R-21

CURRICULUM ESSENTIALS

Handbook on Outcome Based Education

CIVIL ENGINEERING

NARULA INSTITUTE OF TECHNOLOGY

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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: CHEMISTRY
COURSE CODE: CH 101
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
CREDITS: 3
Pre requisites: A basic knowledge in 10+2 science with chemistry

Course Outcomes

After completion of this course students will be able to

CO1: Describe the fundamental properties of atoms & molecules, atomic structure and the periodicity of elements in the periodic table

CO2: Apply fundamental concepts of thermodynamics in different engineering applications.

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

CO4: Determine the structure of organic molecules using different spectroscopic techniques.

CO5: 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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	-	-	-	2	2	2	2
CO2	3	3	3	3	-	-	-	-	2	2	2	3
CO3	3	3	2	2	-	2	2	-	2	-	3	3
CO4	3	2	3	2	-	-	2	-	2	2	3	3
CO5	3	3	3	3	2	2	2	-	2	-	2	3
Avg.	3	2.6	2.6	2.4	2	2	2		2	2	2.4	2.8

COURSE NAME: MATHEMATICS-I
COURSE CODE: M 101
CONTACT: 4:0:0
TOTAL CONTACT HOURS: 48
CREDITS: 4

Prerequisite: The students to whom this course will be offered must have the concept of (10+2) standard matrix algebra, calculus and vector algebra.

Course Outcomes (COs):

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

CO1: Recall the properties and formula related to matrix algebra, differential calculus, multivariable calculus, vector calculus and infinite series.

CO2: Determine the solutions of the problems related to matrix algebra, differential calculus, multivariable calculus, vector calculus and infinite series.

CO3: Apply the appropriate mathematical tools of matrix algebra, differential calculus, multivariable calculus, vector calculus and infinite series for the solutions of the problems.

CO4: Analyze different engineering problems linked with matrix algebra, differential calculus, multivariable calculus, vector calculus.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	2
CO2	3	2	-	-	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	-	-	-	-	-	-	2
CO4	2	3	2	2	-	-	-	-	-	-	-	2
Avg.	2.75	2.25	2	2	-	-	-	-	-	-	-	2

COURSE NAME: BASIC ELECTRICAL ENGINEERING
COURSE CODE: EE101
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
CREDITS: 3

Pre-requisite: Basic 12th standard Physics and Mathematics, Concept of components of electric circuit.

Course Outcomes:

CO1: To understand and analyze basic electric circuits

CO2: To study the working principles of electrical machines.

CO3: To introduce the components of low voltage electrical installations

CO4: To study the fundamentals of electrical Power systems and Control Systems

CO-PO Mapping:

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

COURSE NAME: PROFESSIONAL COMMUNICATION
COURSE CODE: HSMC 101
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 28
CREDITS: 2

Pre-requisites: Basic (10+2) level of knowledge of English grammar, vocabulary reading and writing skills.

Course Outcomes:

CO1: Understand about and use the modalities and nuances of communication in a workplace context.

CO2: Understand about communicating across cultures and societies.

CO3: Know about and apply the basic formats, templates of business and official communication.

CO4: Know about and employ formal communication modes in meetings and reports.

CO5: Know about and use objective and culturally neutral language in interpersonal and business communication.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	2	-	-	3	-	2
CO2	2	3	2	-	-	2	2	2	-	3	-	3
CO3	2	3	-	-	-	3	3	3	-	3	-	3
CO4	-	-	-	-	-	3	3	3	-	3	-	3
CO5	-	-	-	-	-	-	3	3	-	3	-	3
Avg.	2	3	2	-	-	2.67	2.6	2.75	-	3	-	2.8

COURSE NAME: CHEMISTRY LAB
COURSE CODE: CH 191
CONTACT: 0:0:3
CREDITs: 1.5
Pre-requisite: A basic knowledge in 10+2 science with chemistry.
Course Outcome:

CO1: Able to operate different types of instruments for estimation of small quantities chemicals used in industries and scientific and technical fields.
CO2: Able to analyze and determine the composition of liquid and solid samples working as an individual and also as a team member.
CO3: Able to analyze 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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	-	2	3	-	-	-	-	2
CO2	2	2	2	2	-	2	-	-	-	2	-	2
CO3	-	-	-	-	-	-	-	-	3	3	2	2
CO4	2	2	2	2	-	-	2	-	-	-	-	2
CO5	3	3	3	3	2	2	2	2	-	-	2	2
Avg.	2.25	2.25	2.50	2.25	2	2	2.33	2	3	2.5	2	2

COURSE NAME: BASIC ELECTRICAL ENGINEERING LABORATORY

COURSE CODE: EE191

CONTACT: 0:0:3

CREDITS: 1.5

Prerequisite: Basic Physics and applied physics, Basic Mathematics, Basic concept of Electric Circuit.

