R-18

CURRICULUM ESSENTIALS

Handbook on Outcome Based Education

CIVIL ENGINEERING

NARULA INSTITUTE OF TECHNOLOGY

WWW.NIT.AC.IN

Institute Vision

To make the Institute excellent in technological education and research by imparting equitable, inclusive, ethical, flexible and multidisciplinary knowledge to budding technologists to serve the society.

Institute Mission

- To establish continuously improving academic ambience in the Institute in order to prepare the students with beyond curriculum knowledge, creativity, innovation, problem solving abilities, teamwork, communication skills etc. for their holistic development.
- To collaborate with Institutes of higher education, Professional Societies, R&D and Industrial organisations for continuous improvement of academic, research environment in the Institute and to build a strong Industry-Institute interface.
- To promote and nurture entrepreneurial and innovative quality of the students providing proper education, training and supportive facilities so that future entrepreneurs emerge with flying colors.
- To strengthen quality and knowledge-base of faculty through faculty development programmes for continuous upgradation to remain in tune with dynamically changing technology.
- To become a responsible contributor in the socio-economic development of the society through excellence in education and research.

Institute Quality Policy

- Adoption of appropriate standards and practices for good governance, to bring in transparency of all operations and thereby improve credibility at all levels.
- Industry-ready professionals to be developed through interactive teaching learning process involving state of the art class rooms, laboratories, libraries, corporate exposure and innovative project work.
- Higher studies/research for faculty & staff to be encouraged for up gradation of knowledge through participation in Quality Improvement Programs, Seminars, Workshops, Webinars etc.
- Laboratory facilities would be upgraded in emerging areas to promote R&D activities including participation in Govt. and Industry funded projects.
- Industrial consultancy to be carried out in an effective manner for developing sense of accomplishment.
- Interaction with Professional Societies would be encouraged for the professional growth and development of the students, faculties and staff for mutual benefit.
- NBA Accreditation for all AICTE approved programs to be obtained at the earliest and maintained on a long-term basis.
- The innovative and entrepreneurial skills of the students to be nurtured through Innovation & Incubation center, finally culminating in start-ups.

Department Vision

- To produce a new generation of Civil Engineers by providing state-of-the-art education in Civil Engineering recognized worldwide for excellence leading to extensive research in technology and management for industrial and social needs for sustainable development

Department Mission

- **DM 1-** To make the department a highest seat of learning in the field of Civil Engineering and allied research
- **DM 2-** To develop required skills and knowledge so that students are readily employable.
- **DM 3-** To motivate students with high ethical values to serve the society and nation.
- **DM 4-** To provide state of the art resources that contributes to a congenial learning environment.
- **DM 5-** To inculcate innovative and original thinking to budding engineers to face the challenges and changes of future.

Program Educational Objects (PEOs)

- **PEO I: Technical Knowledge:** Graduates will be able to analyze, design and propose a feasible solution to civil engineering problems by applying basic principles of mathematics, science and engineering.

- **PEO II: Professional skills:** Graduates will be inculcated with necessary professional skills, effective oral and written communication to be productive Engineers.

- **PEO III: Problem Solving ability:** Graduates will be able to work as a team in intra and interdisciplinary end over for development of new ideas and products to serve in contemporary societal contexts.

- **PEO IV: Knowledge application:** Graduates will be able to face challenges of the world economic order by incorporating expertise gained by faculty in consultancy work, for educating students, involving modern tools and techniques.

- **PEO V: Technical expertise:** Graduates will achieve a high level of technical and managerial expertise to achieve excellence, outstanding leadership to succeed in positions in Civil Engineering profession with higher threshold start in employment background.

Program outcomes (POs)

Engineering Graduates will be able to:

I. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

II. **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.

III. **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.

IV. **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.

V. **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.

VI. **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.

VII. **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.

VIII. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

IX. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

X. **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.

XI. **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.

XII. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Program Specific Outcomes (PSOs)

At the end of the program, the student will able to-

- **PSO1:** Apply the basic concept of civil engineering skill in the field of Structural, Geotechnical, Environmental, Water resources and Transportation engineering for proper employability.
- **PSO2:** Apply theoretical and experimental knowledge to extend in research and pursue higher studies.
- **PSO3:** Develop skills in appropriate design procedures, construction planning and management, to implement in various projects.

Curriculum Structure

1st Semester

Course Name:
Mathematics-ICourse
Code: M 101 Contact:
3:1:0

Total Contact Hours:
48Credits: 4

Prerequisites:

The students to whom this course will be offered must have the concept of (10+2) standard matrix algebraand calculus.

Course Outcomes:

COs	DESCRIPTIONS
CO1	Recall the distinctive characteristics of matrix algebra and calculus.
CO2	Understand the theoretical working of matrix algebra and calculus.
CO3	Apply the principles of matrix algebra and calculus to address problems in their disciplines.
CO4	Examine the nature of system using the concept of matrix algebra and calculus.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	2	-	-	-	-	-	-	-	-	-	1
CO2	3	2	-	-	-	-	-	-	-	-	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1
CO4	2	3	1	-	-	-	-	-	-	-	-	1

Course Name: Physics –I
Course Code: PH 101
Contact: 3:0:0

Total Contact Hours:
36Credits: 3

Pre requisites: Knowledge of Physics up to 12th standard.

Course Outcomes:

CO1: Describe various types mechanical resonance and its electrical equivalence

CO2: Explain basic principles of Laser, Optical fibers and various types of semiconductors

CO3: Apply superposition to explain interference and diffraction as well as apply wave mechanicsto attainment of Heisenberg's uncertainty principle

CO4: Analyze importance of light as a carrier of information and examine differentcrystallo

CO5: Justify the need of a quantum mechanics as remedy to overcome limitations imposed by classicalphysics

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	-	-	-	-	-	-	-	-	-	-	2
CO2	**3**	-	-	-	-	-	-	-	-	-	-	2
CO3	**3**	2	-	-	-	-	-	-	-	-	-	1
CO4	2	**3**	-	-	-	-	-	-	-	-	-	1
CO5	1	**3**	-	-	-	-	-	-	-	-	-	**1**

Course Name: Basic Electronics EngineeringCourse Code: EC101

Contact: 3:0:0

Total Contact Hours: 36Credits: 3

Prerequisites:

Electric current and voltage-D.C and A.C., Complex impedance, conductivity, resistivity, transformercharging and discharging of capacitor, active and passive elements.

Course Outcomes:

CO1	Students able to describe the fundamentals of Semiconductors
CO2	Students able to explain V-I characteristics of P-N Junction Diode, zener diode , working of diode rectifier, clipper, clamper, and regulator circuit
CO3	Students able to analyze characteristics of Bipolar junction transistor(BJT) under CE, CB, CC mode of operation and its biasing therein
CO4	Students able to illustrate the operations of JFET, MOSFET and the CS,CD , CG configuration using JFET
CO5	Students able to determine parameters due to effect of feedback in amplifier
CO6	Students able to construct inverting amplifier circuit , non-inverting amplifier circuit ,adder circuit , integrator and differentiator circuit using Operational Amplifier IC

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	2	-	1
CO2	3	3	3	1	-	-	-	-	1	1	1	2
CO3	3	1	1	1	-	-	-	-	1	1	1	1
CO4	3	2	1	1	-	-	-	-	1	1	2	2
CO5	3	2	3	1	-	-	-	-	1	1	1	2
CO6	3	3	3	1	-	-	-	-	2	1	2	3

Course Name: English
Course Code: HU101
Contact: 2:0:0

Total Contact Hours: 24

Credits: 2

Prerequisites: The course presupposes a high school level knowledge of English grammar, punctuation, andelementary to intermediate reading and writing skills.

Course Outcomes:

CO1: Know about and employ communication in a globalized workplace scenario.
CO2: Understand and apply functional grammar, reading skills and sub-skills.
CO3: Acquire a working knowledge of writing strategies, formats and templates of professional writing.
CO4: Apply and make use of the modalities of intercultural communication.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	-	-	-	-	-	1	-	-	3	-	2
CO2	2	3	2	-	-	2	2	-	-	3	-	3
CO3	1	3	-	-	-	3	3	-	-	3	-	3
CO4	-	-	-	-	-	3	3	-	-	3	-	3

Course Name: Physics I
LabCourse Code: PH 191
Contact: 0:0:3
Credits: 1.5

Pre requisites: Knowledge of Physics upto 12th standard.

Course Outcomes:

CO1 : Demonstrate experiments allied to their theoretical concepts

CO2 : Conduct experiments using LASER, Optical fiber, Torsional pendulum, Spctrometer

CO3 : Participate as an individual, and as a member or leader in groups in laboratory sessions actively

CO4 : Analyze experimental data from graphical representations , and to communicate effectively themin Laboratory reports including innovative experiments

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	1
CO2	1	2	-	3	-	-	-	-	-	-	-	1
CO3	1	2	-	-	-	-	-	-	3	-	-	1
CO4	1	2	-	-	-	-	-	-	-	3	-	1

Course Name: Basic Electronics Engineering LabCourse Code: EC 191

Contact: 0:0:3

Credit: 1.5

Prerequisites: A basic course in electronics and Communication engineering Progresses from the fundamentals of electricity, active and passive components, basic electronics laws like Ohm's law, Ampere's law.

Course Outcomes:

CO1	Knowledge of Electronic components such as Resistors, Capacitors, Diodes, Transistors measuring equipment like DC power supply, Multimeter, CRO, Signal generator, DC power supply.
CO2	Analyse the characteristics of Junction Diode, Zener Diode, BJT & FET and different types of Rectifier Circuits.
CO3	Determination of input-offset voltage, input bias current and Slew rate, Common- mode Rejection ratio, Bandwidth and Off-set null of OPAMPs.
CO4	Able to know the application of Diode, BJT & OPAMP.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	-	-	-	-	-	-	2
CO2	3	3	3	2	2	-	-	-	-	-	-	2
CO3	3	3	3	2	1	-	-	-	-	-	-	3
CO4	3	3	2	3	2	-	-	-	-	-	-	3

Course Name: Workshop/Manufacturing PracticesCourse Code: ME 192

Contact: 0:0:3

Credit: 1.5

Prerequisite: Higher Secondary with Mathematics, Physics and Chemistry

Course Outcomes:

CO1: Fabricate components with their own hands.

