



CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (AUTONOMOUS)

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

INSTITUTE VISION AND MISSION:

Vision:

To be centre of excellence in technical education and research

Mission:

To address the emerging needs through quality technical education and advanced research

DEPARTMENT VISION AND MISSION:

Vision:

To achieve Academic and Professional Excellence in Teaching and Research in the frontier areas of Electrical and Electronics Engineering Vis-a -Vis serve as a Valuable Resource for Industry and Society.

Mission:

Empowering the Faculty and Student Rendezvous to Nurture Interest for Conceptual Keystone, Applied Multidisciplinary Research, Inspiring Leadership and Efficacious Entrepreneurship culture , Impeccable Innovation in frontier areas to be synergetic with Environmental, Societal and Technological Developments of the National and International community for Universal Intimacy.

M1: Emphasis on providing Strong Theoretical Foundation & Engineering Leadership Eminence, infusion of Creativity and Management skill while maintaining Ethics and Moral for Sustainable Development. **(Individual development)**

M2: Enable the Faculty and Student Interactions to trigger interest for Applied Multidisciplinary Research and Entrepreneurship Culture resulting in Significant Advancement of the field of Specialization with Involvement of Industries and Collaborative Educational Networks. **(Sense of Ownership, Networking and Eco system Development)**

M3: Extend the Conducive Neighborhoods for Innovation in frontier areas to keep pace with Environmental, Societal and Technological Developments of the National and International Community to Serve Humanity. **(Service to Society, Atmanirbhar Bharat)**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS):

- ❖ **PEO 1-** Graduates will Ennoble in offering Design solutions for Complex Engineering Problems using appropriate modern Software tools, with the specified need of the Industry and Protagonist in transforming the Society into a Knowledge Society.
- ❖ **PEO 2-** Graduates will Elevate Engineering Leadership and will be recognized as Experts working in Government, Consulting firms, International organizations with their Creativity in Design of Experiments, Analysis and Interpretation of Data and Synthesis of Information.
- ❖ **PEO 3-** Graduates will Exalt in their Professional career by Persistence in Team work, Ethical behavior, Proactive involvement, and Effective Communication.
- ❖ **PEO 4-** Graduate will Excel by becoming Researches, Professors and Entrepreneurs who will create and Disseminate new knowledge in the frontier areas of Engineering, Technology and Management

PROGRAM OUTCOMES (POs):

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
4. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
5. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOS):

PSO 1: Evaluate complex Engineering Problems to meet the distinct need of Industry & Society, by utilizing knowledge of Mathematics, Science, Emerging Technologies such as AI, Block chain & IT tools.

PSO 2: Exhibit Latent talent in understanding the Engineering and Administration standards at work place as a team leader to manage Projects in the Multi-Disciplinary Environments.

PSO 3: Establish Engineering Expertise in Power system, Machines and Drives Systems and also Pursue Research in the Frontier areas such as Embedded systems, Renewable Energy, E-Mobility and Smart grid.

OPEN ELECTIVE COURSES



DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Open Elective Courses offered by EEE Department under R20 Regulation (to be handled by EEE faculty) to other departmental students.

Open Electives offered during Odd semester

S.No.	Semester	Course Code	Title of the Course
1	Odd	20EE02	EnergyManagement System
2	Odd	20EE04	EnergyConservation

Open Electives offered during Even semester

S.No.	Semester	Course Code	Title of the Course
1	Even	20EE01	Engineering Materials
2	Even	20EE03	Energy Auditing
3	Even	20EE05	Waste Management

20EE001

ENGINEERING MATERIALS

Instruction	3L Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Prerequisites: Student should have prior knowledge of Basic Electrical Engineering

Course Objectives:

1. To analyse the mechanical, magnetic and the electrical properties of materials.
2. To select materials for various engineering application to establish how failures occur in materials.
3. To observe the changes in behaviour of the material while subjected to stress and to know the economic aspects of a design.

Course Outcomes: After completion of the course, students will be able to

1. Classify the given material based on its properties.
2. Select a proper material for a given application.
3. Experiment on materials in order to test its adaptability.
4. Investigate the suitability of material for the latest technological requirement.
5. Compare and contrast the characteristics of the materials to assess the changes in properties.