Course Outcome:

After completion of this course students will be able to

CO1: Identify and use common electrical components.

CO2: To develop electrical networks by physical connection of various components and analyze the circuit behaviour.

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

CO-PO Mapping

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

COURSE NAME: ENGINEERING GRAPHICS & DESIGN LAB
COURSE CODE: ME192
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 different Engineering viewpoints.

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

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	2	2	2	-	2	2	2	2
CO2	2	2	3	2	2	2	2	2	2	2	2	2
CO3	2	2	3	2	3	2	2	-	2	2	2	3
CO4	2	2	3	3	3	3	2	2	3	3	2	2
Avg.	2	2	3	2.25	2.5	2.25	2	2	2.25	2.25	2	2.25

2nd Semester

COURSE NAME: PHYSICS –I
COURSE CODE: PH 201
CONTACT: 3:0:0
TOTAL CONTACT HOURS:36
CREDITS: 3
Pre requisites: Knowledge of Physics up to 12th standard.

Course Outcome:

At the end of the course students should be able to

CO1: Describe various types of oscillating systems, mechanical resonance and its electrical equivalence.
CO2: Explain basic principles of Laser, Optical fibers and Polarization of light.
CO3: Apply superposition principle to explain interference and diffraction, formation of Lissajous figures.
CO4: Analyze different crystallographic structures according to their co-ordination number and packing factors, effect of various level of damping to an oscillating system.
CO5: Justify the need of a quantum mechanics as remedy to overcome limitations imposed by classical physics and user to probability waves to represent microscopic systems.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	2
CO2	3	-	-	-	-	-	-	-	-	-	-	2
CO3	3	2	-	-	-	-	-	-	-	-	-	2
CO4	2	3	-	-	-	-	-	-	-	-	-	2
CO5	2	3	-	-	2	-	-	-	-	-	-	2
Avg.	2.6	2.6	-	-	2	-	-	-	-	-	-	2

COURSE NAME: MATHEMATICS-II
COURSE CODE: M 201
CONTACT: 4:0:0
TOTAL CONTACT HOURS: 48
CREDIT: 4

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

Course Outcomes (COs):

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

CO1: Recall the properties and formula related to ordinary differential equations, improper integral, Laplace transform and numerical techniques.
CO2: Determine the solutions of the problems related to ordinary differential equations, improper integral, Laplace transform and numerical techniques.
CO3: Apply appropriate mathematical tools of ordinary differential equations, improper integral, Laplace transform and numerical techniques for the solutions of the problems.
CO4: Analyze engineering problems by using differential equation, Laplace Transform and Numerical Methods.

CO-PO Mapping:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	2	-	-	-	-	-	-	-	-	-	2
CO2	3	2	-	-	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	-	-	-	-	-	-	2
CO4	2	3	2	2	-	-	-	-	-	-	-	2
Avg.	2.75	2.25	2	2	-	-	-	-	-	-	-	2

COURSE NAME: PROGRAMMING FOR PROBLEM SOLVING
COURSE CODE: CS 201
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
CREDITS: 3
Prerequisites: Number system, Boolean Algebra
Course Outcomes:

After completion of the course students will be able to

CO1: Understand the fundamental concept of Computer and mathematical knowledge and apply them in designing solution to engineering problem.
CO2: Understand the basic concept of C programming and use of data types/operators/input/output function for developing and implementing complete program leading to solution of mathematical and engineering problem.
CO3: Use conditional branching, iteration, recursion and formulate algorithms and programs in solving mathematical/ scientific/ engineering problem leading to lifelong learning.
CO4: Understand the concept of arrays, pointers, fileand dynamic memory allocation and apply it for problem solving and also create new data types using structure, union and enum.
CO5: Understand how to decompose a problem into functions and assemble into a complete program by means of modular programming possibly as a team.

CO–PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	-	-	-	-	-	-	-
CO2	2	2	3	2	-	-	-	-	-	-	-	-
CO3	2	3	2	2	-	-	-	-	-	-	-	3
CO4	3	2	2	2	3	-	-	-	-	-	-	-
CO5	2	2	2	2	-	-	-	-	3	2	-	-
Avg.	2.4	2.4	2.4	2.2	2.5	-	-	-	3	2	-	3

COURSE NAME: PHYSICS- I LAB
COURSE CODE: PH 291
CONTACT: 0:0:3
CREDITS: 1.5
Pre-requisite: Knowledge of Physics up to 12th standard.