CO2: Get practical knowledge of the dimensional accuracies and tolerances applicable for differentmanufacturing processes.

CO3: Produce small devices of their interest for project or research purpose.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	1	-	-	-	2	1	-	2
CO2	3	3	2	2	1	-	-	-	2	1	-	2
CO3	3	2	2	2	1	1	-	1	2	2	3	2

2nd Semester

Course Name: Mathematics - IICourse Code: M 201

Contact: 3:1:0

Total Contact Hours: 48
Credit: 4

Prerequisites: The students to whom this course will be offered must have the concept of (10+2) standard calculus.

Course Outcomes:

CO1	Use mathematical tools to evaluate multiple integrals and vector integrals
CO2	Apply effective mathematical tools for the solutions of ordinary differential equations that model physical processes.
CO3	Recall the properties of Laplace Transform to evaluate multiple integrals and their usage
CO4	Understand the concept of Laplace transform to solve ordinary differential equations.

CO-PO Mapping:

PO / CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
CO1	3	2	2	-	-	-	-	-	-	-	-	1
CO2	3	2	2	-	-	-	-	-	-	-	-	1
CO3	2	2	-	-	-	-	-	-	-	-	-	1
CO4	3	3	2	-	-	-	-	-	-	-	-	1

Course Name:
Chemistry**Course**
Code: CH201
Contact: 3:0:0

Total Contact Hours: *36*

Credits: 3

Pre requisites: Knowledge of Chemistry up to 12th standard.

Course Outcomes:

CO1: ***Able to describe the fundamental properties of atoms & molecules, atomic structure and the periodicity of elements in the periodic table***

CO2: **Able to apply fundamental concepts of thermodynamics in different engineering applications.**

CO3: ***Able to apply the knowledge of water quality parameters, corrosion control & polymers to different industries.***

CO4: **Able to determine the structure of organic molecules using different spectroscopic techniques.**

CO5: ***Capable to evaluate theoretical and practical aspects relating to the transfer of the production of chemical products from laboratories to the industrial scale, in accordance with environmental considerations.***

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	-	-	-	1	2	2	2
CO2	3	3	3	3	-	-	-	-	1	1	2	3
CO3	3	3	2	1	-	2	1	-	1	-	3	3
CO4	3	2	3	2	-	-	1	-	1	2	3	3
CO5	3	3	3	3	1	1	1	-	1	-	2	3

Course Name: Basic Electrical EngineeringCourse Code: EE201

Contact: 3:0:0

Total Contact hours: 36Credits: 3

Prerequisites:

- Basic 12th standard Physics and Mathematics.
- Concept of components of electric circuit.

Course Outcomes:

CO1: To understand Basic Electrical circuits, Power distribution and Safety measures.

CO2: To analyze an apply DC network theorems.

CO3: To analyze and apply concept of AC circuits of single-phase and three-phase.

CO4: To analyze and apply concepts of AC fundamentals in solving AC network problems.

CO5: To understand basic principles of Transformers and Rotating Machines.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	1	-	-	-	2	-	-	-	2	2	1
CO2	2	3	-	-	-	-	-	-	-	-	1	1
CO3	2	3	1	-	-	-	-	-	-	-	1	1
CO4	1	2	3	1	-	-	-	-	-	-	-	1
CO5	3	-	-	-	-	-	-	-	-	-	-	1

Course Name: Programming for Problem Solving
Course Code: CS 201

Contact: 3:0:0

Total Contact Hours:
36Credits: 3

Prerequisites: Number system,

Boolean AlgebraCourse Outcomes:

CO1	Understand and differentiate among different programming languages for problem solving.
CO2	Describe the way of execution and debug programs in C language.
CO3	Define, select, and compare data types, loops, functions to solve mathematical and scientific problem.
CO4	Understand the dynamic behavior of memory by the use of pointers.
CO5	Design and develop modular programs using control structure, selection structure and file.

CO – PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	1	-	3	3	1	1
CO2	2	2	3	3	2	2	-	-	3	3	3	3
CO3	2	2	2	2	2	1	-	-	3	3	1	3
CO4	3	2	2	2	2	3	-	-	3	3	2	3
CO5	3	3	3	3	2	3	-	-	3	3	3	3

Course Name: Engineering Mechanics

Course Code: ME 201

Contacts: 3:0:0

Total Contact Hours: 36Credits: 3

Prerequisites: Basic Concept of Physics

Course Outcomes:

CO1: To understand representation of force, moments for drawing free-body diagrams and analyze frictionbased systems in static condition

CO2: To locate the centroid of an area and calculate the moment of inertia of a section.

CO3: Apply of conservation of momentum & energy principle for particle dynamics and rigid body kinetics

CO4: Understand and apply the concept of virtual work, rigid body dynamics and systems under vibration.

CO – PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	1	-	-	-
CO2	3	3	2	2	-	-	-	-	1	-	-	1
CO3	3	2	3	2	1	-	-	-	1	-	-	1
CO4	3	3	3	3	-	-	-	-	1	-	1	-

Course Name: Programming for Problem

Solving LabCourse Code: CS291

Contacts: 0:0:3

Credits: 1.5

Prerequisites: Number system, Boolean Algebra.

Course Outcomes:

CO1	Learn the concept of DOS system commands and editor.
CO2	To formulate the algorithms for simple problems and to translate given algorithms to a working and correct program.
CO3	To be able to identify and correct syntax errors / logical errors as reported during compilation time and run time.
CO4	To be able to write iterative as well as recursive programs.
CO5	Learn the concept of programs with Arrays, Pointers, Structures, Union and Files.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	2	2	-	1	-	1	2	3
CO2	3	3	3	-	-	-	-	-	-	-	-	2
CO3	2	2	2	2	2	-	-	-	-	-	-	3
CO4	1	2	2	2	2	-	-	-	-	-	-	2
CO5	2	3	3	3	2	2	3	1	3	3	3	3

Course Name:
Chemistry LabCourse
Code: CH 291
Contact: 0:0:3

Credits: 1.5

Prerequisites: Knowledge of Physics up to 12th standard.

Course Outcomes:

CO1: Able to operate different types of instruments for estimation of small quantities chemicals used inindustries and scientific and technical fields.
CO2: Able to analyse and determine the composition of liquid and solid samples working as an individualand also as an team member
CO3: Able to analyse different parameters of water considering environmental issues
CO4: Able to synthesize drug and polymer materials.
CO5: Capable to design innovative experiments applying the fundamentals of chemistry

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	3	1	-	2	3	-	-	-	-	1
CO2	2	2	1	1	-	1	-	-	-	1	-	1
CO3	-	-	-	-	-	-	-	-	3	3	2	2
CO4	2	1	2	2	-	-	1	-	-	-	-	2
CO5	3	3	3	3	1	1	1	1	-	-	2	2

Course Name: Basic Electrical Engineering LaboratoryCourse Code: EE291

Contact: 0:0:3

Credits: 1.5

Prerequisites:

- Basic Physics and applied physics.
- Basic Mathematics.
- Basic concept of Electric Circuit

Course Outcomes:

CO1: Identify and use common electrical components.

CO2: To develop electrical networks by physical connection of various components andanalyze the circuit behavior.

CO3: Apply and analyze the basic characteristics of transformers and electrical machines.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	-	-	-	-	2	-	-	-	-	-	1
CO2	2	3	-	-	-	-	-	-	-	-	1	1
CO3	3	-	-	-	-	-	-	-	-	-	-	1

Course Name: Engineering Graphics &

DesignCourse Code: ME 291

Contact: 0:0:3

Credits: 1.5

Prerequisites: Basic knowledge of geometry

Course Outcomes:

CO1: Get introduced with Engineering Graphics and visual aspects of design.

CO2: Know and use common drafting tools with the knowledge of drafting standards.

CO3: Apply computer aided drafting techniques to represent line, surface or solid models in differentEngineering viewpoints.

CO4: Produce part models; carry out assembly operation and show working procedure of a designed projectwork using animation.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	1	-	1	1	-	1	2	1	-	-
CO2	2	1	2	-	1	1	-	2	1	2	1	1
CO3	2	1	3	2	3	-	-	2	2	2	1	1
CO4	2	1	3	3	3	1	1	2	2	2	2	2

Course Name: Lang. Lab. and Seminar PresentationCourse Code: HU 291

Contact: 0:0:2

Credit: 1

Pre requisites: Basic knowledge of LSRW skills.

Course Outcomes:

CO1: Able to understand advanced skills of Technical Communication in English through Language Laboratory.CO2: Able to apply listening, speaking, reading and writing skills in societal and professional life.

CO3: Able to demonstrate the skills necessary to be a competent Interpersonal communicator.CO4: Able to analyze communication behaviours.

CO5: Able to adapt to multifarious socio-economical and professional arenas with the help of effective communicationand interpersonal skills.

CO – PO Mapping :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	2	-	-	3	-	**3**	**2**	**2**	**3**	**3**	-	**3**
CO2	2	3	3	3	-	**3**	**3**	**3**	**2**	**3**	-	3
CO3	1	3	3	3	-	**2**	**2**	**2**	**2**	**3**	-	2
CO4	1	2	3	3	-	**2**	**1**	**1**	**2**	**3**	-	2
CO5	3	3	2	3	-	**2**	**3**	**2**	**2**	**3**	-	2

3rd Semester

COURSE NAME: NUMERICAL METHODSCOURSE CODE: M(CS) 301

CONTACT: 3:0:0

TOTAL CONTACT HOURS: 36
HRSCREDITS : 3

Prerequisite:

The students to whom this course will be offered must have the concept of (10+2) standardnumber system, algebra and calculus.

