected water supply. Demand of Water: Types of water demands -domestic demand, industrial, institutional and commercial, public use, fire demand, Factors affecting per capita demand, Variations in demand of water, Peak factor, Design period and factors governing design period. Different methods of population forecasting -with merits and demerits. Numerical Problems.	10 hours	L1,L2,L3
Module -2		
Water Treatment: Objectives, Treatment flow chart – significance of each unit Sources and Characteristics: surface and subsurface sources -suitability with regard to quality and quantity. Sampling - Objectives, methods, Preservation techniques. Water quality characteristics: Physical, Chemical and Microbiological.	10 Hours	L1,L2,L3
Module -3		
Sedimentation -theory, settling tanks, types, design. Concept of Plate and Tube settlers. Coagulation aided sedimentation-types of coagulants, chemical feeding, flash mixing, Clarriflocculators . Filtration: mechanism -theory of filtration, types of filters, slow sand, rapid sand and pressure filters including construction, operation, cleaning. Operational problems in filters. Design of slow and rapid sand filter without under drainage system. Ultra and micro filtration: Basic principles, membrane materials, pore size, flux, normalizing permeability, fouling mechanism, Overview of ultra and micro filtration elements and systems, Fouling in MF/UF systems, fouling control and pre treatment.	10 Hours	L1,L2,L3
Module -4		
Softening: Overview of Lime soda, Zeolite process, RO and Nano filtration: Basic principles, Flux, Salt passage, rejection and concentration polarization. Overview of RO and nano filtration membranes and elements, Conventional pre treatment techniques for RO and nano filtration. Disinfection: Methods of disinfection with merits and demerits, Theory of disinfection, emphasis on treatment of water for community bathing. (melas and fairs) Fluoridation and De-fluoridation.	10 Hours	L1,L2,L3
Module -5		
Collection and Conveyance of water: Intake structures - types of intakes –Factors to be considered in selection of intake structures. Pumps: Types of pumps with working principles. Numerical Problems. Pipes: Design of the economical diameter for the rising main; Numerical Problems. Pipe appurtenances, Valves, Fire hydrants Pipe materials: Different materials with advantages and disadvantages. Factors affecting selection of pipe material. Distribution system: Methods- Gravity, Pumping, Combined gravity and pumping system, Service reservoirs and their capacity determination. Visit to Intake structure, Water treatment plant and report working of each unit Design of water treatment plant units and distribution system with population forecasting for the given city	10 Hours	L1,L2,L3

Course Outcomes: After studying this course, students will be able to:

1. Estimate average and peak water demand for a community.
2. Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
3. Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
4. Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.

Program Objectives:

- Engineering knowledge
- Problem analysis
- Interpretation of data

Question Paper Pattern:

- The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
- There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
- Each full question shall cover the topics as a module
- The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. S.K.Garg, Environmental Engineering vol-I, Water supply Engineering – M/s Khanna Publishers, New Delhi 2010
2. Mark.J Hammer, Water & Waste Water Technology, John Wiley & Sons Inc., New York, 2008.

Reference Books:

1. B.C. Punmia and Ashok Jain, Environmental Engineering I-Water Supply Engineering, Laxmi Publications (P)Ltd., New Delhi 2010.
2. Howard S. Peavy, Donald R. Rowe, George T , Environmental Engineering - McGraw Hill International Edition. New York, 2000
3. CPHEEO Manual on water supply and treatment engineering, Ministry of Urban Development, Government of India, New Delhi.

Course Title: Water Resources Management

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER:VI

Subject Code	15CV661	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
	CREDITS – 03	**Total Marks-100**	

Course objectives: This course will enable students to;

1. Judge surface and ground water resources.
2. Address the issues of water resources management.
3. Learn the principles of integrated water resources management.
4. Understand the legal framework of water policy.
5. Know the different methods of water harvesting.

Modules	**Teaching Hours**	**Revised Bloom's Taxonomy (RBT) Level**
Module -1		
Surface and Ground water Resources: Hydrologic Cycle, Global water resources and Indian Water resources, Surface Water Resources, Water Balance, Available Renewable Water Resources, Water Scarcity, The Water Balance as a Result of Human Interference, Groundwater Resources, Types of Aquifers, Groundwater as a Storage Medium	8 hours	L2, L3
Module -2		
Water Resources Planning and Management: Necessity, System components, planning scales, Approaches, planning and management aspects, Analysis, Models for impact prediction and evaluation, Adaptive Integrated Policies, Post Planning and management Issues.	8 Hours	L2, L3
Module -3		
Integrated Water Resources Management: Definition of IWRM, Principles, Implementation of IWRM, Legislative and Organizational Framework, Types and Forms of Private Sector Involvement.	8 Hours	L3, L4
Module -4		
Water Governance and Water Policy: Legal Framework of Water – Substance of National Water Laws – Other key issues – Changing incentives through Regulation - National Water Policy – National-Level Commissions – Irrigation Management Transfer Policies and Activities – Legal Registration of WUAs – Legal Changes in Water Allocation, – Role of Local Institutions – Community Based Organizations – Water Policy Reforms: India.	8 Hours	L2, L3
Module -5		

Water Harvesting and Conservation: Water Harvesting Techniques – Micro-catchments - Design of Small Water Harvesting Structures – Farm Ponds – Percolation Tanks – Yield from a Catchment, Rain water Harvesting-various techniques related to Rural and `Urban area.	8 Hours	L2, L3

Course outcomes: After studying this course, students will be able to:

1. Assess the potential of groundwater and surface water resources.
2. Address the issues related to planning and management of water resources.
3. Know how to implement IWRM in different regions.
4. Understand the legal issues of water policy.
5. Select the method for water harvesting based on the area.

Program Objectives:

- Engineering knowledge
- Problem analysis
- Interpretation of data

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
2. There will be two full questions (with a maximum of two subdivisions) from each module.
3. Each full question shall cover the topics as a module
4. The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. K. Subramanya, "Engineering Hydrology", Tata McGraw Hill Publishers, New Delhi.
2. H.M. Raghunath, "Ground Water", Wiley Eastern Publication, New Delhi.
3. Daniel P. Loucks and Eelco van Beek, "Water Resources Systems. Planning and Management", UNESCO Publication.
4. Mollinga, P. et al, "Integrated Water Resources Management", Water in South Asia Volume I, Sage Publications, 2006.
5. Singh, Chhatrapati "Water Rights in India," Ed: Chhatrapati Singh. Water Law in India: The Indian Law Institute, New Delhi,1992.
6. 6) Dhruva Narayana, G. Sastry, V. S. Patnaik, "Watershed Management", CSWCTRI, Dehradun, ICAR Publications, 1997.

Reference Books:

1. Lal, Ruttan. " Integrated Watershed Management in the Global Ecosystem". CRC Press, New York.
2. Heathcote, I. W. Integrated Watershed Management: Principles and Practice. 1988. John Wiley and Sons, Inc., New York.

Course Title: Municipal and Industrial Waste Water Engineering As per Choice Based Credit System (CBCS) scheme] SEMESTER:VII

Subject Code	15CV71	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS –04		**Total Marks- 100**	

Course objectives: This course will enable students to;

1. Understand sewerage network and influencing parameters.
2. Understand and design different unit operations involved in conventional and biological treatment process.
3. Apply the principles of Industrial effluent treatment process for different industrial wastes.
4. Evaluate self purification of streams depending on hydraulic and organic loading of sewage into receiving waters.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Introduction, need for sanitation, methods of sewage disposal, types of sewerage systems, dry weather flow, wet weather flow, factors effecting dry and wet weather flow on design of sewerage system, estimation of storm flow, time of concentration flow, material of sewers, shape of sewers, laying and testing of sewers, ventilation of sewers. low-cost waste treatment; oxidation pond, septic tank, Sewer appurtenances, manholes, catch basins, basic principles of house drainage, typical layout plan showing house drainage connections,	10 hours	L1,L2
Module -2		
Design of sewers, hydraulic formula for velocity, effects of variation on velocity, regime velocity, design of hydraulic elements for circular sewers for full flow and partial flow conditions, disposal of effluents by dilution, self purification phenomenon, oxygen sag curve, zones of purification, sewage farming, sewage sickness, numerical problems on disposal of effluents, Streeter-Phelps equation	10 Hours	L2,L3
Module -3		
Waste water characteristics, sampling, significance and techniques, physical, chemical and biological characteristics, flow diagram for municipal waste water treatment, unit operations; screens, grit chambers, skimming tanks, equalization Tanks Suspended growth and fixed film bio process, design of trickling filters, activated sludge process, sequential batch reactors, moving bed bio reactors, sludge digesters,	10 Hours	L1,L2,L3
Module -4		
Difference between domestic and industrial waste water, effect of effluent discharge on streams, methods of industrial waste water treatment; volume reduction, strength reduction, neutralization, equalisation and proportioning. Removal of organic, inorganic and colloidal solids, combined treatment methods; merits, demerits and feasibility, principles of discharge of raw, partially treated and completely treated wastes in to streams	10 Hours	L1,L2
Module -5		
Process flow chart, sources and characteristics of industrial waste water, treatment methods, reuse and recovery and disposal; cotton and textile industry, tanning industry, cane sugar and distilleries, dairy industry, steel and cement industry, paper and pulp industry, pharmaceutical and food processing industry.	10 Hours	L1,L2,L3

Course outcomes: After studying this course, students will be able to:

1. Acquires capability to design sewer and Sewerage treatment plant.
2. Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
3. Identify waste streams and design the industrial waste water treatment plant.
4. Manage sewage and industrial effluent issues.