Course Outcome

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

CO1: Demonstrate experiments allied to their theoretical concepts.
CO2: Conduct experiments using LASER, Optical fiber, Torsional pendulum, Spectrometer.
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 them in Laboratory reports including innovative experiments.
CO5: Design solutions for real life challenges.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	2
CO2	3	2	-	-	-	-	-	-	-	-	-	2
CO3	3	2	-	-	-	-	-	-	3	2	-	2
CO4	2	2	-	-	-	-	-	-	-	-	-	2
CO5	2	2	2	2	2	2	-	-	-	-	-	2
Avg.	2.6	2	2	2	2	2	-	-	3	2	-	2

COURSE NAME: PROFESSIONAL COMMUNICATION LAB
COURSE CODE: HSMC291
TOTAL CONTACT HOURS: 26
CREDIT: 1
Pre requisites: Basic knowledge of LSRW skills.
Course Outcome:

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 communication and interpersonal skills.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	2	-	-	3	-	2
CO2	2	3	2	-	-	2	2	2	-	3	-	3
CO3	2	3	-	-	-	3	3	3	-	3	-	3
CO4	-	-	-	-	-	3	3	3	-	3	-	3
CO5	-	-	-	-	-	-	3	3	-	3	-	3
Avg.	2	3	2	-	-	2.67	2.6	2.75	-	3	-	2.8

COURSE NAME: WORKSHOP/MANUFACTURING PRACTICES
COURSE CODE: ME291
CONTACT: 0:0:3
CREDITS: 1.5
Prerequisite: Higher Secondary with Mathematics, Physics and Chemistry.

Course Outcomes:

After completion of this course students will be able to

CO1: Identify and operate various hand tools related to variety of manufacturing operations

CO2: Safely fabricate simple components with their own hands.

CO3: Get practical knowledge of the dimensional accuracies and tolerances applicable for different manufacturing processes.

CO4: Produce small devices of their interest for project or research purpose.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	-	2	3	2	-	2	2	2	3
CO2	2	2	3	2	2	2	2	-	3	2	2	3
CO3	3	2	2	2	2	2	2	2	2	2	2	3
CO4	2	2	3	2	3	3	2	-	3	3	3	3
Avg.	2.25	2	2.5	2	2.25	2.5	2	2	2.5	1.8	1.8	3

COURSENAME: PROGRAMMING FOR PROBLEM SOLVING LAB
COURSE CODE: CS 291
CONTACT: 3:0:0
CREDITS: 1.5
Prerequisites: Number system, Boolean Algebra
Course Outcomes:

After completion of the course students will be able to

CO1: Understand and propose appropriate command or function in running system or developing program for engineering and mathematical problems depending on the platform used even in changed environment leading to their lifelong learning.

CO2: Identify and propose appropriate data type, arithmetic operators, input/output functions and also conditional statements in designing effective programs to solve complex engineering problem using modern tools.

CO3: Design and develop effective programs for engineering and mathematical problems using iterative statements as well as recursive functions using modular programming approach possibly as a team maintaining proper ethics of collaboration.

CO4: Explain and organize data in arrays, strings and structures and manipulate them through programs and also define pointers of different types and use them in defining self-referential structures and also to construct and use files for reading and writing to and from leading to solution of engineering and mathematical problem.

CO5: Prepare laboratory reports on interpretation of experimental results and analyze it for validating the same maintaining proper ethics of collaboration.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	-	-	-	-	-	-	3
CO2	3	3	3	3	3	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	3	3	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	3	-	-
Avg.	3	3	3	2.75	3	-	-	3	3	3	-	3

3rd SEMESTER

COURSE NAME: PHYSICSII
COURSE CODE:PH(CE)301
CONTACT: 3:0:0

TOTAL CONTACT HOURS:
36 HRS CREDITS : 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	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	1	2	2	-
CO2	3	2	-	-	-	-	-	-	-	-	-	2	2	2	-
CO3	2	3	-	-	-	-	-	-	-	-	-	1	2	2	-
CO4	1	2	2	3	-	-	-	-	-	-	-	1	2	2	-

Course Name: Numerical Methods
Course Code: M(CS) 301
Total Contact Hours: 36
Credit: 3

Prerequisite:

The students to whom this course will be offered must have the concept of (10+2) standard number system, algebra and calculus and basic knowledge of numerical analysis.