UNIT- I

Conducting Materials: Electrical conducting materials, High conductivity materials, Materials of High resistivity, Materials used for precision Work, Rheostats, Heating devices, Super conductivity, Special types of Alloys, Applications and properties of Semiconductors, Silicon wafers, integration techniques, Large and Very Large scale integration Techniques (VLSI)

UNIT -II

Insulating Materials: Classification of Insulating materials, temperature rise, electrical properties of insulating materials used for wires-laminations- machines and their applications, Ceramics, Plastics, DC electrical properties, AC electrical properties, Dielectric properties of insulators, Dielectric materials used for various electrical applications, suitability.

UNIT- III

Magnetic Materials: Magnetic parameters, the three types of magnetic material, measuring magnetic materials, Application of soft magnetic materials, Magnetic recording media, Hard (permanent) magnets, Ferrites, Samarium, Cobalt alloys, Neodymium Iron Boron (Nd Fe B).

UNIT- IV

Optical Properties of Materials: EM Radiation Spectrum, Optical properties in materials, Photo electric emission, Photoconductivity, Lasers, Optical fibres, fibre cables.

UNIT -V

Materials for Direct Energy Conversion Devices: Solar cells, equivalent circuit of a solar cell, fuel cell, MHD generators, storage of hydrogen, thermoelectric generators, Nano applications in Electrical Engineering.

Text Books:

1. G.K Benarjee, “Electrical and Electronic Engineering Materials”, PHI, 2015
2. Ian P. Jones, “Material Science for Electrical and Electronic Engineers”, Oxford University Press, 2008.
3. R. K Sukhla, “Electrical Engineering Materials”, McGraw Hill Education, 2013.

Suggested Readings:

1. Dhir, “Electronic Components & Materials”, McGraw Hill Education, 2012.
2. “Electrical Engineering Materials”, McGraw Hill Education, TTTI Madras, 2004.

CO-PO & PSO Correlation Articulation Matrix:

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	2	2	1	1	--	--	--	--	--	--	--	--	--	2	--
CO-2	2	2	1	1	--	2	2	--	--	--	--	--	--	2	1
CO-3	3	3	2	3	2	2	2	--	--	--	--	--	2	3	3
CO-4	3	3	2	3	2	2	2	--	--	--	--	--	2	3	3
CO-5	2	2	2	1	--	--	--	--	--	--	--	--	2	3	3

ENERGY MANAGEMENT SYSTEM

instruction	3L Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Prerequisites: Students should have prior knowledge on different energy generation systems, basic idea about audit instruments.

Course Objectives:

1. To know the concept of Energy Management.
2. To understand the formulation of efficiency for various Engineering Systems
3. To enable the students to develop managerial skills to assess feasibility of alternative approaches and drive strategies regarding Energy Management

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

1. Know the current Energy Scenario and importance of Energy Conservation.
2. Understand the concepts of Energy Management, Energy Auditing.
3. Interpret the Energy Management methodology, Energy security and Energy Strategy.
4. Identify the importance of Energy Efficiency for Engineers and explore the methods of improving Energy Efficiency in mechanical systems, Electrical Engineering systems
5. Illustrate the Energy Efficient Technologies in Civil and Chemical engineering systems

UNIT-I

Various form of Energy and its features: Electricity generation methods using different energy sources such as Solar energy, wind energy, Bio-mass energy, and Chemical energy such as fuel cells. Energy Scenario in India, Impact of Energy on economy, development, and environment sectors of national and international perspective.

UNIT-II

Energy Management-I: Defining Energy Management, need for Energy Management, Energy management techniques, importance of Energy Management, managing the Energy consumption, Energy Audit and Types, Energy Audit Instruments.