Program Objectives:

- Engineering knowledge
- Problem analysis
- Interpretation of data

Question paper pattern:

- The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
- There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
- Each full question shall cover the topics as a module
- The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. Metcalf and Eddy, "Wastewater Engineering - Collection, Treatment, Disposal and Reuse", McGraw Hill Pub.Co., 2009.
2. Nelson Leonard Nemerow, "Industrial Waste Treatment", Butterworth-Heinemann, 2007.
3. Patwardhan A.D, "Industrial Waste Water Treatment", PHI Learning Private Limited-New Delhi
4. Hammer, M.J. and Hammer, M.J., "Water and Wastewater Technology", 7th Ed., Prentice Hall of India

Reference Books:

1. Manual on Waste Water Treatment : CPHEEO, Ministry of Urban Development, New Delhi.
2. Fair, Geyer and Okun , "Water and Wastewater Engineering" Vol-II, John Willey Publishers, New York.

Course Title: Hydrology and Irrigation Engineering

[As per Choice Based Credit System (CBCS) scheme]

SEMESTER:VII

Subject Code	15CV73	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
	CREDITS – 04	**Total**	**Marks-100**

Course Objectives: This course will enable students to;

1. Understand the concept of hydrology and components of hydrologic cycle such as precipitation, infiltration, evaporation and transpiration.
2. Quantify runoff and use concept of unit hydrograph.
3. Demonstrate different methods of irrigation, methods of application of water and irrigation procedure.
4. Design canals and canal network based on the water requirement of various crops.
5. Determine the reservoir capacity.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Hydrology: Introduction, Importance of hydrology, Global and Indian water availability, Practical application of hydrology, Hydrologic cycle (Horton's) qualitative and engineering representation. **Precipitation:** Definition, Forms and types of precipitation, measurement of rain fall using Symon's and Syphon type of rain gauges, optimum number of rain gauge stations, consistency of rainfall data (double mass curve method), computation of mean rainfall, estimation of missing data, presentation of precipitation data, moving average curve, mass curve, rainfall hyetographs.	10 hours	L2, L3
Module -2		
Losses: Evaporation: Introduction, Process, factors affecting evaporation, measurement using IS class-A Pan, estimation using empirical formulae (Meyer's and Rohwer's equations) Reservoir evaporation and control **Evapo-transpiration:** Introduction, Consumptive use, AET, PET, Factors affecting, Measurement, Estimation by Blaney-Criddle equation, **Infiltration:** Introduction, factors affecting infiltration capacity, measurement by double ring infiltrometer, Horton's infiltration equation, infiltration indices.	10 Hours	L2, L3
Module -3		
Runoff: Definition, concept of catchment, factors affecting runoff, rainfall – runoff relationship using regression analysis. **Hydrographs:** Definition, components of hydrograph, base flow separation, unit hydrograph, assumption, application and limitations, derivation from simple storm hydrographs, S curve and its computations, Conversion of UH of different durations	10 Hours	L2, L4

Module -4		
Irrigation: Definition. Benefits and ill effects of irrigation. System of irrigation: surface and ground water, flow irrigation, lift irrigation, Bandhara irrigation. **Water Requirements of Crops:** Duty, delta and base period, relationship between them, factors affecting duty of water crops and crop seasons in India, irrigation efficiency, frequency of irrigation.	10 Hours	L2, L4
Module -5		
Canals: Types of canals. Alignment of canals. Definition of gross command area, cultural command area, intensity of irrigation, time factor, crop factor. Unlined and lined canals. Standard sections. Design of canals by Lacey's and Kennedy's method. **Reservoirs:** Definition, investigation for reservoir site, storage zones determination of storage capacity using mass curves, economical height of dam.	10 Hours	L2, L4

Course outcomes: After studying this course, students will be able to:

1. Understand the importance of hydrology and its components.
2. Measure precipitation and analyze the data and analyze the losses in precipitation.
3. Estimate runoff and develop unit hydrographs.
4. Find the benefits and ill-effects of irrigation.
5. Find the quantity of irrigation water and frequency of irrigation for various crops.
6. Find the canal capacity, design the canal and compute the reservoir capacity.

Program Objectives:

- Engineering knowledge
- Problem analysis
- Interpretation of data

Question paper pattern:

- The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
- There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
- Each full question shall cover the topics as a module
- The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1) K. Subramanya, “Engineering Hydrology”, Tata McGraw Hill Publishers, New Delhi.

2) Jayarami Reddy, “A Text Book of Hydrology”, Lakshmi Publications, New Delhi.

3) Punmia and LalPandey, “Irrigation and Water Power Engineering” Lakshmi Publications, New Delhi.

Reference Books:

1) H.M. Raghunath, “Hydrology”, Wiley Eastern Publication, New Delhi.

2) Sharma R.K., “Irrigation Engineering and Hydraulics”, Oxford & IBH Publishing Co., New Delhi.

3) VenTe Chow, “Applied Hydrology”, Tata McGraw Hill Publishers, New Delhi.

4) Modi P.N “Water Resources and Water Power Engineering”-. Standard book house, Delhi.

3) Garg S.K, “Irrigation Engineering and Hydraulic Structures” Khanna publications, New Delhi.

TITLE OF THE COURSE: REMOTE SENSING AND GIS
B.E., V Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Course Code	**17CV563**	**CIE Marks**	**40**
Number of Lecture Hours/Week	**03**	**SEE Marks**	**60**
Total Number of Lecture Hours	**40 (8 Hours per Module)**	**Exam Hours**	**03**

Credits – 03

Course Objectives: This course will enable students to

1. Understand the basic concepts of remote sensing.
2. Analyze satellite imagery and extract the required units.
3. Extract the GIS data and prepare the thematic maps.
4. Use the thematic maps for various applications.

Module-1

Remote Sensing: Basic concept of Remote sensing, Data and Information, Remote sensing data collection, Remote sensing advantages & Limitations, Remote Sensing process. Electromagnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, and vegetation), Resolution, image registration and Image and False color composite, elements of visual interpretation techniques.

L1,L2,L3

Module-2

Remote Sensing Platforms and Sensors: Indian Satellites and Sensors characteristics, Remote Sensing Platforms, Sensors and Properties of Digital Data, Data Formats: Introduction, platforms- IRS, Landsat, SPOT, Cartosat, Ikonos, Envisat etc. sensors, sensor resolutions (spatial, spectral, radiometric and temporal). Basics of digital image processing- introduction to digital data, systematic errors(Scan Skew, Mirror-Scan Velocity, Panoramic Distortion, Platform Velocity , Earth Rotation) and non-systematic [random] errors(Altitude, Attitude), Image enhancements(Gray Level Thresholding, level slicing, contrast stretching),image filtering.

L2,L3,L4

Module-3

Geographic Information System: Introduction to GIS; components of a GIS; Geographically Referenced Data, Spatial Data- Attribute data-Joining Spatial and attribute data, GIS Operations: Spatial Data Input – Attribute data Management, Geographic coordinate System, Datum; Map Projections: Types of Map Projections, Projected coordinate Systems. UTM Zones.

L2,L3,L4

Module-4

Data Models: Vector data model: Representation of simple features – Topology and its importance; coverage and its data structure, Shape file; Relational Database, Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data conversion.

L3,L4,L5

Module-5

Integrated Applications of Remote sensing and GIS: Applications in land use land cover analysis, change detection, water resources, urban planning, environmental planning, Natural resource management and Traffic management. Location Based

Services And Its Applications.

L3,L4,L5,L6

Course outcomes: After studying this course, students will be able to:

1. Collect data and delineate various elements from the satellite imagery using their spectral signature.
2. Analyze different features of ground information to create raster or vector data.
3. Perform digital classification and create different thematic maps for solving specific problems
4. Make decision based on the GIS analysis on thematic maps.

Text Books:

1. Narayan Panigrahi, "Geographical Information Science", and ISBN 10: 8173716285 / ISBN 13: 9788173716287, University Press 2008.
2. Basudeb Bhatta, "Remote sensing and GIS" , ISBN:9780198072393, Oxford University Press 2011
3. Kang – Tsurg Chang, "Introduction to Geographic Information System". Tata McGraw Hill Education Private Limited 2015.

   Lillesand, Kiefer, Chipman, "Remote Sensing and Image Interpretation", Wiley 2011.

Reference Books:

1. Chor Pang Lo and Albert K.W Yeung, "Concepts & Techniques of GIS", PHI, 2006
2. John R. Jensen, "Remote sensing of the environment", An earth resources perspective – 2nd edition – by Pearson Education 2007.
3. Anji Reddy M., "Remote sensing and Geograperhical information system", B.S. Publications 2008.
4. Peter A. Burrough, Rachael A. McDonnell, and Christopher D. Lloyd, "Principals of Geo physical Information system", Oxford Publications 2004.
5. S Kumar, "Basics of remote sensing & GIS", Laxmi publications 2005.

RENEWABLE ENERGY RESOURCES(Open Elective)
B.E., V Semester, Electrical and Electronics Engineering [As per Choice Based Credit System (CBCS) scheme]

Course Code	17EE563	CIE Marks	40
Number of Lecture Hours/Week	03	SEE Marks	60
Total Number of Lecture Hours	40	Exam Hours	03

Credits - 03

Course objectives:

- To discuss causes of energy scarcity and its solution, energy resources and availability ofrenewable energy.
- To explain sun – earth geometric relationship, Earth – Sun Angles and their Relationships
- To discuss about solar energy reaching the Earth's surface and solar thermal energy applications.
- To discuss types of solar collectors, their configurations and their applications
- To explain the components of a solar cell system, equivalent circuit of a solar cell, its characteristics and applications.
- To discus benefits of hydrogen energy, production of hydrogen energy, storage its advantages and disadvantages.
- To discuss wind turbines, wind resources, site selection for wind turbine
- To discuss geothermal systems, their classification and geothermal based electric power generation
- To discuss waste recovery management systems, advantages and disadvantages
- To discuss biomass production, types of biomass gasifiers, properties of producer gas.
- To discuss biogas, its composition, production, benefits.
- To discuss tidal energy resources, energy availability, power generation.
- To explain motion in the sea wave, power associated with sea wave and energy availability and the devices for harnessing wave energy.
- To discuss principles of ocean thermal energy conversion and production ofelectricity.