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

CO	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, the solution of linear and nonlinear equations, and the solution of ordinary and partial 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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	1	2	2	-
CO2	3	2	1	-	-	-	-	-	-	-	-	1	2	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	2	-
CO4	3	3	2	3	-	-	-	-	-	-	-	1	2	2	-

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URSE NAME: ENGINEERING GEOLOGY
COURSE CODE: M(CS)302

CONTACT: 3:0:0

TOTAL CONTACT HOURS: 36
HRS CREDITS : 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	PSO1	PSO2	PSO3
CO1	3	2	1	2	1	-	1	1	1	1	1	2	2	2	-
CO2	3	2	1	2	1	-	1	1	1	1	1	2	2	2	-
CO3	3	2	2	2	2	1	1	1	1	1	1	-	2	2	-
CO4	3	3	3	3	3	-	-	1	-	2	1	1	2	2	-
CO5	3	2	1	3	3	2	1	1	2	2	1	2	2	2	-

COURSE NAME:SURVEYING
COURSE CODE: CE301
CONTACT: 3:0:0

TOTAL CONTACT HOURS: 36
HRS CREDITS : 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 Trigonometricallyleveling.
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	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	1	1	1	3	3	3	3	3	3	3
CO2	3	3	3	2	2	2	1	2	3	2	3	2	2	3	2
CO3	1	1	1	-	-	-	-	-	1	1	1	1	1	1	1
CO4	3	3	3	3	2	2	2	1	3	2	2	2	2	2	2
CO5	3	3	3	3	2	1	1	1	3	2	1	2	2	2	2

COURSE NAME: STRNGTH OF MATERIALS
COURSE CODE: CE 302
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
HRS CREDITS : 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	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	1	-	2	2	3	2
CO2	3	3	3	2	1	-	-	-	-	1	-	3	2	3	2
CO3	2	3	3	3	1	1	-	-	1	1	1	2	2	3	2
CO4	3	2	3	3	1	-	2	-	-	-	-	1	2	3	2

COURSE NAME: GENDER, CULTURE AND DEVELOPMENT
COURSE CODE: HSMC 302
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 24
HRS CREDITS :2

Prerequisite:None

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

CO1: Provide an analysis of the location of women in the processes of economic development; to understand what economic development is, the scales or levels at which it occurs, and the centrality of gender at every level.
CO2: Examine theoretical and conceptual frameworks for that analysis.

CO3: Reflect upon linkages between the global economy and the gendered macro and micro process of development and transitions from 'government' to 'governance.'

CO4: Explain the usefulness of a rights based approach to gender justice.

CO5: Provide basis for research, practical action and policy formulation and or evaluating for evaluating directions and strategies for social change from a gender perspective.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	2	1	-	-	-	2	3	3	1	-	2
CO2	3	2	-	1	3	2	-	1	2	-	3	3	2	-	1
CO3	3	2	2	-	2	3	1	-	2	1	3	3	3	1	-
CO4	3	1	-	2	-	-	-	2	-	3	3	3	2	-	2
CO5	3	2	-	1	-	1	2	-	2	-	3	3	3	1	-

COURSE NAME: PHYSICS-II LAB
COURSE CODE: PH (CE) 391
CONTACT: 0:0:2

CREDITS : 1.00

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	PO 2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	-	-	-	-	-	1	**2**	**2**	-
CO2	2	1	-	3	-	-	-	-	-	-	-	-	**2**	**2**	-
CO3	-	-	2	-	-	-	-	-	-	-	-	1	**2**	**2**	-
CO4	-	-	-	-	-	-	-	-	3	-	-	-	**2**	**2**	-
CO5	-	-	-	-	-	-	-	-	-	1	-	-	**2**	**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	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	-	1	2	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	1	2	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	2	-
CO4	3	3	2	3	-	-	-	-	-	-	-	1	2	2	-

COURSE NAME: ENGINEERING GEOLOGY LAB

COURSE CODE: CE(CS) 392

CONTACT: 0:0:3

CREDITS : 1.5

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	PSO1	PSO2	PSO3
CO1	3	2	1	2	1	-	1	1	1	1	1	1	2	2	-
CO2	3	2	2	3	2	1	2	-	1	1	-	1	2	2	-
CO3	2	2	1	3	3	2	-	1	1	1	1	1	2	2	-
CO4	2	2	2	1	1	3	1	1	-	1	-	1	2	2	-

COURSE NAME: SURVEYING PRACTICE

COURSE CODE: CE 391

CONTACT: 0:0:3

CREDITS : 1.50

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

Course Outcome:

CO1	To interpret horizontalmeasurementwith the help of Chain & Compass Surveying in thefield.
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.
CO5	To apply knowledge about Theodolite & Curve.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	2	1	1	3	2	2	1	3	3	3
CO2	3	3	3	-	-	2	1	1	3	3	3	1	3	3	3
CO3	3	3	3	-	-	2	1	1	3	2	3	1	3	3	3
CO4	3	3	3	-	1	2	1	1	3	3	3	2	3	2	3
CO5	3	3	3	-	1	2	1	1	3	2	3	2	3	3	3