UNIT-III

Energy Management-II: **understanding Energy costs, bench marking, Energy performance, matching energy use to requirement, optimizing the input, fuel & Energy substitution, material and Energy balance diagrams, Energy pricing, Energy and Environment, Energy Security,**

UNIT-IV

Energy Efficient Technologies-I: Importance of Energy Efficiency for Engineers, Energy Efficient Technology in Mechanical engineering: Compressed Air System, Heating, ventilation and air-conditioning, Fans and blowers, Pumps and Pumping Systems,

Energy Efficient Technology in Electrical engineering: Automatic Power Factor Controllers, Energy Efficient Motors, soft starters with energy saver, variable speed drives, energy efficient transformers, electronic ballast, occupancy sensors, energy efficient lighting controls, space cooling, energy efficiency of lifts and escalator, energy saving potential of each technology.

UNIT-V

Energy Efficient Technologies-II: Energy Efficient Technology in Civil Engineering: Intelligent Buildings, And Various Energy Efficiency Rating Systems for Buildings, Green Buildings Energy Efficiency: management of green buildings, importance of embodied energy in selection of sustainable materials, green building design, waste reduction/recycling, rainwater harvesting, maintenance of the green buildings, green building certification, Renewable energy applications.

Energy Efficient Technology in Chemical Engineering: Green chemistry, Low carbon cements, recycling paper.

Text Books:

1. Umesh Rathore, 'Energy Management', Kataria publications, 2nd edition, 2014.
2. G Hariharaiyer, "Green Building Fundamentals", Notion press.com
3. K V Shama, P Venkateshaiah, "Energy management and conservation", I. K. International Publishing agency Pvt. Ltd., 2011, ISBN: 978-93-81141-29-8

Suggested Reading:

1. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects
2. Hargroves, K., Gockowiak, K., Wilson, K., Lawry, N., and Desha, C. (2014) An Overview of Energy Efficiency Opportunities in Mechanical/civil/electrical/chemical Engineering, The University of Adelaide and Queensland University of Technology.
3. Success stories of Energy Conservation by BEE, New Delhi (www.bee-india.org)

CO-PO & PSO Correlation Articulation Matrix:

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	1	-	-	1	-	1	2	1	-	-	-	1	-	-	-
CO-2	2	1	1	1	-	1	2	1	-	-	-	1	-	-	-
CO-3	2	2	2	1	-	1	2	1	-	-	-	1	-	-	-
CO-4	2	2	1	2	2	1	2	1	-	-	-	1	-	-	-
CO-5	1	1	2	1	1	1	2	2	-	-	-	1	-	-	-

20EEO03

ENERGY AUDITING

Instruction	3 L Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Prerequisites: Students should have prior knowledge on different Electrical Energy Generation systems, measuring instruments and basics of power systems

Course objectives:

1. To know the concept of Energy auditing
2. To understand the formulation of efficiency for various engineering systems
3. To explore the different ways to design various technologies for efficient engineering systems.

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

1. Know the current energy scenario and various energy sources
2. Understand the concepts of energy auditing.
3. Evaluate the performance of existing engineering systems
4. Explore the methods of improving energy efficiency in different engineering systems
5. Design different energy efficient appliances.

UNIT-I

Basics of Energy and its various forms: Overview of Engineering, elements Solar energy, electricity generation methods using solar energy, PV cell, elements of wind energy, electricity generation using wind energy, elements of Bio energy, Bio mass energy conservation, elements of Geothermal energy, sources of Geo thermal energy, sources of Chemical energy, fuel cells, Energy Scenario in India

UNIT-II

Energy Auditing-I: Introduction, Need for energy audit, types of energy audit: Preliminary audit, General/mini Audit, Investment-grade/ Comprehensive audit. Major energy consuming equipment and systems, Energy audit team, energy Auditing methodology: preliminary and detailed. Process flow diagram, Energy Audit report format

UNIT-III

Energy Auditing-II: For buildings: Energy Auditing Instruments, Energy Efficiency, Energy Auditing for buildings- stages in programs, surveying, measurements, and model analysis. Energy audit form of commercial buildings such as Hotel, checklist for Energy saving measures.

UNIT –IV

Energy Efficient Technologies-I: Energy Efficient Technology in Mechanical Engineering: Heating, ventilation, and air-conditioning; Evaporative coolers, Air conditioners -types such as Portable; Central AC, Window AC and Split AC

Energy Efficient Technology in Electrical Engineering: Electricity billing, Power Factor Improvement- Regenerated Energy in Lifts and Escalators

UNIT-V

Energy Efficient Technologies-II: Energy Efficient Technology in Civil Engineering: Green building-features- concept of Embodied energy -Building design-Green construction-Net Zero Energy Building - **Energy Efficient Technology in Chemical Engineering:** Green chemistry, - Battery Management systems – concept and salient features -topologies.