Module-1	**Teaching Hours**
Introduction: Causes of Energy Scarcity, Solution to Energy Scarcity, Factors Affecting Energy Resource Development, Energy Resources and Classification, Renewable Energy – Worldwide Renewable Energy Availability, Renewable Energy in India. **Energy from Sun:** Sun- earth Geometric Relationship, Layer of the Sun, Earth – Sun Angles and their Relationships, Solar Energy Reaching the Earth's Surface, Solar Thermal Energy Applications.	**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying.
Module-2	
Solar Thermal Energy Collectors: Types of Solar Collectors, Configurations of Certain Practical Solar Thermal Collectors, Material Aspects ofSolar Collectors, Concentrating Collectors, Parabolic Dish – Stirling Engine System, Working of Stirling or Brayton Heat Engine, Solar Collector Systems into Building Services, Solar Water Heating Systems, Passive Solar Water Heating Systems, Applications of Solar Water Heating Systems, Active Solar Space Cooling, Solar Air Heating, Solar Dryers, Crop Drying, Space Cooing, Solar Cookers, Solar pond. **Solar Cells:** Components of Solar Cell System, Elements of Silicon Solar Cell, Solar Cell materials, Practical Solar Cells, I – V Characteristics of Solar Cells, Efficiency of Solar Cells, Photovoltaic Panels, Applications of Solar Cell Systems.	**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying, L_4 – Analysing.
Module-3	

Hydrogen Energy: Benefits of Hydrogen Energy, Hydrogen Production Technologies, Hydrogen Energy Storage, Use of Hydrogen Energy, Advantages and Disadvantages of Hydrogen Energy, Problems Associated with Hydrogen Energy. **Wind Energy:** Windmills, Wind Turbines, Wind Resources, Wind Turbine Site Selection. **Geothermal Energy:** Geothermal Systems, Classifications, Geothermal Resource Utilization, Resource Exploration, Geothermal Based Electric Power Generation, Associated Problems, environmental Effects.	**08**

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER - V

17EE563 RENEWABLE ENERGY RESOURCES(Open Elective) (continued)

Module-3 (continued)		**Teaching Hours**
Solid waste and Agricultural Refuse: Waste is Wealth, Key Issues, Waste Recovery Management Scheme, Advantages and Disadvantages of Waste Recycling, Sources and Types of Waste, Recycling of Plastics. ■		
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying, L_4 – Analysing.	
Module-4		
Biomass Energy: Biomass Production, Energy Plantation,Biomass Gasification, Theory of Gasification, Gasifier and Their Classifications, Chemistry of Reaction Process in Gasification, Updraft, Downdraft and Cross-draft Gasifiers, Fluidized Bed Gasification, Use of Biomass Gasifier, Gasifier Biomass Feed Characteristics, Applications of Biomass Gasifier, Cooling and Cleaning of Gasifiers. **Biogas Energy:** Introduction, Biogas and its Composition, Anaerobic Digestion, Biogas Production, Benefits of Biogas, Factors Affecting the Selection of a Particular Model of a Biogas Plant, Biogas Plant Feeds and their Characteristics. **Tidal Energy:**Introduction, Tidal Energy Resource, Tidal Energy Availability, Tidal Power Generation in India, Leading Country in Tidal Power Plant Installation, Energy Availability in Tides, Tidal Power Basin, Turbines for Tidal Power, Advantages and Disadvantages of Tidal Power, Problems Faced in Exploiting Tidal Energy.		**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying, L_4 – Analysing.	
Module-5		
Sea Wave Energy: Introduction, Motion in the sea Waves, Power Associated with Sea Waves, Wave Energy Availability, Devices for Harnessing Wave Energy, Advantages and Disadvantages of Wave Power. **Ocean Thermal Energy:**Introduction,Principles of Ocean Thermal Energy Conversion (OTEC), Ocean Thermal Energy Conversion plants, Basic Rankine Cycle and its Working, Closed Cycle, Open Cycle and Hybrid Cycle, Carnot Cycle, Application of OTEC in Addition to Produce Electricity, Advantages, Disadvantages and Benefits ofOTEC. ■		**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying.	

Course outcomes:

At the end of the course the student will be able to:

- Discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy.
- Discuss energy from sun, energy reaching the Earth's surface and solar thermal energy applications.
- Discuss types of solar collectors, their configurations, solar cell system, its characteristics and their applications.
- Discus generation of energy from hydrogen, wind, geothermal system, solid waste and agriculturerefuse.
- Discuss production of energy from biomass, biogas.
- Discuss tidal energy resources, energy availability and power generation.

- Discuss power generation sea wave energy and ocean thermal energy. ■

Graduate Attributes (As per NBA)

Engineering Knowledge,Problem Analysis,Modern tool usage,Ethics.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 16 marks.
- There will be 2full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER - V

17EE563 RENEWABLE ENERGY RESOURCES(Open Elective) (continued)

Textbook

1	Nonconventional Energy Resources	ShobhNath Singh	Pearson	1st Edition, 2015

Reference Books

1	Nonconventional Energy Resources	B.H. Khan	McGraw Hill	3rd Edition,
2	Renewable Energy; Power for a sustainable Future	Godfrey Boyle	Oxford	3rd Edition, 2012
3	Renewable Energy Sources: Their Impact on global Warming and Pollution	TasneemAbbasi S.A. Abbasi	PHI	1st Edition, 2011

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER –VI

SOLAR AND WIND ENERGY (Professional Elective)

Subject Code	15EE654	IA Marks	20
Number of Lecture Hours/Week	03	Exam Hours	03
Total Number of Lecture Hours	40	Exam Marks	80

Credits – 03

Course objectives:

- To discuss the importance of energy in human life, relationship among economy and environment with energy use.
- To discuss the increasing role of renewable energy, energy management, energy audit, energy efficiency, energy intensity.
- To discuss energy consumption status in India, energy saving potential and energy conservation efforts in India.
- To explain the concept of energy storage and the principles of energy storage devices.
- To discuss the characteristics and distribution of solar radiation, measurement of components of solar radiation and analysis of collected solar radiation data.
- To explain availability of solar radiation at a location and the effect of tilting the surface of collector with respect to horizontal surface.
- To describe the process of harnessing solar energy in the form of heat and working of solar collectors.
- To discuss applications of solar energy including heating and cooling.
- To discuss the operation of solar cell and the environmental effects on electrical characteristics of solar cell
- To discuss sizing and design of typical solar PV systems and their applications.
- To discuss basic Principles of Wind Energy Conversion and to compute the power available in the wind.
- To discuss forces on the Blades, Wind Energy Conversion, collection of Wind Data, energy estimation and site selection.
- To discuss classification of WEC Systems, its advantages and disadvantages of WECS, and Types of Wind Machines (Wind Energy Collectors).
- To evaluate the performance of Wind-machines, Generating Systems.
- To discuss energy storage, applications of Wind Energy and Environmental Aspects.■

Module-1	**Teaching Hours**
Fundamentals of Energy Science and Technology: Introduction, Energy, Economy and Social Development, Classification of Energy Sources, Importance of Non -conventional Energy Sources, Salient features of Non-conventional Energy Sources, World Energy Status, Energy Status in India. **Energy Conservation and Efficiency:** Introduction, Important Terms and Definitions, Important Aspects of Energy Conservation, Global Efforts, Achievements and Future Planning, Energy Conservation/Efficiency Scenario in India, Energy Audit, Energy Conservation Opportunities. **Energy Storage:** Introduction, Necessity of Energy Storage, Specifications of Energy Storage Devices. **Solar Energy-Basic Concepts:** Introduction, The Sun as Source of Energy, The Earth, Sun, Earth Radiation Spectrum, Extraterrestrial and Terrestrial Radiations, Spectral Power Distribution of Solar Radiation, Depletion of Solar Radiation.■	**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying.
Module-2	
Solar Energy-Basic Concepts (continued): Measurement of Solar Radiation, Solar Radiation Data, Solar Time, Solar Radiation Geometry, Solar Day Length, Extraterrestrial Radiation on Horizontal Surface, Empirical Equations for Estimating Terrestrial Solar Radiation on Horizontal Surface, Solar Radiation on Inclined Plane Surface. **Solar Thermal Systems:** Introduction, Solar Collectors, Solar Water Heater, Solar Passive Space Heating and Cooling Systems, Solar Industrial Heating Systems, Solar Refrigeration and Air Conditioning Systems, Solar Cookers.■	**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying, L_4 – Analysing.

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER – VI

15EE654 SOLAR AND WIND ENERGY (Professional Elective) (continued)

Module-3		**Teaching Hours**
Solar Photovoltaic Systems: Introduction, Solar Cell Fundamentals, Solar Cell Characteristics, Solar Cell Classification, Solar Cell Technologies, Solar Cell, Module, and Array Construction, Maximizing the Solar PV Output and Load Matching. Maximum Power Point Tracker. Balance of System Components, Solar PV Systems, Solar PV Applications.■		**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying, L_4 – Analysing.	
Module-4		
Wind Energy: Introduction, Basic Principles of Wind Energy Conversion, History of Wind Energy, Wind Energy Scenario – World and India. The Nature of the Wind, The Power in the Wind, Forces on the Blades, Wind Energy Conversion, Wind Data and Energy Estimation, Site Selection Considerations **Wind energy systems:** Environment and Economics Environmental benefits and problems of wind energy, Economics of wind energy, Factors influence the cost of energy generation, machine parameters, Life cycle cost analysis ■		**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying, L_4 – Analysing.	
Module-5		
Basic Components of a Wind Energy Conversion(WEC) System: Classification of WEC systems, Advantages and Disadvantages of WECS, Types of Wind Machines (Wind Energy Collectors), Analysis of Aerodynamic Forces Acting on the Blade, Performance of Wind-machines, Generating Systems, Energy Storage, Applications of Wind Energy, Environmental Aspects.■		**08**
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding, L_3 – Applying.	