Course Outcome (COs):

On successful completion of the learning sessions of the course, the learner will be able to:

COS	DESCRIPTIONS
CO1	Recall the distinctive principles of numerical analysis and the associated error measures.
CO2	Understand the theoretical workings of numerical techniques.
CO3	Apply numerical methods used to obtain approximate solutions to intractable mathematical problems such as interpolation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.
CO4	Select appropriate numerical methods to apply to various types of problems in engineering and science in consideration of the mathematical operations involved, accuracy requirements, and available computational resources.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	1	1	-	-	-	-	-	-	-	-	1
CO2	3	2	1	-	-	-	-	-	-	-	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1
CO4	3	3	2	3	-	-	-	-	-	-	-	1

COURSE NAME: PHYSICS
-IICOURSE CODE: PH(CE)
301 CONTACT: 3:0:0

TOTAL CONTACT HOURS: 36
HRSCREDITS : 3

Pre-Requisites: 1st year Basic Physics knowledge

Course Outcome (COs):

On successful completion of the learning sessions of the course, the learner will be able to:

COS	DESCRIPTIONS
CO1	explain electromagnetic wave propagation using fundamentals of electrostatics, magnetostatics and electromagnetic theory.
CO2	apply Schrödinger equation in variety of atomic scale problems including nanomaterials.
CO3	analyze the importance of superposition principle of quantum mechanics in conceptualization of Quantum bits.
CO4	justify the importance of Fermi energy level in turning electronic properties of various semiconductors

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	-	-	-	-	-	-	-	-	1
CO2	3	2	-	-	-	-	-	-	-	-	-	2
CO3	2	3	-	-	-	-	-	-	-	-	-	1
CO4	1	2	2	3	-	-	-	-	-	-	-	1

COURSE NAME:
SURVEYINGCOURSE
CODE: CE301 CONTACT:
2:1:0

TOTAL CONTACT HOURS: 36
HRSCREDITS : 3

Pre requisites: Student should have knowledge about measurement and mathematical knowledge

Course Outcome:

CO1	Students will summarize surveying techniques that will remain correct for long period of time.
CO2	Students will experiment about different methods using instrument such as Chain, Compass, Leveling, minor instruments like planimeter, etc.
CO3	Students will learn about Area & Volume calculation.
CO4	Students will evaluate about Trigonometrically leveling.
CO5	Students will analyze about simple & complex problems of different instrument methods of Survey.

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	3	2	2	1	1	3	2	2	2
CO5	3	3	3	3	2	1	1	1	3	2	1	2

COURSE NAME: STRNGTH OF MATERIALS
COURSE CODE: CE 302

CONTACT: 2:1:0

TOTAL CONTACT HOURS: 36
HRSCREDITS : 3

Pre requisites: Student should have the knowledge about Elements of Civil Engineering &Mechanics.

Course Outcome:

CO1	Interpret the concepts of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials.
CO2	Analyze the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels.
CO3	Demonstrate the capability to conduct experiments, as well as to analyze and interpret data
CO4	Ability to classify a component to meet desired needs within realistic constraints of safety.

CO-PO mapping

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	-	-	-	-	-	1	-	2
CO2	3	3	3	2	1	-	-	-	-	1	-	3
CO3	2	3	3	3	1	1	-	-	1	1	1	2
CO4	3	2	3	3	1	-	2	-	-	-	-	1

COURSE NAME: BUILDING MATERIAL AND CONSTRUCTION
COURSE CODE: CE303

CONTACT: 2:1:0

TOTAL CONTACT HOURS: 36
HRSCREDITS : 3

Pre requisites: No Pre Requisite required (NPR)

Course Outcome:

CO1	Students will summaries basic knowledge about various kind of materials used in construction work.
CO2	Students will differentiate about different types of building foundation i.e. shallow and deep foundation, their mechanisms and uses.
CO3	summaries knowledge about various structural members of a building like-walls, door, window, stair, flooring, roof etc.
CO4	Extend to apply their knowledge at the time of decision making for application of structural member including material used.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	1	-	-	-	-	-	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-
CO4	2	3	1	-	-	-	-	-	-	-	-	-

COURSE NAME: ENGINEERING GEOLOGY
COURSE CODE: CE 304

CONTACT: 2:1:0

TOTAL CONTACT HOURS: 36
HRSCREDITS : 3

Pre requisites: Basic knowledge of Geography & Earth Science

Course Outcome:

CO1	Students will have knowledge about Engineering properties of Rocks and their Minerals.
CO2	Student will be appraised about Dam, reservoir, tunnel
CO3	Student will understand about Earthquake phenomena.
CO4	Student will able to carry out Physical exploration
CO5	Student will able to estimate various geological parameters by use of modern tools & techniques

CO-PO mapping

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	1	-	1	1	1	1	1	2
CO2	3	2	1	2	1	-	1	1	1	1	1	2
CO3	3	2	2	2	2	1	1	1	1	1	1	-
CO4	3	3	3	3	3	-	-	1	-	2	1	1
CO5	3	2	1	3	3	2	1	1	2	2	1	2

COURSE NAME: NUMERICAL METHODS LAB
COURSE CODE: M(CS) 391

CONTACT: 0:0:3

CREDITS : 1.50

Prerequisite: Any introductory course on programming language (example. C/ Matlab).

Course Outcome (CO):

On successful completion of the learning sessions of the course, the learner will be able to:

CODES	DESCRIPTIONS
CO1	Understand the theoretical workings of numerical techniques with the help of C/ Matlab
CO2	Execute basic command and scripts in a mathematical programming language
CO3	Apply the programming skills to solve the problems using multiple numerical approaches.
CO4	Analyze if the results are reasonable, and then interpret and clearly communicate the results.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	2	1	-	-	-	-	-	-	-	-	1
CO2	3	2	2	-	-	-	-	-	-	-	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1
CO4	3	3	2	3	-	-	-	-	-	-	-	1

COURSE NAME: ENGINEERING GEOLOGY LAB

COURSE CODE: CE 391

CONTACT: 0:0:2

CREDITS : 1

Pre requisites: Student should have the knowledge about Engineering geology theory.

Course Outcome:

CO1	Student should acquire knowledge about engg. Properties of rocks and their minerals.
CO2	Student should be able to identify rocks and minerals
CO3	Student should be able to use modern tools live microscope to explore samples.
CO4	Student should be able to interpret map.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	1	-	1	1	1	1	1	1
CO2	3	2	2	3	2	1	2	-	1	1	-	1
CO3	2	2	1	3	3	2	-	1	1	1	1	1
CO4	2	2	2	1	1	3	1	1	-	1	-	1

COURSE NAME: SURVEYING PRACTICE
COURSE CODE: CE 392

CONTACT: 0:0:3

CREDITS : 1.50

Pre requisites: Student should have knowledge about the basic Basic Survey Theory

Course Outcome:

CO1	To interpret horizontal measurement with the help of Chain & Compass Surveying in the field.
CO2	To enumerate about Plane Table surveying.
CO3	To estimate vertical measurement with the help of Leveling in the field.
CO4	To apply indirect methods& demonstration of minor instruments.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	-	-	2	1	1	3	2	2	1
CO2	3	3	3	-	-	2	1	1	3	3	3	-
CO3	3	3	3	-	-	2	1	1	3	2	3	1
CO4	3	3	3	-	-	2	1	1	3	3	3	2

COURSE NAME: PHYSICS-II LAB**COURSE CODE:** PH (CE) 391 **CONTACT: 0:0:3**

CREDITS : 1.50

Pre requisites: Basic Knowledge of Physics-I Lab.

Course Outcome:

CO1	demonstrate experiments allied to their theoretical concepts
CO2	conduct experiments using semiconductors , dielectric and ferroelectrics
CO3	classify various types of magnetic materials
CO4	participate as an individual, and as a member or leader in groups in laboratory sessions actively
CO5	analyze experimental data from graphical representations , and to communicate effectively them in Laboratory reports including innovative experiments

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	1
CO2	2	1	-	3	-	-	-	-	-	-	-	-
CO3	-	-	2	-	-	-	-	-	-	-	-	1
CO4	-	-	-	-	-	-	-	-	3	-	-	-
CO5	-	-	-	-	-	-	-	-	-	1	-	-

4th Semester

COURSE NAME: MATHEMATICS- III
COURSE CODE: M 401
CONTACT: 3:1:0
TOTAL CONTACT HOURS: 48 HRS
CREDITS : 4

Prerequisite:

The students to whom this course will be offered must have the concept of (10+2) standard calculus, basic probability and differential equations.

Course Outcome (COs):

On successful completion of the learning sessions of the course, the learner will be able to:

DES	DESCRIPTIONS
1	Recall the underlying principle and properties of Fourier series, Fourier transform, probability distribution of a random variable, calculus of complex variable, partial differential equation and ordinary differential equation.
2	Exemplify the variables, functions, probability distribution anddifferential equations and find their distinctive measures using the underlying concept of Fourier series, Fourier transform, probability distribution of a random variable, calculus of complex variable, partial differential equation and ordinarydifferential equation.
3	Apply Cauchy's integral theorem and the residue theorem to find the value of complex integration, and compute the probability of real world uncertain phenomena by indentifying probability distribution that fits the phenomena.
4	Solve partial differential equation using method of separationof variables and ordinary differential equation using techniquesof series solution and special function (Legendre's and Bessel's).
5	Find the Fourier series and Fourier transform of functions by organizing understandings of underlying principles and also evaluate the integral using Parseval's identity.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	1	1	-	-	-	-	-	-	-	-	1
CO2	3	2	1	-	-	-	-	-	-	-	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1
CO4	3	2	2	-	-	-	-	-	-	-	-	1
CO5	3	3	2	3	-	-	-	-	-	-	-	1

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	1	1	-	-	-	-	-	-	-	-	1
CO2	3	2	1	-	-	-	-	-	-	-	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1
CO4	3	2	2	-	-	-	-	-	-	-	-	1
CO5	3	3	2	3	-	-	-	-	-	-	-	1

COURSE NAME: VALUES AND ETHICS IN PROFESSION
COURSE CODE: HU401
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 24 HRS
CREDITS : 2

Prerequisites: Ethics in engineering practice is about professional responsibilities of engineers. Professional ethics have been recognized as an important foundation in the practice of engineering for several decades in many industrialized countries. Codes of ethics have been invoked as a basis for professional engineering licensure. Violations of such ethical codes have led to many well-known tragic engineering failures that endangered human life and jeopardized public welfare. As a response to this concern, a new discipline, engineering ethics, is emerging. This discipline will doubtless take its place alongside such well-established fields as medical ethics, business ethics, and legal ethics. Recently, ethics has attracted the attention of several colleges of engineering around the world. In this regard, ethics started merging into engineering curricula for the last two decades. Implementations varied from introducing some ethics case studies into existing courses, to introducing standalone ethics courses.