4th SEMESTER

COURSE NAME: MATHEMATICS- III COURSE

CODE: M 401

CONTACT: 3:0:0

TOTAL CONTACT HOURS: 36 HRS CREDITS

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:

CODES	DESCRIPTIONS
CO1	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 differentialequation.
CO2	Exemplify the variables, functions, probability distribution and differential 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 ordinary differential equation.
CO3	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.
CO4	Solve partial differential equation using method of separation of variables and ordinary differential equation using techniques of series solution and special function (Legendre's and Bessel's).
CO5	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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	-	-	-	-	-	-	-	-	1	2	2	-
CO2	3	2	1	-	-	-	-	-	-	-	-	1	2	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	2	-
CO5	3	3	2	3	-	-	-	-	-	-	-	1	2	2	-

COURSE NAME: STRUCTURAL ANALYSIS
COURSE CODE: CE 401
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS :3

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	PO 4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	2	-	1	2	1	2	3	3	2	**2**	**2**	**-**
CO2	3	3	3	3	1	2	1	1	2	1	2	2	**2**	**2**	**-**
CO3	3	3	3	2	2	2	1	2	3	3	2	2	**2**	**2**	**-**

COURSE NAME: CONCRETE TECHNOLOGY
COURSE CODE: CE 402
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS :3

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

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	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	2	-	-	-	1	3	**2**	**2**	**-**
CO2	3	3	3	2	3	1	2	-	-	1	1	2	**2**	**2**	**-**
CO3	3	1	2	1	3	-	-	1	-	1	-	1	**2**	**2**	**-**
CO4	3	-	2	-	3	2	2	-	-	-	-	2	**2**	**2**	**-**
CO5	3	3	-	2	2	2	3	-	1	1	-	2	**2**	**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 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	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	3	2	2	1	1	1	1	1	1	1	1	2	3	3	3
CO2	2	2	3	3	2	3	1	1	2	2	2	3	2	3	2
CO3	2	2	3	2	2	1	1	3	2	1	1	2	1	1	1
CO4	3	3	3	3	3	2	1	3	2	1	3	3	2	2	2
CO5	2	3	1	2	1	3	1	2	2	2	2	2	2	2	2
CO6	3	3	3	3	2	2	2	2	3	2	2	3	2	2	2

COURSE NAME: BUILDING MATERIAL AND CONSTRUCTION
COURSE CODE: CE404

CONTACT: 3:0:0

TOTAL CONTACT HOURS: 36
HRS CREDITS : 3

Pre requisites: No Pre Requisite required (NPR)

CourseOutcome:

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	PSO 1	PSO 2	PSO 3
CO1	3	2	-	-	-	1	-	-	-	-	-	-	2	2	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-	2	2	-
CO3	3	2	1	-	-	-	-	-	-	-	-	-	2	2	-
CO4	2	3	1	-	-	-	-	-	-	-	-	-	2	2	-

COURSE NAME: UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY
COURSE CODE: HU403

CONTACT: 3:0:0

TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Prerequisite: None

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

CO1:Developholisticperspectivebasedonself-explorationabout themselves(humanbeing),family,societyandnature/existence.
CO2: Cultivatetheharmonyinthehumanbeing,family,societyand nature/existenc.
CO3: Strengthenself-reflection.
CO4: Build commitmentandcouragetoact.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	2	1	-	-	-	2	3	3	1	-	2
CO2	3	2	-	1	3	2	-	1	2	-	3	3	2	-	1
CO3	3	2	2	-	2	3	1	-	2	1	3	3	3	1	-
CO4	3	1	-	2	-	-	-	2	-	3	3	3	2	-	2

COURSE NAME: OBJECT ORIENTED PROGRAMMING USING JAVA LAB

COURSE CODE: M(CS) 491

CONTACT: 0:0:3

CREDITS: 1.

Prerequisites:

1. Computer Fundamentals
2. Basic understanding of Computer Programming and related Programming Paradigms
3. Problem Solving Techniques with proper logic Implementation.

Course Outcome(s):

CO1: Create the procedure of communication between Objects, classes & methods.

CO2: Understand the elementary facts of Object Orientation with various characteristics as well as several aspects of Java.

CO3: Analyze distinct features of different string handling functions with various I/O operations.

CO4: Discuss simple Code Reusability notion w.r.t. Inheritance, Package and Interface.