Course outcomes:
At the end of the course the student will be able to:

- Discuss the importance of energy in human life, relationship among economy and environment with energy use and the increasing role of renewable energy.
- Explain the concept of energy storage and the principles of energy storage devices.
- To discuss solar radiation on horizontal and tilted surface, its characteristics, measurement and analysis of radiation data.
- Describe the process of harnessing solar energy and its applications in heating and cooling.
- Discuss fabrication, operation of solar cell, electrical characteristics, sizing and design of solar PV systems and their applications.
- Explain basic Principles of Wind Energy Conversion, collection of wind data, energy estimation and site selection.
- Discuss the performance of Wind-machines, energy storage, applications of Wind Energy and environmental aspects.■

Graduate Attributes (As per NBA)
Engineering Knowledge, Design/ Development of Solutions, The Engineer and Society, Environment and Sustainability, Ethics, Project Management and Finance.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 16 marks.
- There will be 2full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module.■

B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE) CHOICE BASED CREDIT SYSTEM (CBCS) SEMESTER – VI				
15EE654 SOLAR AND WIND ENERGY(Professional Elective) (continued)				
Textbook				
1	Non-Conventional Energy Resources	B. H. Khan	McGraw Hill	2nd Edition 2017
2	Non-Conventional Sources of Energy	Rai, G. D	Khanna Publishers	4th Edition, 2009
Reference Books				
1	Non-Conventional Energy Resources	ShobhNath Singh	Pearson	1st Edition, 2015
2	Solar Energy – Principles of Thermal Collections and Storage	S.P. Sukhatme J.K.Nayak	McGraw Hill	3rd Edition, 2008
3	Wind Turbine Technology	Ahmad Hemami	Cengage	1st Edition, 2012

B. E. MECHANICAL ENGINEERING
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
SEMESTER - IV

APPLIED THERMODYNAMICS

Course Code	**18ME42**	CIE Marks	40
Teaching Hours /Week (L:T:P)	3:2:0	SEE Marks	60
Credits	04	Exam Hours	03

Course Learning Objectives:

- To understand the applications of the first and second laws of Thermodynamics to various gas processes and cycles.
- To understand fundamentals of I. C. Engines, Construction and working Principle of an Engine and Compare Actual, Fuel-Air and Air standard cycle Performance.
- To study Combustion in SI and CI engines and its controlling factor in order to extract maximum power.
- To know the concepts of testing of I. C. Engines and methods to estimate Indicated, Brake and Frictional Power and efficiencies.
- To understand theory and performance Calculation of Positive displacement compressor.
- To understand the concepts related to Refrigeration and Air conditioning.
- To get conversant with Psychrometric Charts, Psychrometric processes, human comfort conditions.

Module-1

Air standard cycles: Carnot, Otto, Diesel, Dual and Stirling cycles, p-v and T -s diagrams, description, efficiencies and mean effective pressures. Comparison of Otto and Diesel cycles.
I.C.Engines: Classification of IC engines, Combustion of SI engine and CI engine, Detonation and factors affecting detonation, Performance analysis of I.C Engines, Heat balance, Morse test, IC Engine fuels, Ratings and Alternate Fuels.

Module-2

Gas power Cycles: Gas turbine (Brayton) cycle; description and analysis. Regenerative gas turbine cycle. Inter-cooling and reheating in gas turbine cycles. Introduction to Jet Propulsion cycles.

Module-3

Vapour Power Cycles: Carnot vapour power cycle, drawbacks as a reference cycle. Simple Rankine cycle; description, T-S diagram, analysis for performance. Comparison of Carnot and Rankine cycles. Effects of pressure and temperature on Rankine cycle performance.
Actual vapour power cycles. Ideal and practical regenerative Rankine cycles, open and closed feed water heaters. Reheat Rankine cycle. Characteristics of an Ideal working fluid in vapour power cycles.

Module-4

Refrigeration Cycles: Vapour compression refrigeration system; description, analysis, refrigerating effect. Capacity, power required units of refrigeration, COP, Refrigerants and their desirable properties, alternate Refrigerants. Air cycle refrigeration; reversed Carnot cycle, reversed Brayton cycle, vapour absorption refrigeration system.
Pscychrometrics and Air-conditioning Systems: Psychometric properties of Air, Psychometric Chart, Analyzing Air-conditioning Processes; Heating, Cooling, Dehumidification and Humidification, Evaporative Cooling. Adiabatic mixing of two moist air streams. Cooling towers.

Module-5

Reciprocating Compressors: Operation of a single stage reciprocating compressors. Work input through p-v diagram and steady state steady flow analysis. Effect of Clearance and Volumetric efficiency. Adiabatic, Isothermal and Mechanical efficiencies. Multi-stage compressor, saving in work, Optimum intermediate pressure, Inter-cooling, Minimum work for compression.
Steam nozzles: Flow of steam through nozzles, Shape of nozzles, effect of friction, Critical pressure ratio, Supersaturated flow.

Course Outcomes: At the end of the course the student will be able to:

CO1: Apply thermodynamic concepts to analyze the performance of gas power cycles.
CO2: Apply thermodynamic concepts to analyze the performance of vapour power cycles.

CO3: Understand combustion of fuels and performance of I C engines.
CO4: Understand the principles and applications of refrigeration systems.
CO5: Apply Thermodynamic concepts to determine performance parameters of refrigeration and air-conditioning systems.
CO6: Understand the working principle of Air compressors and Steam nozzles, applications, relevance of air and identify methods for performance improvement.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Sl No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbook/s				
1	Engineering Thermodynamics	P.K. Nag	Tata McGraw Hill	6th Edition 2018
2	Applications of Thermodynamics	V.Kadambi, T. R.Seetharam, K. B. Subramanya Kumar	Wiley Indian Private Ltd	1st Edition 2019
3	Thermodynamics	Yunus A, Cengel, Michael A Boles	Tata McGraw Hill	7th Edition
Reference Books				
1	Thermodynamics for engineers	Kenneth A. Kroos and Merle C. Potter	Cengage Learning	2016
2	Principles of Engineering Thermodynamics	Michael J, Moran, Howard N. Shapiro	Wiley	8th Edition
3	An Introduction to Thermo Dynamics	Y.V.C.Rao	Wiley Eastern Ltd	2003.
4	Thermodynamics	Radhakrishnan	PHI	2nd revised edition
5	I.C Engines	Ganeshan.V	Tata McGraw Hill	4th Edi. 2012
6	I.C.Engines	M.L.Mathur& Sharma.	Dhanpat Rai& sons-India	

APPLIED THERMODYNAMICS

B.E, IV Semester, Mechanical Engineering

[As per Choice Based Credit System (CBCS) scheme]

Course Code	17ME43	**CIE Marks**	**40**
Number of Lecture Hours/Week	**04**	**SEE Marks**	**60**
Total Number of Lecture Hours	**50(10 Hours per Module)**	**Exam Hours**	**03**

Credits – 04

Course Objectives:

- **To have a working knowledge of basic performance of Gas power cycles.**
- **To Calculate the forces exerted by a fluid at rest on submerged surfaces and understand the force of buoyancy**
- **To understand and evaluate the performance of steam power cycles their various Engineering applications**
- **To know how fuel burns and their thermodymic properties.**
- **To Understand mechanism of power transfer through belt, rope, chain and gear drives in I C Engines**
- **To determine performance parameters of refrigeration and air-conditioning systems.**
- **Evaluate the performance parameters of reciprocating air compressor as a function of receiver pressure.**

Module - 1

Gas Power Cycles: Air standard cycles; Carnot, Otto, Diesel, Dual and Stirling cycles, p-v and T -s diagrams, description, efficiencies and mean effective pressures. Comparison of Otto and Diesel cycles. Gas turbine (Brayton) cycle; description and analysis. Regenerative gas turbine cycle. Inter-cooling and reheating in gas turbine cycles. Jet propulsion: Introduction to the principles of jet propulsion,

Module - 2

Vapour Power Cycles: Carnot vapour power cycle, drawbacks as a reference cycle. Simple Rankine cycle; description, T-s diagram, analysis for performance. Comparison of Carnot and Rankine cycles. Effects of pressure and temperature on Rankine cycle performance. Actual vapour power cycles. Ideal and practical regenerative Rankine cycles, open and closed feed water heaters. Reheat Rankine cycle. Characteristics of an Ideal working fluid in Vapour power cycles, Binary Vapour cycles.

Module - 3

Combustion Thermodynamics: Theoretical (Stoichiometric) air for combustion of fuels. Excess air, mass balance, Exhaust gas analysis, A/F ratio. Energy balance for a chemical reaction, enthalpy of formation, enthalpy and internal energy of combustion. Combustion efficiency. Dissociation and equilibrium, emissions.

I.C.Engines: Classification of IC engines, Combustion of SI engine and CI engine, Detonation and factors affecting detonation, Performance analysis of I.C Engines, heat balance, Morse test, IC Engine fuels, Ratings and Alternate Fuels.

Module - 4

Refrigeration Cycles: Vapour compression refrigeration system; description, analysis, refrigerating effect. Capacity, power required, units of refrigeration, COP, Refrigerants and their desirable properties, alternate Refrigerants. Any one case study on cold storage or industrial refrigerator. Air cycle refrigeration; reversed Carnot cycle, reversed Brayton cycle, Vapour absorption refrigeration system. Steam jet refrigeration.

Pscychrometrics and Air-conditioning Systems: Properties of Atmospheric air, and Psychometric properties of Air, Psychometric Chart, Analyzing Air-conditioning Processes; Heating, Cooling, Dehumidification and Humidification, Evaporative Cooling. Adiabatic mixing of two moist air streams. Cooling towers.