Course Outcome: On Completion of this course student will be able to

CO-1 Understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.

CO-2 Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories

CO-3 Understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field

CO-4 Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.

CO-5 Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.

CO-PO Mapping

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO1	_	_	_	_	_	1	1	1	1	2	_	_
CO2	_	_	_	_	_	1	1	3	1	2	_	_
CO3	_	_	_	_	_	3	2	3	_	1	_	_
CO4	_	_	_	_	_	3	2	1	_	_	_	_
CO5	_	_	_	_	_	3	2	2	_	1	3	_

COURSE NAME: STRUCTURAL ANALYSIS
COURSE CODE: CE 401
CONTACT: 3:1:0
TOTAL CONTACT HOURS: 48 HRS
CREDITS : 4

Pre requisites: Students must have knowledge in engineering mechanics, solving of free body diagrams and application of different structural aspects of materials in any type of structures like support reactions, bending moments, stresses, torsion etc.

Course Outcome:

CO1. Learn about determinate and indeterminate structures and determination of degree of static and kinematic indeterminacy for any type of structures.

CO2. Analysis of any structure by strain energy method.

CO3. Analysis of determinate and indeterminate structures by different methods.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	1	2	1	2	3	3	2
CO2	3	3	3	3	1	2	1	1	2	1	2	2
CO3	3	3	3	2	2	2	1	2	3	3	2	2

COURSE NAME: CONCRETE TECHNOLOGY
COURSE CODE: CE 402
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 24 HRS
CREDITS : 2

Pre requisites: Student should have knowledge about the building materials and construction.

Course Objective: The objective of this course is to produce knowledge to the student ingredients of concrete, specific

Course Outcome:

CO1	Identify the functional role of ingredients of concrete
CO2	Student should be able to gather knowledge to mix design philosophy
CO3	Student will be able to differentiate various types of cement used for various specific purpose
CO4	Student will be able to apply fundamental knowledge in the freshand hardened properties of concrete
CO5	Student will be able to design ordinary and control concretes, replacement of cement and their specific applications

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	3	-	-	2	-	-	-	1	3
CO2	3	3	3	2	3	1	2	-	-	1	1	2
CO3	3	1	2	1	3	-	-	1	-	1	-	1
CO4	3	-	2	-	3	2	2	-	-	-	-	2
CO5	3	3	-	2	2	2	3	-	1	1	-	2

COURSE NAME: SOIL MECHANICS
COURSE CODE: CE 403
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Student should have knowledge about the basic of strength of materials, physics and chemistry

Course Objective: To provide students with basic understanding of physical and mechanical properties of soil, together with knowledge of basic engineering procedures to identify factors controlling soil behavior and methods to determine soil properties. Students will acquire basic knowledge in engineering design of geotechnical systems

Course Outcome:

CO1	Identify the fundamental differences in engineering behavior between cohesive and cohesion less soils
CO2	Compute the groundwater seepage and distribution of groundwater pressure.
CO3	Calculate the applied stress beneath the ground surface.
CO4	Demonstrate that you know the fundamental difference in the strength and deformation characteristics of cohesive and cohesion less soils.
CO5	Analyze field and laboratory data to determine the strength and deformation properties of cohesive and cohesion less soils.
CO6	Determine settlements due to consolidation of soil

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	1	1	1	1	1	1	2
CO2	2	2	3	3	2	3	1	1	2	2	2	3
CO3	2	2	3	2	2	1	1	3	2	1	1	2
CO4	3	3	3	3	3	2	1	3	2	1	3	3
CO5	2	3	1	2	1	3	1	2	2	2	2	2
CO6	2	2	2	3	1	2	2	2	3	2	3	2

COURSE NAME: BUILDING PLANNING AND DRAWING
COURSE CODE: CE 491
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Student should have knowledge about building materials and construction and alsomathematics

Course Objective: The objective of this course is to make student able to Learn to sketch and take field dimensions and to take data and transform it into graphic drawings and Auto Cad skills.

Course Outcome:

CO1	Prepare simple layout of buildings.
CO2	Produce working drawings for individual components like doors and windows etc.
CO3	Develop line diagram, building section, elevation, key plan and sectional elevation.
CO4	Illustrate hand drafting any parts of a building and implement the regulations for layout of plan.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	2	-	-	-	1	-	-	1
CO2	3	2	-	1	2	-	-	-	1	-	-	1
CO3	3	2	-	1	2	-	-	-	1	-	-	1
CO4	3	2	-	1	2	-	-	-	1	-	-	1

COURSE NAME: CONCRETE LAB
COURSE CODE: CE 492
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Student should have the basic knowledge about concrete technology theory

Course Outcome:

CO1	Identify the functional role of ingredients of concrete
CO2	Apply this knowledge to mix design philosophy to get different grade of concrete
CO3	Student should be able to test of different concrete property to specify quality of concrete
CO4	Student shall learn to work in a team to achieve the objective

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	-	-	-	1	1	-	1
CO2	3	2	2	2	2	1	1	1	1	-	-	1
CO3	3	2	2	2	2	1	-	-	1	-	-	1
CO4	1	1	1	1	1	-	1	1	3	2	2	1

COURSE NAME: CONCRETE LAB
COURSE CODE: CE 492
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Student should have the basic knowledge about concrete technology theory

Course Outcome:

CO1	Identify the functional role of ingredients of concrete
CO2	Apply this knowledge to mix design philosophy to get different grade of concrete
CO3	Student should be able to test of different concrete property to specify quality of concrete
CO4	Student shall learn to work in a team to achieve the objective

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	-	-	-	1	1	-	1
CO2	3	2	2	2	2	1	1	1	1	-	-	1
CO3	3	2	2	2	2	1	-	-	1	-	-	1
CO4	1	1	1	1	1	-	1	1	3	2	2	1

COURSE NAME: SOIL MECHANICS LAB – I
COURSE CODE: CE 493
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Student should have the basic knowledge about Basic Soil Mechanics theory

Course Outcome:
CO1: Identify soils with reference to their characteristics
CO2: Describe the behavior and effect of water in soils
CO3: Examine modes of soil behavior
CO4: Calculate and plot soil strength parameters
CO5: Interpret different methods of improving soil stability including reference to compaction plant

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	3	3	2	1	-	1	3	2	2
CO2	3	3	2	2	3	2	1	1	-	2	3	1
CO3	3	2	1	2	1	3	1	2	-	2	1	2
CO4	2	3	2	3	1	1	2	1	2	1	2	3
CO5	2	3	3	2	2	1	1	1	2	1	2	2

COURSE NAME: QUANTITY SURVEYING, SPECIFICATIONS AND VALUATION
COURSE CODE: CE 494
CONTACT: 0:0:3
CREDITS : 1.5

Pre requisites: Student should have knowledge about building construction and material details.

Course Outcome:

CO1: Student will be able to prepare specification for using materials of construction and its items ofworks.
CO2: Student will be able to illustrate a detailed estimation of material consumption and abstracts for entire construction projects
CO3: Student will learn how to analyze the rates for different items of work including labor and material.
CO4: Interpret fundamental concepts of valuation
CO5: Students will be able to identify various legal issues related to construction.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	2	1	-	-	-	2	2
CO2	3	3	3	2	-	-	-	-	-	-	1	2
CO3	3	3	3	1	-	-	-	-	-	-	2	2
CO4	3	3	3	2	-	-	-	-	-	-	2	2
CO5	3	3	3	2	1	2	-	-	2	2	2	2

COURSE NAME: ECONOMICS FOR ENGINEERS
COURSE CODE: HU 502
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 24 HRS
CREDITS : 2

Pre requisites: NIL

Course Outcome:

CO1 : To Identify various uses for scares resources
CO2 : To understand key economic concepts and implement in real world problems
CO3 : To apply critical thinking skills to analyze financial data and their impacts
CO4 : To evaluate business performance through cost accounting principles

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	-	-	-	-	-	-	-	-	2	-
CO2		-		-	-	-	3	-	-	-	-	2	-
CO3	-	-	-	2	2	3	-	-	-	-	-	2	2
CO4	-	-	-	3		-	-	-	-	-	-	3	2

COURSE NAME: STRUCTURAL DESIGN – I
COURSE CODE: CE 501
CONTACT: 2:1:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Student should have knowledge about how to solve analysis of structural problem.