CO5: Apply Exception handling, Multithreading and Applet (Web program in java) programming concept in Java.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	1	-	-	1	2	2	-
CO2	3	2	2	-	1	-	-	-	1	-	-	2	2	2	-
CO3	2	3	2	3	-	-	-	-	2	-	-	-	2	2	-
CO4	1	-	-	-	-	-	-	-	1	2	-	2	2	2	-
CO5	2	1	1	-	1	-	-	-	2	-	-	2	2	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.

Text / Reference Books:

Sl No	Title	Author
1	Principles of Building Drawing	Shah & Kale
2	Text Book of Building Construction	Sharma & Kaul
3	Building Construction	B C Punmia
4	Civil engineering drawing	M.Chakrabory

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	1	2	-	-	-	1	-	-	1	**2**	**2**	**-**
CO2	3	2	-	1	2	-	-	-	1	-	-	1	**2**	**2**	**-**
CO3	3	2	-	1	2	-	-	-	1	-	-	1	**2**	**2**	**-**
CO4	3	2	-	1	2	-	-	-	1	-	-	1	**2**	**2**	**-**

COURSE NAME: CIVIL ENGINEERING LAB-1
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-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	-	-	-	1	1	-	1	**2**	**2**	-
CO2	3	2	2	2	2	1	1	1	1	-	-	1	**2**	**2**	-
CO3	3	2	2	2	2	1	-	-	1	-	-	1	**2**	**2**	-
CO4	1	1	1	1	1	-	1	1	3	2	2	1	**2**	**2**	-

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

CO-PO mapping:

CO	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	1	2	3	3	2	1	-	1	3	2	2	3	2	3
CO2	3	3	2	2	3	2	1	1	-	2	3	1	3	3	3
CO3	3	2	1	2	1	3	1	2	-	2	1	2	2	2	3
CO4	2	3	2	3	1	1	2	1	2	1	2	3	2	2	2
CO5	2	3	3	2	2	1	1	1	2	1	2	2	2	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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	2	1	2	1	-	-	-	2	2	**2**	**2**	**-**
CO2	3	3	3	2	-	-	-	-	-	-	1	2	**2**	**2**	**-**
CO3	3	3	3	1	-	-	-	-	-	-	2	2	**2**	**2**	**-**
CO4	3	3	3	2	-	-	-	-	-	-	2	2	**2**	**2**	**-**
CO5	3	3	3	2	1	2	-	-	2	2	2	2	**2**	**2**	**-**

COURSE NAME: ENVIRONMENTAL SCIENCE

COURSE CODE: MC401

CONTACT: 0:0:3

Pre requisites: NIL

Course Outcome:

CO1-To understand the natural environment and its relationships with human activities.
CO2-To apply the fundamental knowledge of science and engineering to assess environmental and health risk.
CO3-To develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations.
CO4-Acquire skills for scientific problem-solving related to air, water, noise & land pollution.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	-	-	2	3	3	-	-	1	2	2	2	-
CO2	3	3	3	1	1	2	3	3	-	-	1	2	2	2	-
CO3	3	3	3	2	1	2	3	3	-	-	1	2	2	2	-
CO4	1	1	1	1	2	2	3	3	-	-	1	2	2	2	-

COURSE NAME: ECONOMICS FOR ENGINEERS
COURSE CODE: HSMC 504
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 24 HRS
CREDITS : 2

Pre requisites:NIL

Course Outcome:

CO1 :To learn the identification of various uses for scares resources.
CO2 :To understand key economic concepts and implement them in real life problems.
CO3 :To design sustainable and effective economic models in real life projects.
CO4 :To apply critical thinking skills in analysing financial data and their impacts.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	-	2	3	3	-	2	3	2	2	2	2	2	-
CO2	2	2	3	2	3	-	-	-	-	-	3	2	2	2	2	-
CO3	2	-	3	2	-	3	-	-	2	-	-	-	2	2	2	-
CO4	-	2	2	3	2	3	-		-	-	3	2	-	2	2	-

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

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

1.

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 : : Design the structural details of foundation
CO5 : Interpret and use the I.S Code specifications

CO-PO mapping

CO	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	3	3	3	3	2	1	1	2	1	3	**1**	**1**	**3**
CO2	2	2	2	2	1	3	2	2	2	2	2	2	**2**	**2**	**2**
CO3	2	2	1	2	3	2	1	3	2	2	2	3	**2**	**2**	**3**
CO4	2	1	2	2	2	2	3	2	2	2	1	2	**2**	**3**	**2**
CO5	2	2	2	3	2	2	2	1	1	2	2	2	**2**	**2**	**3**

COURSE NAME: TRANSPORTATION ENGINEERING-I
COURSE CODE: CE 503
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
CO4:Understanding of Loading Pattern of Bridge
CO5:Knowledge about IRC Guidelines

CO-PO Mapping

CO	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	2	3	1	1	1	3	3	3	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2	3	2	3
CO3	3	1	2	1	2	3	2	2	1	3	3	3	3	3	3
CO4	3	2	2	1	2	3	2	3	2	3	3	3	2	3	2
CO5	3	2	2	3	3	3	3	3	3	2	3	3	3	3	3

COURSE NAME: HYDRAULICS
COURSE CODE: PEC 501A
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 pumpselection.