Module - 5

Reciprocating Compressors: Operation of a single stage reciprocating compressors. Work input through p-v diagram and steady state steady flow analysis. Effect of Clearance and Volumetric efficiency. Adiabatic, Isothermal and Mechanical efficiencies. Multi-stage compressor, saving in work, Optimum intermediate pressure, Inter-cooling, Minimum work for compression.
Steam nozzles: Flow of steam through nozzles, Shape of nozzles, effect of friction, Critical pressure ratio, Supersaturated flow

Course outcomes:

- **Apply thermodynamic concepts to analyze the performance of gas power cycles including propulsion systems.**
- **Evaluate the performance of steam turbine components.**
- **Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment.**
- **Apply thermodynamic concepts to analyze turbo machines.**
- **Determine performance parameters of refrigeration and air-conditioning systems.**
- **Understand the principles and applications of refrigeration systems.**
- **Analyze air-conditioning processes using the principles of psychrometry and Evaluate cooling and heating loads in an air-conditioning system.**
- **Understand the working, applications, relevance of air and identify methods for performance improvement.**

TEXT BOOKS:

1. Rattan S.S, Theory of Machines,Tata McGraw-Hill Publishing Company Ltd., New Delhi, 4th Edition, 2014.
2. Ambekar A. G., Mechanism and Machine Theory, PHI, 2009. Thermodynamics an engineering approach, by Yunus A. Cenegal and Michael A. Boles. Tata McGraw hill Pub. Sixth edition, 2008.
3. Basic and Applied Thermodynamics" by P .K. Nag, Tata McGraw Hill, 2nd Edi. 2009
4. Fundamentals of Thermodynamics by G.J. Van Wylen and R.E. Sonntag, Wiley Eastern. Fourth edition 19993.

REFERENCE BOOKS:

1. Thermodynamics for engineers, Kenneth A. Kroos and Merle C. Potter, Cengage Learning, 2016
2. Principles of Engineering Thermodynamics, Michael J,Moran, Howard N. Shapiro, Wiley, 8th Edition
3. An Introduction to Thermo Dynamics by Y.V.C.Rao, Wiley Eastern Ltd, 2003.
4. Thermodynamics by Radhakrishnan. PHI, 2nd revised edition.
5. I.C Engines by Ganeshan.V. Tata McGraw Hill, 4rth Edi. 2012.
6. I.C.Engines by M.L.Mathur & Sharma. Dhanpat Rai& sons- India

ENERGY AND ENVIRONMENT

B.E, V Semester, Mechanical Engineering

[As per Choice Based Credit System (CBCS) scheme]

Course Code	**17ME562**	**CIE Marks**	**40**
Number of Lecture Hours/Week	**03**	**SEE Marks**	**60**
Total Number of Lecture Hours	**40 (8Hours per Module)**	**Exam Hours**	**03**

Credits – 03

Course Objective:

1. **Understand energy scenario, energy sources and their utilization**
2. **Learn about methods of energy storage, energy management and economic analysis**
3. **Have proper awareness about environment and eco system.**
4. **Understand the environment pollution along with social issues and acts.**

Module - 1

Basic Introduction to Energy: Energy and power, forms of energy,primary energy sources, energy flows, world energy production and consumption,Key energy trends in India:Demand, Electricity, Access to modern energy, Energy production and trade, Factors affecting India's energy development:Economy and demographics Policy and institutional framework, Energy prices and affordability, Social and environmental aspects, Investment..

Module - 2

Energy storage systems: Thermal energy storage methods, Energy saving, Thermal energy storage systems
Energy Management: Principles of Energy Management, Energy demand estimation, Energy pricing
Energy Audit: Purpose, Methodology with respect to process Industries, Characteristic method employed in Certain Energy Intensive Industries
Economic Analysis: Scope, Characterization of an Investment Project

Module - 3

Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness.
Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession.

Module - 4

Environmental Pollution: Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards , Solid waste Management, Disaster management Role of an individual in prevention of pollution, Pollution case studies.

Module - 5

Social Issues and the Environment: Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation, Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act,

Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation.

Course outcomes:

1. **Summarize the basic concepts of energy, its distribution and general Scenario.**
2. **Explain different energy storage systems, energy management, audit and economic analysis.**
3. **Summarize the environment eco system and its need for awareness.**
4. **Identify the various types of environment pollution and their effects.**
5. **Discuss the social issues of the environment with associated acts.**

TEXT BOOKS:

1. Textbook for Environmental Studies For Undergraduate Courses of all Branches of Higher Education by University grant commission and BharathiVidyapeeth Institute of environment education and Research ,Pune
2. De, B. K., Energy Management audit & Conservation, 2nd Edition, Vrinda Publication, 2010.

REFERENCE BOOKS

1. Turner, W. C., Doty, S. and Truner, W. C., Energy Management Hand book, 7th edition, Fairmont Press, 2009.
2. Murphy, W. R., Energy Management, Elsevier, 2007.
3. Smith, C. B., Energy Management Principles, Pergamum, 2007
4. Environment pollution control Engineering by C S Rao, New Age International, 2006, reprint 2015, 2nd edition.
5. Environmental studies, by Benny Joseph, Tata McGraw Hill, 2008, 2nd edition.

ENERGY AND ENVIRONMENT
(OPEN ELECTIVE – I)

Course	Code	Credits	L-T-P	Assessment		Exam Duration
				SEE	CIA	
Energy And Environment	15ME562	03	3-0-0	80	20	3Hrs

Course Objectives

1. Understand energy scenario, energy sources and their utilization
2. Learn about methods of energy storage, energy management and economic analysis
3. Have proper awareness about environment and eco system.
4. Understand the environment pollution along with social issues and acts.

Module – I

Basic Introduction to Energy: Energy and power, forms of energy,primary energy sources, energy flows, world energy production and consumption,Key energy trends in India:Demand, Electricity, Access to modern energy, Energy production and trade, Factors affecting India's energy development:Economy and demographics Policy and institutional framework, Energy prices and affordability, Social and environmental aspects, Investment. **8 Hours**

Module – II

Energy storage systems: Thermal energy storage methods, Energy saving, Thermal energy storage systems
Energy Management: Principles of Energy Management, Energy demand estimation, Energy pricing
Energy Audit: Purpose, Methodology with respect to process Industries, Characteristic method employed in Certain Energy Intensive Industries
Economic Analysis: Scope, Characterization of an Investment Project **10 Hours**

Module – III

Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness.
Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession. **8 Hours**

Module – IV

Environmental Pollution: Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards , Solid waste Management, Disaster management Role of an individual in prevention of pollution, Pollution case studies. **8 Hours**

Module – V

Social Issues and the Environment: Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation, Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation.

8 Hours

Course Outcomes

At the end of the course, the student will be able to:

1. Summarize the basic concepts of energy, its distribution and general Scenario.
2. Explain different energy storage systems, energy management, audit and economic analysis.
3. Summarize the environment eco system and its need for awareness.
4. Identify the various types of environment pollution and their effects.
5. Discuss the social issues of the environment with associated acts.

TEXT BOOKS:

1. Textbook for Environmental Studies For Undergraduate Courses of all Branches of Higher Education by University grant commission and Bharathi Vidyapeeth Institute of environment education and Research ,Pune
2. De, B. K., Energy Management audit & Conservation, 2nd Edition, Vrinda Publication, 2010.

REFERENCE BOOKS:

1. Turner, W. C., Doty, S. and Truner, W. C., Energy Management Hand book, 7th edition, Fairmont Press, 2009.
2. Murphy, W. R., Energy Management, Elsevier, 2007.
3. Smith, C. B., Energy Management Principles, Pergamum, 2007
4. Environment pollution control Engineering by C S rao, New Age Inytermnational, 2006, reprint 2015, 2nd edition
5. Environmental studies, by Benny Joseph, Tata McGraw Hill, 2008, 2nd edition.

E- Learning

- India Energy Outlook 2015(www.iea.org/.../IndiaEnergyOutlook_WEO2015.pdf)
- Open courseware

Energy Engineering

Course	Code	Credits	L-T-P	Assessment		Exam Duration
				SEE	CIA	
Energy Engineering	15ME71	04	3-2-0	80	20	3Hrs

Courselearning objectives is to

- Understand energy scenario,energy sources and their utilization
- Learn about energy conversion methods and their analysis
- Study the principles of renewable energy conversion systems
- Understand the concept of green energy and zero energy.

Module – I

Thermal Energy conversion system: Review of energy scenario in India,General Philosophy and need of Energy ,Different Types of Fuels used for steam generation,Equipment for burning coal in lump form, strokers, different types, Oilburners, Advantages and Disadvantages of using pulverized fuel, Equipmentfor preparation and burning of pulverized coal, unit system and bin system.Pulverized fuel furnaces, cyclone furnace, Coal and ash handling, Generationof steam using forced circulation, high and supercritical pressures.Chimneys: Natural, forced, induced and balanced draft, Calculations andnumerical involving height of chimney to produce a given draft. Coolingtowers and Ponds. Accessories for the Steam generators such asSuperheaters, De-superheater, control of superheaters, Economizers, Air preheatersand re-heaters.

9 Hours

Module – II

Diesel Engine Power System: Applications of Diesel Engines in Power field.Method of starting Diesel engines. Auxiliaries like cooling and lubricationsystem, filters, centrifuges, Oil heaters, intake and exhaust system, Layout ofdiesel power plant.

Hydro-Electric Energy: Hydrographs, flow duration and mass curves, unithydrograph and numerical. Storage and pondage, pumped storage plants, low, medium and high head plants, Penstock, water hammer, surge tanks,gates and valves. General layout of hydel power plants.