Course Outcome:

CO1 : Exhibit the knowledge of concrete design philosophies, by working and limit state methodology
CO2 : Design the structural details of beam and slab
CO3 : Design the structural details of column.
CO4 : Interpret and use the I.S Code specifications

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	1	2	1	-	3	3	2
CO2	3	3	3	3	-	2	-	-	-	1	2	2
CO3	3	3	3	2	-	-	-	-	-	-	2	2
CO4	3	3	3	2	-	-	-	-	-	-	2	2

COURSE NAME: FOUNDATION ENGINEERING
COURSE CODE: CE 502
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Student should have knowledge about basic of Soil Mechanics

Course Outcome:

CO1 : Describe bearing capacity of soil.
CO2 : Define earth pressure theories
CO3 : Design of shallow foundations
CO4 : Classify piles & their loading capacity for deep foundation.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	1	1	1	2	3	1	2	3
CO2	2	2	2	3	2	2	1	2	3	1	2	3
CO3	2	2	1	2	1	1	1	1	2	1	1	2
CO4	2	1	1	2	3	2	1	1	2	1	2	2

COURSE NAME: HYDRAULICS
COURSE CODE: CE 503A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic knowledge of Fluid Mechanics

Course Outcome:

CO1 : Students will be able to recognize with different water resources terminology like hydrology, ground water, hydraulics of pipelines and open channel.
CO2 : Students will be able to explain and be able to use the energy and momentum equations.
CO3 : Students will be able to separate flow in closed pipes, and design and recommend of pipes including sizes.
CO4 : Students will be able to summarize pumps classification and be able to select a system curve used in pump selection.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	1	-	-	-	-	-	-	-
CO4	2	3	1	-	1	-	-	-	-	-	-	-

COURSE NAME: WATER SUPPLY AND PLUMBING
COURSE CODE: CE 503B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Student should knowledge about hydraulic

Course Outcome:

CO1 : Student will be able to apply appropriate treatment to raw water i.e. surface water/ground water useful for domestic as well as drinking purpose, industries liquid waste and reuse ofwater.
CO2 : Student will be able to calculate and recommend the pipe- network for water supply and Sewage disposal effectively.
CO3 : Student may clarify and identify the impurities present in water used for domestic, different types of industrial as well as constructionworks.
CO4 : Student will able to produce and select water distribution and sewer-network system.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	1	1	-	-	-	-	-	-
CO2	2	3	2	-	1	1	-	-	-	-	-	-
CO3	3	2	2	-	1	-	-	-	-	-	-	-
CO4	3	2	2	-	1	-	-	-	-	-	-	-

COURSE NAME: WASTE WATER AND TREATMENT
COURSE CODE: CE 503C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Fluid Mechanics or an equivalent course in fluid flow or hydraulics.

Course Outcome:

CO1 : Students will be able to summarize the quality parameters typically used to differentiate wastewater and judge the different classes of treated wastewater
CO2 : Students will be able to describe various types of process units used for preliminary, primary and secondary treatment and explain how they achieve the target level oftreatment
CO3 : Students will be able to identify and summarize emerging technologies for advanced wastewater treatment and water recycling
CO4 : Students will be able to differentiate water and wastewater treatment on solid wastes management.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	-	1	-	-	-	-	-
CO2	2	2	3	-	1	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	1	2	-	-	-	-	-	-

COURSE NAME: TRANSPORTATION ENGINEERING
COURSE CODE: CE 504A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Knowledge on IRC codes, Loading pattern base on IRC, Traffic features etc.

Course Outcome:

CO1 : Understanding of traffic loading pattern
CO2 : Understanding of traffic engineering and traffic management
CO3 : Basic concept of railway engineering

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	3	1	2	1	2	3	2	2	1	3	3	3

COURSE NAME: INFRASTRUCTURE PLANNING & DESIGN
COURSE CODE: CE 504B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic Civil Engineering knowledge in design and construction management.

Course Outcome*:*

CO1 : Students will summarise basic knowledge about the role of infrastructure in economic development, India's infrastructural capacity and its scenario in adequacy and quality.

CO2 : Students will understand application of techniques to estimate supply and demand for infrastructure along with stratergic planning required in urban, regional and national levels

CO3 : To know the common aspects of rural and urban infrastructure management and to fuse them into an integrated infrastructure management.

CO4 : Assessment of risk management, understanding the stakeholders concerns and overviewing of policies involved in infrastructure management.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	2	-	-	3	2	1	3	2
CO2	1	1	-	-	2	1	2	1	2	1	1	2
CO3	1	-	3	-	-	-	-	-	-	-	3	2
CO4	1	-	2	2	1	1	3	1	1	1	1	2

COURSE NAME: PUBLIC TRANSPORT SYSTEM
COURSE CODE: CE 504C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic knowledge of Civil Engineering

Course Outcome:

CO1 : Able to remember transit modes, management activities and demand analysis.
CO2 : Capable of designing transit terminal units, fleet management and cost analysis.
CO3 : Capable of planning and scheduling transit terminal platform for loading and un loading, selecting suitable traffic management techniques.
CO4 : Capable of selecting different demand management techniques, intersection management techniques and small area management.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	1	-	-	-	-	-	-	1
CO2	3	2	2	2	1	-	-	-	-	-	-	1
CO3	2	2	2	2	2	-	-	-	-	-	-	1
CO4	3	2	2	3	2	-	-	-	-	-	-	1

COURSE NAME: TRANSPORTATION & HIGHWAY ENGINEERING LAB
COURSE CODE: CE 591 A
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Student should have the basic knowledge about Highway&Transportation engineering.

Course Objective: The objective of this course is to understand the characteristics and behavior of highway materials used in highway engineering. Students will learn standard principles and procedure to design prepare and/or test materials such as B.M. & S.D.B.C. mixdesign including Marshal Stability Test. Know how to select materials based on their properties and their proper use for a particular facility under prevailing loads and environmental conditions.

Course Outcome:

CO1: Identify the functional role of different materials of highway engineering.
CO2: Apply this knowledge to mix design philosophy to get different suitable B.M. & S.D.B.C. Mix.
CO3: Student should be able to test of existing highway and examine the quality of that highway by Benkelman Beam Test.
CO4: Student shall learn to work in a team to achieve the objective.

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	-	-	-	1	1	-	1
CO2	3	2	2	2	2	1	1	1	1	-	-	1
CO3	3	2	2	2	2	1	-	-	1	-	-	1
CO4	1	1	1	1	1	-	1	1	3	2	2	1

COURSE NAME: INFRASTRUCTURE PLANNING & DESIGN LAB
COURSE CODE: CE 591 B
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Basic Civil Engineering knowledge in design and construction management.

Course Outcome:

CO1: To enumerate various economic, financial, social and sustainable tools in infrastructure management.
CO2: To enumerate various planning and management tools adopted for infrastructural development.
CO3: To estimate the actual cost involved in a small scale to large scale infrastructure project.
CO4: To study case studies and relate them with practical explorations for nearby ongoing infrastructural projects.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	2	-	-	3	2	1	3	2
CO2	1	2	-	1	2	1	2	1	2	1	2	2
CO3	1	1	3	1	-	-	-	-	1	1	3	2
CO4	1	1	2	2	2	1	3	1	2	1	2	2

COURSE NAME: PUBLIC TRANSPORT SYSTEM LAB
COURSE CODE: CE 591 C
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Basic knowledge of Civil Engineering

Course Outcome:

CO1: To solve network and routing problem through some case study discussion.
CO2: To evaluate various costs involve in designing and scheduling of public transit service.
CO3: To estimate various basic parameters like traffic demand, passenger car unit (PCU) value in field.
CO4: To understand the various design aspect in parking and traffic intersection design.

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	1	-	-	-	-	-	-	1
CO2	3	2	2	2	1	-	-	-	-	-	-	1
CO3	2	2	2	2	2	-	-	-	-	-	-	1
CO4	3	2	2	3	2	-	-	-	-	-	-	1

COURSE NAME: SOIL MECHANICS LAB-II
COURSE CODE: CE 592
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Basic course on soil mechanics with understanding of soil parameters, behavior and response against loading.

Course Outcome:

CO1: Ability to caculate the compressive strength of soil
CO2: Ability to perform shear strength of soil
CO3: Ability to understand standard penetration test
CO4: Ability to understand consolidation parameters of soil

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	3	3	-	-	-	-	2	-	2
CO2	3	3	-	3	3	-	-	-	-	2	-	2
CO3	3	3	-	3	3	-	-	-	-	2	-	2
CO4	3	3	-	3	3	-	-	-	-	2	-	2

COURSE NAME: CIVIL ENGINEERING LAB
COURSE CODE: CE 593
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Student should have the basic knowledge about building material and construction and also should have knowledge about basic concrete property.

Course Outcome:

CO1: Test of beams for deflection, flexure and shear
CO2: Experiments on Concrete, including Mix design
CO3: Illustrate knowledge on Non destructive testing (NDT) equipments – Rebound hammer, Ultra sonic pulse velocity meter

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	3	3	-	1	1	2	3	-	1
CO2	3	2	3	2	2	1	1	-	2	1	2	2
CO3	3	2	2	2	3	2	2	2	1	-	2	1

COURSE NAME: ADVANCED PROGRAMMING FOR PROBLEM SOLVING
COURSE CODE: CE 594
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Number system, Boolean Algebra, Basic C programming concepts.

Course Outcome:

CO1: To formulate the algorithms for arithmetic and logical problems and translate the algorithms to C programs.
CO2: To be able to test and execute the programs and correct syntax and logical errors during compile and run time.
CO3: To implement conditional branching, iteration and recursion.
CO4: To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
CO5: To use arrays, pointers, structures, unions and files to formulate algorithms and programs and apply programming to solve searching and sorting problems.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	2	2		1		1	2	3
CO2	3	3	3	-	-	-	-	-	-	-	-	2
CO3	2	2	2	2	2	-	-	-	-	-	-	3
CO4	1	2	2	2	2	-	-	-	-	-	-	2
CO5	2	3	3	3	2	2	3	1	3	3	3	3

COURSE NAME: CONSTITUTION OF INDIA
COURSE CODE: MC 501
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 32

Pre requisites: NA

Course Outcome:

CO1: Develop human values, create awareness about law ratification and significance of Constitution

CO2: Comprehend the Fundamental Rights and Fundamental Duties of the Indian Citizen to implant morality, social values and their social responsibilities.

CO3: Create understanding of their Surroundings, Society, Social problems and their suitable solutions.

CO4: Familiarize with distribution of powers and functions of Local Self Government.

CO5: Realize the National Emergency, Financial Emergency and their impact on Economy of the country.