CO-PO mapping

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	-	-	2	2	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-	2	2	-
CO3	3	2	1	-	1	-	-	-	-	-	-	-	2	2	-
CO4	2	3	1	-	1	-	-	-	-	-	-	-	2	2	-

COURSE NAME: WATER SUPPLY AND PLUMBING
COURSE CODE: PEC 501B
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 reuseofwater.
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	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO 1	3	2	1	-	1	1	-	-	-	-	-	-	2	2	-
CO 2	2	3	2	-	1	1	-	-	-	-	-	-	2	2	-
CO 3	3	2	2	-	1	-	-	-	-	-	-	-	2	2	-
CO 4	3	2	2	-	1	-	-	-	-	-	-	-	2	2	-

OURSE NAME: WASTE WATER AND TREATMENT
COURSE CODE: PEC 501C
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	PSO1	PSO2	PSO3
CO1	2	1	-	-				1		1		1	2	2	-
CO2	2	1	2	2		2			1	1	2		2	2	-
CO3	1	1	1	1	2	1	1	2		2		2	2	2	-
CO4	-	2	1	-	2		2		2		1	1	2	2	-

COURSE NAME: SOIL MECHANICS LAB-II
COURSE CODE: CE 591
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 determine shear strength of soil
CO3: Ability to understand standard penetration test
CO4: Ability to understand consolidation parameters of soil
CO5: Ability to perform all the test for determing shear strength of soil

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	2	1	2	2	2	1	2	3	3	2	3
CO2	3	3	2	2	2	1	2	2	2	2	2	3	3	2	3
CO3	2	2	1	1	2	2	2	3	2	2	2	3	2	2	3
CO4	3	3	3	2	3	2	3	2	2	2	3	3	2	2	3
CO5	3	3	2	2	2	2	3	2	2	2	3	3	2	2	3

COURSE NAME: CIVIL ENGINEERING LAB-II
COURSE CODE: CE 592
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	PSO1	PSO2	PSO3
CO1	3	1	1	3	3	-	1	1	2	3	-	1	**2**	**2**	**-**
CO2	3	2	3	2	2	1	1	-	2	1	2	2	**2**	**2**	**-**
CO3	3	2	2	2	3	2	2	2	1	-	2	1	**2**	**2**	**-**

COURSE NAME: TRANSPORTATION & HIGHWAY ENGINEERING LAB
COURSE CODE: CE 593
CONTACT: 0:0:3
CREDITS : 1.50

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

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	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	2	2	1	-	1	1	3	3	2	2
CO2	3	3	3	3	2	2	2	1	1	2	1	3	3	3	2
CO3	3	3	3	3	3	2	2	2	1	3	2	3	2	3	3
CO4	-	3	3	3	2	2	2	3	3	3	3	3	1	3	3

COURSE NAME: HYDRAULICS LAB
COURSE CODE: PCE 591A
CONTACT: 0:0:3
CREDITS : 1.50

PRE-REQUISITES:

Knowledge of Hydraulics

COURSE OUTCOMES:

Student will be able to :

CO-1- Know principles of Flow measurement

CO-2- Able to critically observe / examine and measure the discharge through flow measuring devices

CO-3-Understand the working principles of pumps

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	-	-	2	2	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-	2	2	-
CO3	3	2	1	-	1	-	-	-	-	-	-	-	2	2	-

COURSE NAME: WATER SUPPLY AND PLUMBING LAB

COURSE CODE: PCE 591B
CONTACT: 0:0:3
CREDITS : 1.50

PRE-REQUISITES:

Knowledge water supply system and Plumbing fixtures

COURSE OUTCOMES:

After completing the course student will be able to :

CO-1 Understand the working principles of piping
CO-2 Know how to execute plumbing work
CO-3 Handle complex water supply problems.
CO-4 Understand working principles of pumps.

LIST OF GRADED PRACTICAL EXERCISES

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	1	-	-	-	-	-	-	2	2	-
CO2	2	3	2	-	1	1	-	-	-	-	-	-	2	2	-
CO3	3	2	2	-	1	-	-	-	-	-	-	-	2	2	-
CO4	3	2	2	-	1	-	-	-	-	-	-	-	2	2	-

COURSE NAME: WASTE WATER LAB
COURSE CODE: PCE 591C
CONTACT: 0:0:3
CREDITS : 1.50

PRE-REQUISITES:

The detail syllabus for waste water analysis laboratory is as follows."