7 Hours

Module – III

Solar Energy: Fundamentals; Solar Radiation; Estimation of solar radiation on horizontal and inclined surfaces; Measurement of solar radiation data, Solar Thermal systems: Introduction; Basics of thermodynamics and heat transfer; Flat plate collector; Evacuated Tubular Collector; Solar air collector; Solar concentrator; Solar distillation; Solar cooker; Solar refrigeration and air conditioning; Thermal energy storage systems, Solar Photovoltaic systems: Introduction; Solar cell Fundamentals; Characteristics and classification; Solar cell: Module, panel and Array construction; Photovoltaic thermal systems

8 Hours

Module – IV

Wind Energy: Properties of wind, availability of wind energy in India, windvelocity

and power from wind; major problems associated with wind power,wind machines; Types of wind machines and their characteristics, horizontaland vertical axis wind mills, coefficient of performance of a wind mill rotor(Numerical Examples).
Tidal Power: Tides and waves as energy suppliers and their mechanics;fundamental characteristics of tidal power, harnessing tidal energy,limitations.

Module – V

Biomass Energy: Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies; Urban waste to energy conversion; Biomass gasification.
Green Energy: Introduction: Fuel cells: Overview; Classification of fuel cells; Operating principles; Fuel cell thermodynamics Nuclear, ocean, MHD, thermoelectric and geothermal energy applications; Origin and their types; Working principles, Zero energy Concepts

8 Hours

Course Outcomes

At the end of the course, the student will be able to:

- Summarize the basic concepts of thermal energy systems,
- Identify renewable energy sources and their utilization.
- Understand the basic concepts of solar radiation and analyze the working of solar PV and thermal systems.
- Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas.
- Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator.
- Identify methods of energy storage for specific applications

TEXT BOOKS:

1. B H Khan, Non conventional energy resources, 3rd Edition, McGraw Hill Education
2. Principles of Energy conversion, A. W. Culp Jr., McGraw Hill. 1996

REFERENCE BOOKS:

1. S.P. Sukhatme, Solar Energy: principles of Thermal Collection and Storage, Tata McGraw-Hill (1984).
2. C. S. Solanki, “Solar Photovoltaic’s: Fundamental Applications and Technologies, Prentice Hall of India, 2009.
3. L.L. Freris, Wind Energy Conversion Systems, Prentice Hall, 1990.

Scheme of Examination: Two question to be set from each module. Students have to answer five full questions, choosing at least one full question from each module.

AUTOMOBILE ENGINEERING

Course	Code	Credits	L-T-P	Assessment		Exam duration
				SEE	CIA	
Automobile	15ME655	3	3-0-0	80	20	3 Hrs

Course learning objectives: The student will be able to learn

- The layout and arrangement of principal parts of an automobile
- The working of transmission and brake systems
- The operation and working of steering and suspension systems
- To know the Injection system and its advancements
- To know the automobile emissions and its effects on environment

MODULE 1

ENGINE COMPONENTS AND IT'S PRINCIPLE PARTS: Spark Ignition (SI) & Compression Ignition (CI) engines, cylinder – arrangements and their relatives merits, Liners, Piston, connecting rod, crankshaft, valves, valve actuating mechanisms, valve and port timing diagrams, Types of combustion chambers for S.I.Engine and C.I.Engines, methods of a Swirl generation, choice of materials for different engine components, engine positioning. Concept of HCCI engines, hybrid engines, twin spark engine, electric car.

COOLING AND LUBRICATION: cooling requirements, types of cooling- thermo siphon system, forced circulation water cooling system, water pump, Radiator, thermostat valves. Significance of lubrication, splash and forced feed system. **10 Hours**

MODULE 2

TRANSMISSION SYSTEMS: Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, Over drive, transfer box, fluid flywheel, torque converter, propeller shaft, slip joints, universal joints ,Differential and rear axle, Hotchkiss Drive and Torque Tube Drive.

BRAKES: Types of brakes, mechanical compressed air, vacuum and hydraulic braking systems, construction and working of master and wheel cylinder, brake shoe arrangements, Disk brakes, drum brakes, Antilock –Braking systems, purpose and operation of antilock-braking system, ABS Hydraulic Unit, Rear-wheel antilock & Numerical **08 Hours**

MODULE 3

STEERING AND SUSPENSION SYSTEMS: Steering geometry and types of steering gear box-Power Steering, Types of Front Axle, Suspension, Torsion bar suspension systems, leaf spring, coil spring, independent suspension for front wheel and rear wheel, Air suspension system.

IGNITION SYSTEM: Battery Ignition system, Magneto Ignition system, electronic Ignition system.

08 Hours

MODULE 4

SUPERCHARGERS AND TURBOCHARGERS: Naturally aspirated engines, Forced Induction, Types of superchargers, Turbocharger construction and operation, Intercooler, Turbocharger lag.

FUELS, FUEL SUPPLY SYSTEMS FOR SI AND CI ENGINES: Conventional fuels, alternative fuels, normal and abnormal combustion, cetane and octane numbers, Fuel mixture requirements for SI engines, types of carburetors, C.D.& C.C. carburetors, multi point and single point fuel injection systems, fuel transfer pumps, Fuel filters, fuel injection pumps and injectors. Electronic Injection system, Common Rail Direct Injection System.

08 Hours

MODULE 5

AUTOMOTIVE EMISSION CONTROL SYSTEMS: Different air pollutants, formation of photochemical smog and causes. Automotive emission controls, Controlling crankcase emissions, Controlling evaporative emissions, Cleaning the exhaust gas, Controlling the air-fuel mixture, Controlling the combustion process, Exhaust gas recirculation, Treating the exhaust gas, Air-injection system, Air-aspirator system, Catalytic converter.

EMISSION STANDARDS: Euro I, II, III and IV norms, Bharat Stage II, III, IV norms. Motor Vehicle Act

08 Hours

Course Outcomes: Student will be able

- To identify the different parts of an automobile and it's working
- To understand the working of transmission and braking systems
- To comprehend the working of steering and suspension systems
- To learn various types of fuels and injection systems
- To know the cause of automobile emissions ,its effects on environment and methods to reduce the emissions.

TEXT BOOKS:

1. Automobile engineering, Kirpal Singh, Vol I and II (12th Edition) Standard Publishers 2011
2. Automotive Mechanics, S. Srinivasan, (2nd Edition) Tata McGraw Hill 2003.

REFERENCE BOOKS:

1. Automotive mechanics, William H Crouse & Donald L Anglin (10th Edition) Tata McGraw Hill Publishing Company Ltd., 2007
2. Automotive mechanics: Principles and Practices, Joseph Heitner, D Van Nostrand Company, Inc
3. Fundamentals of Automobile Engineering, K.K.Ramalingam, Scitech Publications (India) Pvt. Ltd.
4. Automobile Engineering, R. B. Gupta, Satya Prakashan,(4th Edition) 1984.

APPLIED THERMODYNAMICS

Course	Code	Credits	L-T-P	Assessment		Exam Duration
				SEE	CIA	
Applied Thermodynamics	15ME43	04	3-2-0	80	20	3Hrs

Courselearning objectives:

- To have a working knowledge of basic performance of Gas power cycles.
- To Calculate the forces exerted by a fluid at rest on submerged surfaces and understand the force of buoyancy
- To understand and evaluate the performance of steam power cycles their various Engineering applications
- To know how fuel burns and their thermodymic properties.
- To Understand mechanism of power transfer through belt, rope, chain and gear drives in I C Engines
- To determine performance parameters of refrigeration and air-conditioning systems.
- Evaluate the performance parameters of reciprocating air compressor as a function of receiver pressure.

Module - I

Gas Power Cycles : Air standard cycles; Carnot, Otto, Diesel, Dual and Stirling cycles, p-v and T -s diagrams, description, efficiencies and mean effective pressures. Comparison of Otto and Diesel cycles. Gas turbine (Brayton) cycle; description and analysis. Regenerative gas turbine cycle. Inter-cooling and reheating in gas turbine cycles.

Jet propulsion: Introduction to the principles of jet propulsion, turbojet, turboprop, Ramjet and turbofan engines and their processes . Principles of rocket propulsion, Introduction to rocket engine.10 Hours

Module –II

Vapour Power Cycles: Carnot vapour power cycle, drawbacks as a reference cycle. Simple Rankine cycle; description, T-s diagram, analysis for performance. Comparison of Carnot and Rankine cycles. Effects of pressure and temperature on Rankine cycle performance. Actual vapour power cycles. Ideal and practical regenerative Rankine cycles, open and closed feed water heaters. Reheat Rankine cycle. Characteristics of an Ideal working fluid in Vapour power cycles, Binary Vapour cycles

10 Hours

Module –III

Combustion Thermodynamics: Theoretical (Stoichiometric) air for combustion of fuels. Excess air, mass balance, Exhaust gas analysis, A/F ratio. Energy balance for a chemical reaction, enthalpy of formation, enthalpy and internal energy of combustion. Combustion efficiency. Dissociation and equilibrium, emissions.

I.C.Engines: Classification of IC engines, Combustion of SI engine and CI engine, Detonation and factors affecting detonation, Performance analysis of I.C Engines, heat balance, Morse test, IC Engine fuels, Ratings and Alternate Fuels. Automotive Pollutions and its effects on environment.

10 Hours

Module –IV

Refrigeration Cycles: Vapour compression refrigeration system; description, analysis, refrigerating effect. Capacity, power required, units of refrigeration, COP, Refrigerants and their desirable properties, alternate Refrigerants. Any one case study on cold storage or industrial refrigerator. Air cycle refrigeration; reversed Carnot cycle, reversed Brayton cycle, Vapour absorption refrigeration system. Steam jet refrigeration.

Pscychrometrics and Air-conditioning Systems: Properties ofAtmospheric air, and Psychometric properties of Air, Psychometric Chart, Analyzing Air-conditioning Processes; Heating, Cooling, Dehumidification and Humidification, Evaporative Cooling. Adiabatic mixing of twomoist air streams. Cooling towers.

10 Hours

Module –V

Reciprocating Compressors: Operation of a single stage reciprocating compressors. Work input through p-v diagram and steady state steady flow analysis. Effect of Clearance and Volumetric efficiency. Adiabatic, Isothermal and Mechanical efficiencies. Multi-stage compressor, saving in work, Optimum intermediate pressure, Inter-cooling, Minimum work for compression.