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	2	3	-	-	-	2
CO2	-	-	-	-	-	3	2	3	-	-	-	2
CO3	-	-	-	-	-	3	2	3	-	1	-	2
CO4	-	-	-	-	-	3	2	3	-	1	-	2
CO5	-	-	-	-	-	3	2	3	-	1	-	2

COURSE NAME: STRUCTURAL DESIGN – II
COURSE CODE: CE 601
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: A basic concept of material properties and behavior with basic knowledge of structural analysis and structural elements behaviorunder different loading pattern. Knowledge of stress and strain with fundamental concept of Engineering mechanics.

Course Outcome:

CO1 : Understand various types of design methodology as per limit and working stress method
CO2: Interpret different type of connections
CO3 : Design compression, tension and beam members
CO4 : Analyze column bases
CO5 : Design plate girder, uses of stiffeners

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	3	-	-	-	-	-	-
CO2	-	2	3	3	-	3	-	-	-	-	-	-
CO3	-	2	-	3	3	3	-	2	-	-	-	-
CO4	-	-	2	3	2	2	-	2	-	-	-	-
CO5	-	2	2	3	2	2	-	-	-	-	-	-

COURSE NAME: CONSTRUCTION PLANNING AND MANAGEMENT
COURSE CODE: CE 602
CONTACT: 2:1:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic course in construction material and methodology with understanding of structural elements and their uses and sequence of construction, erection. Basic knowledge of quantity Estimation and valuation.

Course Outcome:

CO1 : Students will be able to successfully apply business and Management skills in positions within the construction industry.
CO2: Use industry resources including associations and organizations.
CO3 : Practice informed decision- making in personal and professional endovers.
CO4 : Manage a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	2	-	-	-	-	-	-
CO2	2	2	2	2	1	2	2	-	2	2	2	-
CO3	2	2	1	2	3	2	2	-	2	1	1	-
CO4	-	-	1	1	1	-	-	-	2	1	3	-

OURSE NAME: BRIDGE ENGINEERING
COURSE CODE: CE 603A
CONTACT: 3:1:0
TOTAL CONTACT HOURS: 48 HRS
CREDITS : 4

Pre requisites: Student should have knowledge about how to solve analysis of structural problem, reinforced concrete structure design and steel structure design.

Course Outcome:

CO1 : Exhibit the knowledge of the history of bridges and know about the IRC guidelines.
CO2: Design the RCC bridges of different type.
CO3 : Design the Balanced Cantilever Bridges.
CO4 : Design the steel bridges of different type. schedule, and safety requirements.
CO5 : Exhibit the knowledge of Composite Bridges and Cable Stayed Bridges.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	1	2	1	-	3	3	2
CO2	3	3	3	3	-	2	-	-	-	1	2	2
CO3	3	3	3	2	-	-	-	-	-	-	2	2
CO4	3	3	3	2	-	-	-	-	-	-	2	2
CO5	3	3	3	2	-	-	-	-	-	1	2	2

COURSE NAME: PRESTRESSED CONCRETE
COURSE CODE: CE 603B
CONTACT: 3:1:0
TOTAL CONTACT HOURS: 48 HRS
CREDITS : 4

Pre requisites: Basic understanding of R.C.C. design and analysis with fundamental knowledge of limit state behavior of R.C.C. with basic knowledge of structural analysis

Course Outcome:

CO1 : The student will get basic concept of pre-stressing materials and procedures.
CO2: Detail understanding on losses in prestressed
CO3 : Become familiar with IS Codes on Prestressing.
CO4 : Understand design of various parts of a prestressed structure for many kind of loading.
CO5 : Detail Idea on anchorage zone and composite members

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	1	-	-	-	-	-
CO2	3	2	1	2	-	-	1	-	-	-	-	-
CO3	-	2	1	-	1	3	1	-	-	-	-	-
CO4	2	2	3	2	2	-	1	-	-	-	-	-
CO5	2	2	1	2	2	-	1	-	-	-	-	-

COURSE NAME: STRUCTURAL DYNAMICS & EARTHQUAKE ENGINEERING
COURSE CODE: CE 603C
CONTACT: 3:1:0
TOTAL CONTACT HOURS: 48 HRS
CREDITS : 4

Pre requisites: Student should knowledge about earthquake ,retrofitting and dynamics of the structure

Course Outcome:

CO1 : Student will be able know Degrees of freedom, Undamped single degree freedom system, Damped single degree freedom system

CO2: Student will be able to know about Response of single degree freedom system due to harmonic loading

CO3 : Student will be able to know about Duhamel's Integral, Response due to constant force, Rectangular load, Introduction to numerical evaluation of Duhamel's integral of undamped system.

CO4 : Student will able to know about Fundamentals: Elastic rebound theory, Plate tectonics, Definitions of magnitude, Intensity, Epicenter etc., Seismographs, Seismic zoning, Response of Simple Structural Systems

CO5 : Student will able to know about Principles of earthquake resistant design

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	3	2	2	1	1	3	2	2	2
CO5	3	3	3	3	3	1	1	1	3	3	2	-

COURSE NAME: OPERATIONS RESEARCH
COURSE CODE: CE 604A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic concepts of Probability distribution , statistical estimation, regression analysis and ANOVA, Basic Mathematics

Course Outcome:

CO1 : At the end of the course, the students will be able to identify and develop operational research models from the verbal description of the real System.
CO2: Apply the mathematical tools that are needed to solve optimisation problems.
CO3 : Use mathematical software to solve the proposed models.
CO4 : Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decisionmaking processes in Management Engineering.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	2	-	3	-	-	3
CO2	-	-	-	-	-	1	-	1	-	3	-	1
CO3	-	-	-	-	-	2	-	-	-	-	-	1
CO4	-	-	-	-	-	3	2	-	3	3	-	2

COURSE NAME: HUMAN RESOURCE MANAGEMENT
COURSE CODE: CE 604B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic concepts of Management and Planning

Course Outcome:

CO1 : On completion of this course the students will be able to know resource
CO2: planning and management in construction.
CO3 : Plan and manage key human resource functions within organizations.
CO4 : Contribute to employee performance management and organizational Effectiveness

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	2	1	2	-	3	-	-	3
CO2	-	-	-	-	-	1	-	1	3	3	-	3
CO3	-	-	-	-	1	2	-	-	-	3	-	1
CO4	-	-	-	-	-	3	2	-	3	3	-	2

COURSE NAME: STUDIES ON SIX SIGMA
COURSE CODE: CE 604C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic concepts of Management and Planning

Course Outcome:

CO1 : Understand requirement of implementation of Six Sigma.
CO2: Relate Six Sigma concept to the overall business mission and objective.
CO3 : Understand Six Sigma methodology including DMAIC.
CO4 : Employ Six Sigma skills to lead a successful process improvement project for a meaningful result

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	1	-	-	-	-	-	-	-	1
CO2	2	1	1	1	1	-	-	-	-	-	-	1
CO3	3	3	3	2	2	-	-	-	-	-	-	1
CO4	3	3	3	3	3	-	-	-	2	2	2	1

COURSE NAME: STRUCTURAL DESIGN AND DETAILING
COURSE CODE: CE 691
CONTACT: 0:0:2
CREDITS : 1.0

Pre requisites: Student should knowledge about rcc and steel structure design of various structural components and building structure.

Course Outcome:

CO1: Design principle of R.C.C. sections. Limit state method of design Loads and stresses to be considered in the design as per I.S. code provision.
CO2: Design & detailing of a i) simply supported R.C.C Beam ii) Continuous T- Beam
CO3: Student should be able to Design & Detailing of columns, isolated and combined footing.
CO4: Design of different units: Slab, beam column, roofing and staircase from floor plan of a multistoried frame building, typical detailing of a two way floor slab.
CO5: Problems on general consideration and basic concepts

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	-	-	-	1	1	-	1
CO2	3	2	2	2	2	1	1	1	1	-	-	1
CO3	3	2	2	2	2	1	-	-	1	-	-	1
CO4	3	1	1	1	1	-	1	1	3	2	2	1
CO5	3	3	3	1	1	1	1	1	2	1	2	1

COURSE NAME: COMPUTER AIDED DESIGN AND DRAFTING
COURSE CODE: CE 692
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Fundamentals of computer operation with basic knowledge of Structure Analysis and Design for different structural components with basic knowledge of engineering drawing.

Course Outcome:

CO1: Students will be able to integrate the role of graphic communication in the engineering design process

CO2: Students will be able to use CAD software to generate a computer model and technical drawing for a simple, well-defined part or assembly.

CO3: Students will be able to apply basic concepts to develop construction (drawing) techniques and produce 2D Orthographic Projections

CO4: Understand and demonstrate dimensioning concepts and techniques

CO5: Become familiar with the use of Blocks, Design Center, and Tool Palettes, Solid Modeling concepts and techniques

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	1	1	3	-	-	-	-	3	2	-
CO2	1	2	1	1	3	-	-	-	-	3	2	-
CO3	1	2	1	1	3	-	-	-	-	3	1	-
CO4	1	2	1	1	3	-	-	-	-	3	1	-
CO5	1	2	1	1	1	-	-	-	-	1	-	-

7th Semester

COURSE NAME: ENVIRONMENTAL ENGINEERING
COURSE CODE: CE701
CONTACT: 2:1:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites:

The basic concept of hydraulics with knowledge of pressure, loss etc calculation. Fundamentals of chemistry and preliminary knowledge of Quantity estimation.

Course Outcome:

CO1 : Students will be able to understand key current environmental problems like level of pollution
CO2 : Be able to identify and value the effect of the pollutants on the environment: atmosphere, water and soil.
CO3 : Be able to analyze an industrial activity and identify the environmental problems.
CO4 : Be able to plan strategies to control, reduce and monitor pollution.
CO5 : Be able to select the most appropriate technique to purify and/or control the emission of pollutants.
CO6 : Be able to apply the basis of an Environmental Management System (EMS) to an industrial activity

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	-	-	1	2	1	-	-	-	-	-
CO2	-	-	2	-	1	1	-	-	-	-	-	-	-
CO3	1	1	1	2	-	-	-	-	-	-	-	-	1
CO4	-	-	2	-	2	-	-	-	-	-	-	-	-
CO5	1	-	1	2	2	-	-	-	-	-	-	-	1
CO6	-	-	-	-	-	-	2	1	-	2	3	-	-

COURSE NAME: HYDROLOGY AND WATER RESOURCE ENGINEERING
COURSE CODE: CE 702A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic course in Hydraulic Engineering with emphasis on behavior and utilization of groundwater with basic knowledge of interpretation of charts and mathematics.