Text Books:

1. Umesh Rathore, 'energymanagement', Kataria publications, 2nd edition, 2014.
2. G.Harihara Iyer : Green Building – Fundamentals, Notion Press .com2022
3. Hargroves, K., Gockowiak, K., Wilson, K., Lawry, N., and Desha, C. (2014) An Overview of Energy Efficiency Opportunities in Mechanical/civil/electrical/chemical Engineering, The University of Adelaide and Queensland University of Technology.

Suggested Reading:

1. Success stories of Energy Conservation by BEE, New Delhi (www.bee-india.org)
2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects

CO-PO & PSO Correlation Articulation Matrix:

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CO-1	2	2	1	1	1	2	-	-	-	-	1	1	1	1	-
CO-2	2	1	3	2	1	2	-	-	-	-	1	1	1	2	-
CO-3	2	1	3	2	1	2	-	-	-	-	2	2	1	2	1
CO-4	2	1	2	2	1	2	-	-	-	-	2	2	1	1	1
CO-5	1	1	2	1	1	2	-	-	-	-	2	2	1	1	2

20EEO04

ENERGY CONSERVATION

Instruction	3 L Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Prerequisites: Students should have prior knowledge on Fundamentals of power systems, electrical machines, and power electronics.

Course Objectives:

1. To know the concept of Energy conservation
2. To understand the formulation of efficiency for various engineering systems
3. To explore the different ways to design various technologies for efficient engineering systems.

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

1. Know the current energy scenario and importance of energy conservation.
2. Understand the concepts of energy conservation.
3. Evaluate the performance of existing engineering systems
4. Explore the methods of improving energy efficiency in different engineering systems
5. Understanding different energy efficient devices.

UNIT-I

Basics of Energy audits various forms : Overview of Engineering elements , Solar energy, Electricity generation methods using Solar energy, PV cell, elements of wind energy, electricity generation using wind energy, elements of Bio energy, Bio mass energy conservation, sources of chemical energy, fuel cells, Energy Scenario in India.

UNIT-II

Energy Conservation-I: Domestic Sector: Energy conservation needs and objectives, Energy Conservation strategies in domestic sector, Energy Conservation tips in the kitchen, other energy saving tips in the domestic house, Energy Conservation measures in office, energy conservation processes/activities for a building.

HVAC (heating, ventilation, air conditioning), components of HVAC, energy conservation opportunities in HVAC systems.

UNIT-III

Energy Conservation-II: Industrial Sector: Energy Conservation in Indian industrial sector, Energy saving potential in industry: boiler, furnaces, air compressors, refrigeration systems, heat exchanger, heat pump, turbines, electric drives, pumps, cooling towers, fans and blowers.

Energy Conservation in agriculture sector: Energy Conservation opportunities in pumps used in agriculture sector, summary.

UNIT-IV

Energy Efficient Technologies-I: Importance of Energy Efficiency for engineers, Energy Efficient Technology in Mechanical engineering: Heating, ventilation and air-conditioning, boiler and steam distribution systems.

Energy Efficient Technology in civil engineering: future of roads, harnessing road and transport infrastructure; Energy Efficient Technology in Agriculture: IoT and Drone Technology.

UNIT-V

Energy Efficient Technologies-II: Energy efficient technology in electrical engineering: Electricity billing ,Electrical load management and, power factor improvement and its benefit, selection and location of capacitors ; Energy efficient technology in Chemical engineering: green chemistry, low carbon cements, recycling paper. Green buildings concept.

Text Books:

1. Umesh Rathore, 'energy management', Kataria publications, 2nd edition, 2014.
2. G Harihara Iyer , "Green Building Fundamentals", Notion press.com
3. Guidebooks for National Certification Examination for Energy Manager/Energy Auditors Book-1, General Aspects
4. Hargroves, K., Gockowiak, K., Wilson, K., Lawry, N., and Desha, C. (2014) An Overview of Energy Efficiency Opportunities in Mechanical/civil/electrical/chemical Engineering, The University of Adelaide and Queensland University of Technology.