Steam nozzles: Flow of steam through nozzles, Shape of nozzles, effect of friction, Critical pressure ratio, Supersaturated flow.

10 Hours

Course outcomes

Students will be able to

- Apply thermodynamic concepts to analyze the performance of gas power cycles including propulsion systems.
- Evaluate the performance of steam turbine components.
- Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment.
- Apply thermodynamic concepts to analyze turbo machines.
- Determine performance parameters of refrigeration and air-conditioning systems.
- Understand the principles and applications of refrigeration systems.
- Analyze air-conditioning processes using the principles of psychrometry and Evaluate cooling and heating loads in an air-conditioning system.
- Understand the working, applications, relevance of air and identify methods for performance improvement.

Text Books:

1. Thermodynamics an engineering approach, by Yunus A. Cenegal and Michael A. Boles. Tata McGraw hill Pub. Sixth edition, 2008.

2. Basic and Applied Thermodynamics" by P .K. Nag, Tata McGraw Hill, 2nd Edi. 2009
3. Fundamentals of Thermodynamics by G.J. Van Wylen and R.E. Sonntag, Wiley Eastern. Fourth edition 19993.

Reference Books:

1. Thermodynamics for engineers, Kenneth A. Kroos and Merle C. Potter, Cengage Learning, 2016
2. Principles of Engineering Thermodynamics, Michael J,Moran, Howard N. Shapiro, Wiley, 8th Edition
3. An Introduction to Thermo Dynamics by Y.V.C.Rao, Wiley Eastern Ltd, 2003.
4. Thermodynamics by Radhakrishnan. PHI, 2nd revised edition.
5. I.C Engines by Ganeshan.V. Tata McGraw Hill, 4rth Edi. 2012.
6. I.C.Engines by M.L.Mathur & Sharma. Dhanpat Rai& sons- India

E- Learning

- Nptel.ac.in
- VTU, E- learning
- MOOCS
- Open courseware

Scheme of Examination:

Two question to be set from each module. Students have to answer five full questions, choosing at least one full question from each module.

2014-Regulation

BUSINESS, GOVERNMENT AND SOCIETY

Subject Code	: 14MBA14	IA Marks	: 50
No. of Lecture Hours / Week	: 04	Exam Hours	: 03
Total Number of Lecture Hours	: 56	Exam Marks	: 100
Practical Component	: 01 Hour / Week		

Objectives:

1. To enable students to understand the challenges and complexities faced by businesses and their leaders as they endeavor maximize returns while responsibly managing their duties to stakeholders and society.
2. To help students to understand the rationale for government interventions in market systems.
3. To help students develop an understanding of Social Responsibility and make their own judgments as to the proper balance of attention to multiple bottom lines.
4. To help students develop the skills needed to work through ethical dilemmas

Module 1: **(8 Hours)**

The Study of Business, Government and Society (BGS): Importance of BGS to Managers

–Models of BGS relationships – Market Capitalism Model, Dominance Model, Countervailing Forces Model and Stakeholder Model – Global perspective – Historical Perspective.

Module 2: **(8 Hours)**

Corporate Governance: Introduction, Definition, Market model and control model, OECD on corporate governance, A historical perspective of corporate governance, Issues in corporate governance, relevance of corporate governance, need and importance of corporate governance, benefits of good corporate governance, the concept of corporate, the concept of governance, theoretical basis for corporate governance, obligation to society, obligation to investors, obligation to employees, obligation to customers, managerial obligation, Indian cases

Module 3: **(4 Hours)**

Public Policies: The role of public policies in governing business, Government and public policy, classification of public policy, areas of public policy, need for public policy in business and levels of public policy.

Module 4: **(8 Hours)**

Environmental concerns and corporations: History of environmentalism, environmental preservation-role of stakeholders, international issues, sustainable development, costs and benefits of environmental regulation, industrial pollution, role of corporate in environmental management, waste management and pollution control, key strategies for prevention of pollution, environmental audit, Laws governing environment.

Module 5: **(8 Hours)**

Business Ethics: Meaning of ethics, business ethics, relation between ethics and business ethics, evolution of business ethics, nature of business ethics, scope, need and purpose, importance, approaches to business ethics, sources of ethical knowledge for business roots of

unethical behaviour, ethical decision making, some unethical issues, benefits from managing ethics at workplace, ethical organizations

Module 6: **(6 Hours)**

Corporate Social Responsibility: Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Arguments for and against CSR, CSR in Indian perspective, Indian examples.

Module 7: **(14 Hours)**

Business Law: Law of contract - meaning of contract, agreement, essential elements of a valid contract. Law of agency- meaning, creation and termination of agency. Bailment and Pledge - meaning, rights and duties of bailor and bailee.

Negotiable Instruments Act 1881: Nature and Characteristics of Negotiable instruments, Kinds of Negotiable Instruments – Promissory Notes, Bills of Exchange and Cheques. Discharge and Dishonour of Negotiable Instruments.

Sale of Goods Act 1930: Definition of Sale, Sale v/s Agreement to Sell, Goods, Condition and Warranties, Express and Implied Condition, "Doctrine of Caveat Emptor", Right and duties of Unpaid Seller.

Meaning, scope and objectives of - Intellectual property law, law relating to patents, law relating to copyrights, law relating to trade mark.

Practical Components:

1. Students are expected to study any five CSR initiatives by Indian organizations and submit a report for the same.
2. A group assignment on "The relationship between Business, Government and Society in Indian Context and relating the same with respect the models studied in Module 1.
3. Case studies/Role plays related ethical issues in business with respect to Indian context.

RECOMMENDED BOOKS:

1. Business, Government, and Society: A Managerial Perspective, Text and Cases – John F. Steiner, 12/e, McGraw-Hill, 2011.
2. Business and Government – Francis Cherunilam, HPH.
3. Corporate Governance: principles, policies and practices – Fernando A. C, 2/e, Pearson, 2011.
4. Business Ethics and Corporate Governance - Ghosh B. N, Tata McGraw-Hill, 2012.
5. Business Law for Managers, Goel P. K, Biztantra, 2012.
6. Corporate Social Responsibility: A Study of CSR Practices in Indian Industry, Baxi C. V & Rupamanjari Sinha Ray, Vikas Publishing House, 2012.

REFERENCE BOOKS:

1. Business and Society - Lawrence and Weber, 12/e, Tata McGraw- Hill, 2010.
2. Business Ethics - Bajaj P. S & Raj Agarwal, Biztantra, 2012.
3. Corporate Governance - Keshoo Prasad, 2/e, PHI.
4. Corporate Governance, Ethics and social responsibility - Balachandran V, & Chandrashekharan V, 2/e, PHI, 2011.
5. Corporate Governance – Machiraju H. R, HPH.
6. Business Ethics and Corporate Governance – Prabakaran S, Excel BOOKS.
7. Corporate Goverance – Badi N. V, Vrinda Publications, 2012.
8. Civic Sense – Prakash Pillappa, Excel BOOKS, 2012.

ENVIRONMENTAL STUDIES

Subject Code :	**14CIV18/14CIV28**	**IA Marks**	**: 25**
Hours/Week :	**02**	**Exam. Hours**	**: 02**
Total Hours :	**25**	**Exam. Marks**	**: 50**

Course Objectives :

1. Recognize major concepts in environmental sciences and demonstrate in-depth understanding of the environment.
2. Develop analytical skills, critical thinking, and demonstrate problem-solving skills using scientific techniques.
3. Demonstrate the knowledge and training for entering graduate or professional schools, or the job market.

Module – 1

Introduction : Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. **2 Hours**

Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development. **3 Hours**

Module – 2

Natural Resources, Water resources : Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. **2 Hours**

Energy : Different types of energy, Conventional sources & Non Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy. **3 Hours**

Module – 3

Environmental Pollution : Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. **2 Hours**

Global Environmental Issues : Population Growth, Urbanization, Land Management, Water & Waste Water Management. **3 Hours**

Module – 4

Air Pollution & Automobile Pollution : Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures. **3 Hours**

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods. **2 Hours**

Module – 5

Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices. **2 Hours**

Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education & Women Education. **3 Hours**

Course Outcomes :

Students will be able to,

1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community,
4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Text Books :

1. Benny Joseph (2005), **"Environmental Studies"**, Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), **"Environmental Studies",** Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, **"Environmental Studies – From Crisis to Cure"**, Oxford University Press, 2005,
4. Aloka Debi, **"Environmental Science and Engineering",** Universities Press (India) Pvt. Ltd. 2012.

Reference Books :

1. Raman Sivakumar, **"Principals of Environmental Science and Engineering",** Second Edition, Cengage learning Singapore, 2005

Double and triple integrals :
Evaluation of double integrals. Evaluation by changing the order of integration and changing into polar coordinates. Evaluation of triple integrals. **10 Hours**

Module – 4

Integral Calculus :
Application of double and triple integrals to find area and volume. Beta and Gamma functions, definitions, Relation between beta and gamma functions and simple problems.

Curvilinear coordinates :
Orthogonal curvilinear coordinates - Definition, unit vectors and scale factors. Expressions for gradient, divergence and curl. Cylindrical and spherical coordinate systems. **10 Hours**

Module – 5

Laplace Transform :
Definition and Laplace transforms of elementary functions. Laplace transforms of $e^{at} f(t), t^n f(t) and \frac{f(t)}{t}$ (without proof), periodic functions, unit-step function and Impulse function - problems

Inverse Laplace Transform :
Inverse Laplace Transform - problems, Convolution theorem and problems, solution of linear differential equations using Laplace Transforms.
10 Hours

Course Outcomes :
On completion of this course, students are able to,

- Use ordinary differential equations to model engineering phenomena such as electrical circuits, forced oscillation of mass spring and elementary heat transfer.
- Use partial differential equations to model problems in fluid mechanics, electromagnetic theory and heat transfer.
- Evaluate double and triple integrals to find area , volume, mass and moment of inertia of plane and solid region.
- Use curl and divergence of a vector function in three dimensions, as well as apply the Green's Theorem, Divergence Theorem and Stokes' theorem in various applications like electricity, magnetism and fluid flow.