Course Outcome:

CO1 : The student will be able to acquire knowledge of Hydrological Cycle and its component.
CO2 : The student will be able to understand irrigation water, use of irrigation water in farm land, different irrigation methods & effective usage of water resources.
CO3 : The student will be able to analyse Ground water and Surface water conveyance system.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	2	-	1	-	-	-	-	-	-
CO2	1	-	3	1	-	1	-	-	-	-	-	-
CO3	-	1	2	1	-	-	-	-	-	-	-	-

COURSE NAME: IRRIGATION ENGINEERING
COURSE CODE: CE 702B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic course in Irrigation Engineering with emphasis on behavior and utilization of surface water with basic knowledge of interpretation of Hydraulics.

Course Outcome:

CO1 : The student will be able to acquire knowledge of Crop cycle and details of various crop seasons.
CO2 : The student will be able to understand irrigation of water, use of irrigation water in farm land, different irrigation methods & amp; effective usage of water resources.
CO3 : The student will be able to understand Surface water conveyance and distribution system.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	2	-	1	-	-	-	-	-	-
CO2	1	-	3	1	-	1	-	-	-	-	-	-
CO3	-	1	2	1	-	-	-	-	-	-	-	-

COURSE NAME: HYDRAULIC STRUCTURE
COURSE CODE: CE 702C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites:

Basic course on hydraulics with emphasis on fluid behavior pressure losses and application of theories in real scenario knowledge of seepage and groundwater calculation.

Course Outcome:

CO1 : Students will able to analyze and design hydraulic structures using of practice.
CO2 : Students will able to Apply the basic design principles to engineering design practice
CO3 : To define basic theories of hydraulic structure design concepts- cross drainage works, canal falls etc.
CO4 : To define basic theories of hydraulic structure design concepts- dams, culverts, siphons etc.
CO5 : To identify seepage under hydraulic structures and protection methods.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	-	-	-	-	-	-	-	-	-
CO2	2	2	3	-	-	-	-	-	-	-	-	-
CO3	2	1	2	1	-	-	-	-	-	-	-	1
CO4	2	2	3	1	-	-	-	-	-	-	-	2
CO5	1	2	3	-	-	-	-	-	-	-	-	-

COURSE NAME: GROUND IMPROVEMENT& TECHNIQUE
COURSE CODE: CE 703A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Knowledge of Basic Soil Mechanics / Fundamental Geotechnical Engineering

Course Outcome:

CO1 : Understand the different ground improvement techniques.
CO2 : Understand the methods of stabilisation
CO3 : Understand the methods and properties of reinforced soil
CO4 : Understand the basic concepts of geosynthetics
CO5 : Understand the basic concept of consolidation of soil
CO6 : Understand the concept of shear strength in soil

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	3	2	1	2	2	3	2	3
CO2	3	3	1	2	3	2	1	1	2	3	1	3
CO3	3	3	2	2	3	3	3	3	1	1	2	3
CO4	3	3	1	3	1	2	2	1	2	1	1	3
CO5	3	3	1	1	2	1	2	2	3	2	2	3
CO6	3	2	3	1	2	2	2	1	2	2	1	1

COURSE NAME: URBAN PLANNING
COURSE CODE: CE 703B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Student should knowledge about the procedure of urban planning.

Course Outcome:

CO1 : Student will be able know the introduction of the man and Environment ,Biological and behavioral responses to human settlements, Role

CO2 : Student will be able to know about planning thought behind Jaipur and Delhi Studies of selected examples to include concentric city, , CIAM, linear industrial city and contemporary India Cities

CO3 : Student will be able to know about definitions of town planning, levels of planning and steps for preparation of a town plan

CO4 : Student will able to know about design of regional hubs like shopping malls, sub divisional hospitals, etc.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	3	2	2	1	1	3	2	2	2

COURSE NAME: TRAFFIC ENGINEERING & PLANNING
COURSE CODE: CE 703C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic course on transportation engineering with preliminary knowledge of pavement design, alignment, and statutory regulations preliminary knowledge of statistics and probability.

Course Outcome:

CO1 : Learn about basic Traffic Engineering administration.
CO2 : Students would be aware of the basic principles of speed, journey time and delay time.
CO3 : Students will be able to understand volume counts and parking surveys.
CO4 : Students would be aware of the basic principles of design, planning and management of traffic system.
CO5 :Design a pretimed signalized intersection and determine the signal splits and design an actuated signalized intersection.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	2	3	-	-	2	-	-	-	-	-	-	1
CO3	1	2	3	-	-	2	-	-	-	-	2	-
CO4	1	1	3	-	-	2	-	-	-	-	-	1
CO5	-	-	3	2	-	2	-	-	-	-	-	1

COURSE NAME: ENGINEERING MATERIALS
COURSE CODE: CE 704A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Knowledge of materials and metals, Definition of crystal, Knowledge of alloys etc.

Course Outcome*:*

CO1 : Understanding the behaviour and properties of materials
CO2 : Understanding the features of crystals and alloys
CO3 : Uses of polymers, ceramic etc

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	1	1	1	1	3	2	3	2	3	3	2	1

COURSE NAME: ELECTRICAL & ELECTRONICS MEASUREMENT
COURSE CODE: CE 704B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Concepts of basic Electrical Engineering

Course Outcome:

CO1 : Understand the basics of Electrical measuring system and their classification
CO2 : Student will be able to measurement of voltage and current by the use of CT and PT for extending instruments ranges.
CO3 : Understand and measure of Resistance, Inductance, Capacitance, Power, and Energy
CO4 : Student will be able to understand the function of cathode ray oscilloscope with block diagram.
CO5 : Internal and general repairing of instruments and problem solving capacity

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	1	-	-	-	-	-	-	1
CO2	3	2	2	2	1	-	-	-	-	-	-	1
CO3	2	2	2	2	2	-	-	-	-	-	-	1
CO4	3	2	2	3	2	-	-	-	-	-	-	1
CO5	3	2	2	2	1	-	-	-	-	-	-	1

COURSE NAME: MATERIAL HANDLING
COURSE CODE: CE 704 C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Student should have knowledge about the materials and the working principals of machines.

Course Outcome:

CO1: Ability to identify about the materials and the load characteristics.
CO2: Understanding the working principal of different types of conveyors, elevators
CO3: Understanding the working principal of Cranes, load handling instrument.
CO4: Understanding the principal and design of AGV, EOT

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	3	3	2	2	1	1	2	2	2	1	1	2
CO4	3	3	3	3	2	2	1	1	3	2	2	2
CO5	3	3	3	3	2	1	1	1	3	2	1	3

COURSE NAME: ENVIRONMENTAL ENGINEERING LAB
COURSE CODE: CE 791
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Basic course of environmental engineering with preliminary knowledge of chemistry. Knowledge of different impurities and different dissolved solids with chemical behavior of that element.

Course Outcome:

CO1: To enumerate various economic, financial, social and sustainable tools in infrastructure management.
CO2: Identify appropriate test for environmental problems
CO3: Statistically analyze and interpret laboratorial results
CO4: Apply the laboratorial results to problem identification, quantification, and basic environmental design and technical solutions.
CO5: Understand and use of water and wastewater sampling procedures and sample preservations.

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	1	-	-	2	-	-	-	-	-
CO2	1	1	3	1	-	-	-	-	-	-	-	-
CO3	1	2	3	1	-	-	-	-	-	-	-	-
CO4	3	3	1	-	-	-	-	-	-	-	-	-
CO5	1	2	3	-	-	-	-	-	-	-	-	-

COURSE NAME: MATERIALS TESTING LABORATORY
COURSE CODE: CE 792A
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Engineering Chemistry.

Course Outcome:

CO1: To understand the deformation behavior of materials
CO2: To observe the microstructure of a material sample under heat treatment.
CO3: To measure the mechanical properties of a material

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	-	-	-	-	-	2	1	2	-	1
CO2	1	2	-	-	-	-	-	2	2	2	-	2
CO3	1	3	-	-	-	2	1	2	2	2	-	2

COURSE NAME: ELECTRICAL AND ELECTRONIC MEASUREMENT LABORATORY
COURSE CODE: CE 792B
CONTACT: 0:0:3
CREDITS : 1.50

Pre requisites: Concepts of basic Electrical and Electronics.

Course Outcome:

CO1 : Understand the basics of Electrical and Electronicsmeasuring system and their classification

CO2 : Student will be able to measurement of voltage and current by the use of CT and PT for extending instruments ranges.

CO3 : Understand and measure of Resistance, Inductance, Capacitance, Power, and Energy

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	1							1
CO2	3	2	2	2	1							1
CO3	2	2	2	2	2							1

COURSE NAME: MATERIAL HANDLING LABORATORY
COURSE CODE: CE 792 C
CONTACT: 0:0:3
CREDITS : 1.5

Pre requisites: Student should have knowledge about the materials and the working principals of machines.

Course Outcome:

CO1: Ability to identify about the materials and the load characteristics.
CO2: Understanding the working principal of different types of conveyors, elevators
CO3: Understanding the working principal of Cranes, load handling instrument.
CO4: Understanding the principal and design of AGV, EOT

CO-PO mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	3	3	2	2	1	1	2	2	2	1	1	2
CO4	3	3	3	3	2	2	1	1	3	2	2	2
CO5	3	3	3	3	2	1	1	1	3	2	1	3

COURSE NAME: SOCIAL AWARENESS
COURSE CODE: MC 781
CONTACT: 0:0:3
CREDITS : 0.00

Pre requisites: Basic knowledge of Social science.