Suggested Reading:

1. S. C. Tripathy, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991
2. Success stories of Energy Conservation by BEE, New Delhi (www.bee-india.org)

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CO-2	3	2		3	-	1	-	-	-	-	-	-	-	-	-
CO-3	3	3	2	3	2	2	-	-	-	-	-	-	2	1	-
CO-4	3	2	2	2	2	1	-	-	-	-	-	-	2	1	-
CO-5	2	2	1	2	2	1	-	-	-	-	-	-	-	-	-

20EEO05

WASTE MANAGEMENT

Instruction	3 L Hours per week
Duration of SEE	3 Hours
SEE	60 Marks
CIE	40 Marks
Credits	3

Course Objectives:

1. To Imbibe the concept of effective utilization of any scrap
2. To become familiar with the processes of all disciplines of engineering.
3. To learn the technique of connectivity from waste to utility.

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

1. Categorize the waste based on the physical and chemical properties.
2. Explain the Hazardous Waste Management and Treatment process.
3. Illustrate the Environmental Risk Assessment, methods, mitigation and control.
4. Interpret the Biological Treatment of Solid and Hazardous Waste.
5. Identify the waste disposal options, describe the design and construction, Operation, Monitoring, Closure of Landfills

UNIT-I

Introduction to waste management and Municipal Solid Waste Management: Classification of waste: Agro based, Forest residue, Industrial waste, e-Waste, Municipal Solid Waste Management: Fundamentals Sources, composition, generation rates, collection of waste, separation, transfer and transport of waste, treatment and disposal options.

UNIT-II

Hazardous Waste Management and Treatment: Hazardous Waste Identification and Classification, Hazardous Waste Management: Generation, Storage and collection, Transfer and transport, Processing, Disposal, Hazardous Waste Treatment: Physical and Chemical treatment, Thermal treatment, Biological treatment, Pollution Prevention and Waste Minimisation, Hazardous Wastes Management in India.

UNIT-III

Environmental Risk Assessment: Defining risk and environmental risk, Parameters for toxicity quantification, Types of exposure, Biomagnifications, Effects of exposure to toxic chemicals, risk analysis and risk matrix, methods of risk assessment, mitigation and control of the risk, case studies.

UNIT-IV

Biological Treatment: Solid and Hazardous Waste Composting; bioreactors; anaerobic decomposition of solid waste; principles of biodegradation of toxic waste; inhibition; co-metabolism; oxidative and reductive processes; slurry phase bioreactor; in-situ remediation.

UNIT-V

Waste Disposal: Key Issues in Waste Disposal, Disposal Options and Selection Criteria: Disposal options, Selection criteria, Sanitary Landfill: Principle, Landfill processes, Landfill Gas Emission:

Composition and properties, Hazards, Migration, Control, Leachate Formation: Composition and properties. Leachate migration, Control, Treatment, Environmental Effects of Landfill, Landfill Operation Issues, Design and construction, Operation, Monitoring, Closure of Landfills - Landfill Remediation, national and International Waste management programs

Text Books:

1. John Pichtel Waste Management Practices CRC Press, Taylor and Francis Group 2005.
2. LaGrega, M.D. Buckingham, P.L. and Evans, J.C. Hazardous Waste Management, McGraw Hill International Editions, New York, 1994
3. Richard J. Watts, Hazardous Wastes - Sources, Pathways, Receptors John Wiley and Sons, New York, 1997

Suggested Reading:

1. Basics of Solid and Hazardous Waste Mgmt. Tech. by Kanti L. Shah 1999, Prentice Hall.
2. Solid and Hazardous Waste Management 2007 by S.C. Bhatia Atlantic Publishers & Dist.

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CO-2	1	2	2	1	1	2	2	1	-	-	-	1	1	-	-
CO-3	2	2	2	2	1	2	2	2	-	-	-	1	1	-	-
CO-4	1	1	1	1	1	1	1	1	-	-	-	1	1	-	-
CO-5	1	2	2	2	1	2	2	2	-	-	-	1	1	-	-

"Human beings tend to resist change even when change represents growth and development."