- Use Laplace transforms to determine general or complete solutions to linear ODE

Scheme of examination :

- **Two full questions (with a maximum of four sub questions) of twenty marks each to be set from each module. Each question should cover all the contents of the respective module.**
- **Students have to answer five full questions choosing one full question from each module**

Text Books :

1. B.S.Grewal, **"Higher Engineering Mathematics",** Khanna publishers, 42nd edition, 2013.
2. Ervin Kreyszig, **"Advanced Engineering Mathematics"** - Vol-I & II, Wiley, 2013

Reference Books :

1. B.V.Ramana **"Higher Engineering M athematics"** Tata Mc Graw-Hill, 2006
2. N.P.Bali and Manish Goyal,**"A text book of Engineering mathematics"**, Laxmi publications, latest edition
3. H.K.Dass and Er.Rajnish Verma,**"Higher Engineerig Mathematics"**, S.Chand publishing, 1st edition, 2011.

ENVIRONMENTAL STUDIES

[As per Choice Based Credit System (CBCS) scheme]

(Effective from the academic year 2015 -2016)

SEMESTER - I/II

Subject Code	15CIV18/15CIV28	IA Marks	10
Number of Lecture Hours/Week	02	Exam Marks	40
Total Number of Lecture Hours	25	Exam Hours	02

Course Objectives:

1. **To identify the major challenges in environmental issues and evaluate possible solutions.**
2. **Develop analytical skills, critical thinking and demonstrate socio-economic skills for sustainable development.**
3. **To analyze an overall impact of specific issues and develop environmental management plan.**

Module - 1

Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. **2 Hours**

Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development. **3 Hours**

Module - 2

Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. **2 Hours**

Energy – Different types of energy, Conventional sources & Non Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy. **3 Hours**

Module -3

Environmental Pollution – Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. **2 Hours**

Global Environmental Issues: Population Growth, Urbanization, Land Management, Water & Waste Water Management. **3 Hours**

Module -4

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures. **3 Hours**

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods. **2 Hours**

Module - 5

Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices. **2 Hours**

Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education & Women Education. **3 Hours**

Course Outcome:

Students will be able to,

1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,
3. Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components
4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Text Books:

1. Benny Joseph (2005), **"Environmental Studies"**, Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), **"Environmental Studies",** Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, **"Environmental Studies – From Crisis to Cure**", Oxford University Press, 2005,
4. Aloka Debi, **"Environmental Science and Engineering",** Universities Press (India) Pvt. Ltd. 2012.

Reference Books:

1. Raman Sivakumar, **"Principals of Environmental Science and Engineering",** Second Edition, Cengage learning Singapore, 2005
2. P. Meenakshi, **"Elements of Environmental Science and Engineering",** Prentice Hall of India Private Limited, New Delhi, 2006
3. S.M. Prakash, **"Environmental Studies",** Elite Publishers Mangalore, 2007
4. Erach Bharucha, **"Text Book of Environmental Studies"**, for UGC, University press, 2005
5. G.Tyler Miller Jr., **"Environmental Science – working with the Earth"**, Tenth Edition, Thomson Brooks /Cole, 2004
6. G.Tyler Miller Jr., **"Environmental Science – working with the Earth"**, Eleventh Edition, Thomson Brooks /Cole, 2006
7. Dr.Pratiba Sing, Dr.AnoopSingh and Dr.Piyush Malaviya, **"Text Book of Environmental and Ecology"**, Acme Learning Pvt. Ltd. New Delhi.

ENVIRONMENTAL STUDIES

[As per Choice Based Credit System (CBCS) scheme]

(Effective from the academic year 2017 -2018)

SEMESTER - I/II

Subject Code	17CIV18/17CIV28	IA Marks	20
Number of Lecture Hours/Week	02	Exam Marks	30
Total Number of Lecture Hours	25	Exam Hours	02

Course Objectives:

1. **To identify the major challenges in environmental issues and evaluate possible solutions.**
2. **Develop analytical skills, critical thinking and demonstrate socio-economic skills for sustainable development.**
3. **To analyze an overall impact of specific issues and develop environmental management plan.**

Module - 1

Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security. **2 Hours**

Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development. **3 Hours**

Module - 2

Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle. **2 Hours**

Energy – Different types of energy, Conventional sources & Non Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy. **3 Hours**

Module -3

Environmental Pollution – Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. **2 Hours**

Global Environmental Issues: Population Growth, Urbanization, Land Management, Water & Waste Water Management. **3 Hours**

Module -4

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures. **3 Hours**

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods. **2 Hours**

Module - 5

Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices. **2 Hours**

Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education & Women Education. **3 Hours**

Course Outcome:

Students will be able to,

1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,
3. Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components
4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Text Books:

1. Benny Joseph (2005), **"Environmental Studies"**, Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), **"Environmental Studies",** Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, **"Environmental Studies – From Crisis to Cure**", Oxford University Press, 2005,
4. Aloka Debi, **"Environmental Science and Engineering",** Universities Press (India) Pvt. Ltd. 2012.

Reference Books:

1. Raman Sivakumar, **"Principals of Environmental Science and Engineering",** Second Edition, Cengage learning Singapore, 2005
2. P. Meenakshi, **"Elements of Environmental Science and Engineering",** Prentice Hall of India Private Limited, New Delhi, 2006
3. S.M. Prakash, **"Environmental Studies",** Elite Publishers Mangalore, 2007
4. Erach Bharucha, **"Text Book of Environmental Studies"**, for UGC, University press, 2005
5. G.Tyler Miller Jr., **"Environmental Science – working with the Earth"**, Tenth Edition, Thomson Brooks /Cole, 2004
6. G.Tyler Miller Jr., **"Environmental Science – working with the Earth"**, Eleventh Edition, Thomson Brooks /Cole, 2006
7. Dr.Pratiba Sing, Dr.AnoopSingh and Dr.Piyush Malaviya, **"Text Book of Environmental and Ecology"**, Acme Learning Pvt. Ltd. New Delhi.

Course Title: Alternative Building Materials

As per Choice Based Credit System (CBCS) scheme]

SEMESTER:VI

Subject Code	15CV653	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
	CREDITS –03	**Total Marks-**	**100**

Course objectives: This Course will enable students to:

1. understand environmental issues due to building materials and the energy consumption in manufacturing building materials
2. study the various masonry blocks, masonry mortar and structural behavior of masonry under compression.
3. Study the alternative building materials in the present context.
4. understand the alternative building technologies which are followed in present construction field.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Introduction: Energy in building materials, Environmental issues concerned to building materials, Embodied energy and life-cycle energy, Global warming and construction industry, Green concepts in buildings, Green building ratings – IGBC and LEED manuals – mandatory requirements, Rainwater harvesting & solar passive architecture. Environmental friendly and cost effective building technologies, Requirements for buildings of different climatic regions	8 hours	L1,L2,L3
Module -2		
Elements of Structural Masonry : Elements of Structural Masonry, Masonry materials, requirements of masonry units' characteristics of bricks, stones, clay blocks, concrete blocks, stone boulders, laterite Blocks, Fal- G blocks and Stabilized mud block. Manufacture of stabilized blocks. **Structural Masonry Mortars:** Mortars, cementations materials, sand, natural & manufactured, types of mortars, classification of mortars as per BIS, characteristics and requirements of mortar, selection of mortar. Uses of masonry, masonry bonding, Compressive strength of masonry elements, Factors affecting compressive strength, Strength of Prisms/wallets and walls, Effect of brick bond on strength, Bond strength of masonry: Flexure and shear, Elastic properties of masonry materials and masonry, Design of masonry compression elements subjected to axial load.	8 Hours	L1,L2,L3
Module -3		
Alternative Building Materials: Lime, Pozzolana cements, Raw materials, Manufacturing process, Properties and uses. Fibers- metal and synthetic, Properties and applications. Fiber reinforced plastics, Matrix materials, Fibers organic and synthetic, Properties and applications. Building materials from agro and industrial wastes ,Types of agro wastes, Types of industrial and mine wastes, Properties and applications. Masonry blocks using industrial wastes. Construction and demolition wastes	8 Hours	L1,L2,L3
Module -4		
Alternative Building Technologies: Use of arches in foundation, alternatives for wall constructions, composite masonry, confined masonry, cavity walls, rammed earth, Ferro cement and ferroconcrete building components, Materials and specifications, Properties, Construction methods, Applications. Top down construction, Mivan Construction Technique. **Alternative Roofing Systems:** Concepts, Filler slabs, Composite beam panel roofs, Masonry vaults and domes	8 Hours	L1,L2,L3

Module -5

Equipment for Production of Alternative Materials: Machines for manufacture of concrete, Equipments for production of stabilized blocks, Moulds and methods of production of precast elements, Cost concepts in buildings, Cost saving techniques in planning, design and construction, Cost analysis: Case studies using alternatives.	8 Hours	L1,L2,L3

Course Outcomes: After studying this course, students will be able to:

1. Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;
2. Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.
3. Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material.
4. Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.

Program Objectives:

- Engineering knowledge
- Problem analysis
- Interpretation of data

Question paper pattern:

- The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
- There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
- Each full question shall cover the topics as a module
- The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. KS Jagadish, BV Venkatarama Reddy and KS Nanjunda Rao, "Alternative Building Materials and Technologies", New Age International pub.
2. Arnold W Hendry, "Structural Masonry", Macmillan Publishers

Reference Books:

1. RJS Spence and DJ Cook, "Building Materials in Developing Countries", Wiley pub.
2. LEED India, Green Building Rating System, IGBC pub.
3. IGBC Green Homes Rating System, CII pub.
4. Relevant IS Codes.