Course Outcome:

CO1: Ability to understand the knowledge and methodologies to better understand the public issues and to act effectively as a citizen.
CO2: Ability to employ the knowledge and methodologies to enhance the functional components in their profession.
CO3: Ability to employ the knowledge and methodologies to enhance their interpersonal interactions.
CO4: Ability to prepare project report and give presentation on the social issues.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	2	2	-	1	-	2
CO2	1	-	-	-	-	3	1	2	2	2	-	2
CO3	-	-	-	-	-	-	-	2	3	3	-	2
CO4	3	2	2	-	-	-	-	-	2	2	3	-

COURSE NAME: DYNAMICS OF SOIL & FOUNDATION
COURSE CODE: CE801A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites:
Knowledge of Basic Soil Mechanics / Fundamental Geotechnical Engineering.

Course Outcome:
CO1 : Understand the dynamic behaviour of foundations.
CO2 : Design foundations and isolation systems subjected to different kinds of vibrations.
CO3 : Determine dynamic properties of soils by using laboratory and non-destructive field tests.
CO4 : Design machine foundations.
CO5 : Assess the liquefaction potential of a given site.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	2	2	3	3	2	3	3
CO2	3	3	1	2	2	3	2	2	3	3	1	3	3
CO3	3	3	2	2	3	3	2	2	1	3	1	3	3
CO4	3	3	1	3	1	2	2	2	2	2	1	3	3
CO5	3	3	1	1	2	1	2	2	3	2	2	3	3

COURSE NAME: FINITE ELEMENT ANALYSIS
COURSE CODE: CE 801B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic knowledge of structural analysis for determinate and indeterminate structures, trusses and behavior of plates and preliminary knowledge of standard structural software and computer uses knowledge of matrices algebra.

Course Outcome:

CO1 : Obtain an understanding of the fundamental theory of the FEA method.
CO2 : Developed the ability to generate the governing FE equations for systems governed by partial differential equations.
CO3 : Understand the use of the basic finite elements for structural applications using truss, beam, frame, and plane elements.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	2	-	-	-	-	-	-	-	2
CO2	3	3	3	3	-	-	-	-	-	-	-	2
CO3	3	-	-	3	-	-	-	-	-	-	-	2

COURSE NAME: ADVANCED STRUCTURAL ANALYSIS
COURSE CODE: CE 801C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Studentshould have knowledge about the subjects Strength of Materials and Structural Analysis-I & II.

Course Outcome:

CO1 : Students will understand matrix method of analysis.
CO2 : Students will learn to evaluate wind loads on structures.
CO3 : Students will learn to analyse plates and shell structures.
CO4 : Students will be able to apply knowledge of elasticity in different coordinate systems.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	-	-	-	1
CO2	3	2	2	2	-	-	-	-	-	-	-	1
CO3	3	2	1	2	-	1	-	-	-	-	-	1
CO4	3	2	2	2	-	1	-	-	-	-	-	1

COURSE NAME: ADVANCED FOUNDATION ENGINEERING
COURSE CODE: CE 802A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites:

Basic knowledge of soil mechanics with emphasis on soil behavior, parameters, test procedure. Knowledge on foundation and bearing capacity and settlement analysis. Preliminary knowledge on vibration and dynamics of structures.

Course Outcome:

CO1 : Determine suitable soil parameters
CO2 : Design and analyze foundation systems using conventional methods
CO3 : Design a budget and proposal for a Geotechnical investigation
CO4 : Design appropriate foundation systems based on ground-investigation data and be able to select correct soil parameters for the designs
CO5 : Understand limitations and uncertainties in geotechnical design

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	-	-	-	-	2	-	2
CO2	3	3	2	3	-	-	-	-	-	1	-	2
CO3	3	3	3	3	3	-	-	-	-	2	-	2
CO4	3	3	3	3	3	2	-	-	-	2	-	2
CO5	3	3	3	2	-	-	-	-	-	-	-	2

COURSE NAME: ADVANCED TRANSPORTATION ENGINEERING
COURSE CODE: CE 802B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic knowledge of on transportation engineering with fundamentals of pavement design alignment survey and testing procedure of road material understanding basic methodology of transportation models and uses.

Course Objective: Students will gain knowledge on traffic Engineering and transportation planning. Familiarity with railway engineering location survey, Geometric design ,signaling and track maintenance. To acquire knowledge on Airport engineering- runways, taxiways, aprons, wind rose diagram, design and taxiway and terminal building.

Course Outcome:

CO1 : Learn about highway engineering and traffic engineering.
CO2 : Learnn about airport engineering
CO3 : Learn about Railway engineering.

Course contents:

Module-I: Traffic Engineering : Road user and vehicle characteristics; Traffic flow characteristics – Traffic Volume, Speed, Headway, Concentration and Delay; Traffic surveys & studies; Traffic estimation; Statistical applications in traffic engineering analysis; Parking; Road intersections – Basic traffic conflicts, classification of at-grade intersections, channelization, traffic signals, signs and marking; Road Safety	**8L**
Module-II: Transportation planning: Transportation planning at different levels; Transport Project planning – Planning studies and investigation; Elements of Urban Transportation Planning; Transport Demand Analysis; Preparation of Project Report	**10L**
Module-III: Railway Engineering : Location surveys & alignment, Permanent way components, Gauges, Geometric Design, Points & crossings, Stations & Yards, Signaling, Track Maintenance	**10L**
Module-IV: Airport Engineering : Functional areas of airports: Runways, Taxiways, , Aprons, Terminal buildings; Classification of Airports; Airport site selection; Design of Runway, Runway orientation, Wind Rose diagram; Design of Taxiway and Terminal Building	**8L**

COURSE NAME: PAVEMENT DESIGN
COURSE CODE: CE 802C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Concept of different types of pavement and its features based on IRC.

Course Outcome:

CO1: Understanding the pavement performance under different circumstances.
CO2: Concept of pavement design.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2

COURSE NAME: METRO SYSTEM AND ENGINEERING
COURSE CODE: CE 803A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic idea of transportation engineering

Course Outcome:

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

CO1 : To Integrate skills required for Urban Mass Mobility planning & formulation.
CO2 : Analyzing the issues & challenges in the Urban Transport and Mobility Sector
CO3 : To analyze the benchmarking process as applied in Urban Transport projects.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	2	-	-	-	-	-	-	1
CO3	3	2	3	-	-	2	-	-	-	-	2	-

COURSE NAME: AIR & NOISE POLLUTION & CONTROL
COURSE CODE: CE 803B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic knowledge of environment pollution and its causes with preliminary knowledge of chemistry knowledge on different impurities are pollutants of air.

Course Outcome*:*

CO1 : To learn about the air pollutants, sources and its effects.
CO2 : To have a clear understanding on the air quality standards and its techniques.
CO3 : To determine the fluid resistance for organic materials.
CO4 : To find the Properties of air pollution and its control measures.
CO5 : To learn about the effects and the sources of noise pollution.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	1	2	2	-	2	-	-	2
CO2	2	2	2	3	1	-	-	-	-	-	-	-
CO3	-	3	2	3	1	-	-	-	-	-	-	-
CO4	-	1	2	2	1	-	3	-	1	-	-	2
CO5	-	1	-	2	1	2	3	-	-	-	-	2

COURSE NAME: REMOTE SENSING AND GIS
COURSE CODE: CE 803C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Student should knowledge about remote sensing and GIS.

Course Outcome:

CO1 : Student will be able know the introduction of the remote sensing and Geodetics, Triangulation, Trilateration, Tachometry etc.
CO2 : Student will be able to know and apply the photogrammetric survey and analyze the problems.
CO3 : Student will be able to know and apply the satellite survey. Also analyze and evaluate the problems.
CO4 : Student will able to know about the astronomy and GPS system.
CO5 : Student will able to know about GIS concept.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	1	1	1	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	3	2	2	1	1	3	2	2	2
CO5	3	3	3	3	2	1	1	1	3	2	1	2

COURSE NAME: ESSENCE OF INDIAN KNOWLEDGE TRADITION
COURSE CODE: MC 801
CONTACT: 0:0:3
CREDITS : 0

Pre requisites: Have some knowledge of Indian societal culture

Course Outcome:

CO1: Identify the concept of Traditional knowledge and its importance.
CO2: Explain the connection between Modern Science and Indian Knowledge System.
CO3: Understand the importance of Yoga for health care.
CO4: Interpret the effect of traditional knowledge on environment.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	-	-	2	1	2	1
CO2	-	-	-	-	-	-	-	3	2	1	2	2
CO3	-	-	-	-	-	-	-	-	2	2	-	1
CO4	-	-	-	-	-	-	-	-	1	2	-	1

COURSE NAME: ESSENCE OF INDIAN KNOWLEDGE TRADITION
COURSE CODE: MC 801
CONTACT: 0:0:3
CREDITS : 0

Pre requisites: Have some knowledge of Indian societal culture

Course Outcome:

CO1: Identify the concept of Traditional knowledge and its importance.
CO2: Explain the connection between Modern Science and Indian Knowledge System.
CO3: Understand the importance of Yoga for health care.
CO4: Interpret the effect of traditional knowledge on environment.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	-	-	2	1	2	1
CO2	-	-	-	-	-	-	-	3	2	1	2	2
CO3	-	-	-	-	-	-	-	-	2	2	-	1
CO4	-	-	-	-	-	-	-	-	1	2	-	1

NARULA INSTITUTE OF TECHNOLOGY

UGC | NAAC | NBA | nirf NATIONAL INSTITUTIONAL RANKING FRAMEWORK | ATAL | MAKAUT (Formerly, WBUT) | AICTE | WBSCT&VE&SD (Formerly WBSCTE)

81, Nilgunj Rd, Agarpara, Kolkata, West Bengal 700109
www.nit.ac.in | 033 2563 8888