-Sara Fine

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING-CBIT(A)

The List of Open Elective Courses offered by other departments to EEE Students during V semester(OE-1),VII semester (OE-2,OE-3) and VIII semester (OE-4) of R20 scheme.

1. Department of ECE

SNO	COURSE CODE	COURSE
1	20EC 001	Remote Sensing and GIS
2	20EC 002	Basics of DSP
3	20EC 003	Biomedical Instrumentation
4	20EC 004	Principles of Embedded Systems
5	20EC 005	Systems Automation & Control
6	20EC 006	MEMS and its Applications
7	20EC 007	Neural Networks and Fuzzy Logic
8	20EC 008	Fundamentals of Biomedical Signal Processing
9	20EC 009	Principles of VLSI
10	20EC 010	Fundamentals of Wireless Communications

2. Department of CSE

SNO	COURSE CODE	COURSE
Offered during odd semester		
1	20CSO01	Fundamentals of Virtual Reality
2	20CSO02	Introduction to Web Technology
3	20CSO03	Introduction to Soft Computing
4	20CSO04	Open Source Technologies
5	20CSO05	Basics of Artificial Intelligence
6	20CSO06	Fundamentals of Blockchain Technology
7	20CSO07	Fundamentals of Software Engineering

Offered during even semester		
8	20CSO08	Basics of Machine Learning
9	20CSO09	Fundamentals of DBMS
10	20CSO10	Basics of Cyber Security
11	20CSO11	Data Visualization Models
12	20CSO12	Introduction to Mobile Application Development
13	20CSO13	Basics of Cloud Computing
14	20CSO14	Fundamentals of Computer Vision

3. Department of IT

SNO	COURSE CODE	COURSE
1	20IT001	Object Oriented Programming Using JAVA
2	20IT002	Principles of Internet of Things
3	20IT003	Introduction To Cloud Computing

4. Department of CIVIL

SNO	COURSE CODE	COURSE
1	20CE 001	Infrastructure for Smart Cities
2	20CE 002	Disaster Risk Reduction and Management
3	20CE 003	Rural Water Supply and Onsite Sanitation System

5. Department of MECH

SNO	COURSE CODE	COURSE
1	20ME 001	Robotics
2	20ME 002	Human Values and Professional Ethics
3	20ME 003	Research Methodologies
4	20ME 004	Entrepreneurship
5	20ME 005	Human Rights and Legislative Procedure
6	20ME 006	Nano Materials and Technology
7	20ME 007	Intellectual Property Rights
8	20ME 008	Mechatronics
9	20ME 009	Organizational Behaviour
10	20ME 010	Introduction to Operations Research
11	20ME 011	Modern Manufacturing Processes
12	20ME 012	3D Printing
13	20ME 013	Industrial and Financial Management
14	20ME 014	Principles of Management
15	20ME 015	Principles of Industry 4.0

6. Department of AIDS

SNO	COURSE CODE	COURSE
1	20ADO01	Introduction to Python Programming
2	20ADO02	Data Analysis and Visualization
3	20ADO03	Fundamentals of Data Science

7. Department of Chemical

SNO	COURSE CODE	COURSE
Offered during odd semester		
1	20CH 001	Energy Resources and Technology
2	20CH 003	Water Conservation Management
3	20CH 005	Safety and Hazards Management
4	20CH 006	Fundamentals of Fuel Cells
Offered during even semester		
5	20CH 004	Industrial Pollution Control
6	20CH 002	Environmental and Sustainable Development

8. Department of Bio-Tech

SNO	COURSE CODE	COURSE
1	20BT C36	Biology For Engineers
2	20BT 001	Biology For Engineers
3	20BT 002	Biomaterials For Engineers
4	20BT 003	Bioterrorism And National Security
5	20BT 004	Bioinformatics
6	20BT 005	Cognitive Neuroscience

N.B: Students interested to opt any Open Elective from above are advocated to visit the respective department Portal for syllabus and other details.