COURSE OUTCOME:

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

CO1- Quantify the pollutant concentration in water and wastewater

CO2-Suggest the type of treatment required and amount of dosage required for the treatment

CO3- Examine the conditions for the growth of micro-organisms

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-				1		1		1	2	2	-
CO2	2	1	2	2		2			1	1	2		2	2	-
CO3	1	1	1	1	2	1	1	2		2		2	2	2	-

COURSE NAME: INTELLECTUAL PROPERTY RIGHT

COURSE CODE: MC 501

CONTACTS: 0:0:3

TOTAL CONTACT HOURS: 24

Prerequisite: None

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

CO1: Explain fundamental aspects of Intellectual property Rights to students
CO2: To disseminate knowledge on patents, patent regime in India and abroad and registration aspects
CO3: To disseminate knowledge on copyrights and its related rights and registration aspects
CO4: To disseminate knowledge on trademarks and registration aspects
CO5: To disseminate knowledge on Design, Geographical Indication (GI), Plant Variety and Layout Design Protection and their registration aspects
CO6: To aware about current trends in IPR and Govt. steps in fostering IPR

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1	2	3			2		2	3	3	1	2	3
CO2	3	1		1			1		1		3	3		1	
CO3	3		1	2	3			2		2	3	3	1	2	3
CO4	3	1		1			1		1		3	3		1	
CO5	3		2		2	3				2	3	3	2		2
CO6	3	2		1				2	2		3	3		1	

6th Semester

COURSE NAME: PRICIPLES OF MANAGEMENT
COURSE CODE: HU 605
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 24 HRS

CREDITS : 2

Course Outcomes:

At the end of this course student will demonstrate the ability to:

CO-1: To identify the resources needed for each stage, project development including involved stakeholders, tools and supplementary material
CO-2: To understand internal stakeholders with information regarding project costs by considering factors such as estimated cost, variances and profits
CO-3: To understand the time needed to successfully complete a project, considering factors such as task dependencies and task lengths
CO-4: To distinguish among the various tools for improving quality and how each should be used.
CO-5: To implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	3	3	3	2	3	2	2	2	2	-
CO2	2	3	-	2	-	-	2	-	3	-	3	-	2	2	-
CO3	2	-	3	2	-	3	-	-	2	-	3	-	2	2	-
CO4	-	2	-	3	2	3	-	2	-	-	-	-	2	2	-
CO5	2	-	-	-	3	2	-	-	2	-	3	-	2	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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	2	1	1	2	1	2	**1**	**1**	**2**
CO2	2	2	3	3	1	3	2	2	2	2	2	2	**2**	**2**	**3**
CO3	2	2	1	3	3	3	1	2	2	2	2	2	**2**	**2**	**3**
CO4	2	1	2	3	2	2	2	2	2	2	1	2	**2**	**2**	**3**
CO5	2	2	2	3	2	2	2	1	1	2	2	2	**2**	**2**	**3**

COURSE NAME: CONSTRUCTION PLANNING AND MANAGEMENT
COURSE CODE: CE 602
CONTACT: 3:0:0
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 andvaluation.

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	2	2	2	2	2	2	-	-	-	-	-	-	2	2	-
CO 2	2	2	2	2	1	2	2	-	2	2	2	-	2	2	-
CO 3	2	2	1	2	3	2	2	-	2	1	1	-	2	2	-
CO 4	-	-	1	1	1	-	-	-	2	1	3	-	2	2	-

COURSE NAME: BRIDGE ENGINEERING
COURSE CODE: PEC 601A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS :3

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	2	-	2	2	1	-	3	3	2	2	2	-
CO2	3	3	3	3	-	2	-	-	-	2	2	2	2	2	-
CO3	3	3	3	2	-	-	-	-	-	2	2	2	2	2	-
CO4	3	3	3	2	-	2	-	3	-	-	2	2	2	2	-
CO5	3	3	3	2	-	-	-	-	-	1	2	2	2	2	-

OURSE NAME: PRESTRESSED CONCRETE
COURSE CODE: PEC 601B
CONTACT: 3:1:0
TOTAL CONTACT HOURS: 36HRS
CREDITS :3

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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	2	2	-	-	-	1	-	-	-	-	-	2	2	-
CO 2	3	2	1	2	-	-	1	-	-	-	-	-	2	2	-
CO 3	-	2	1	-	1	3	1	-	-	-	-	-	2	2	-
CO 4	2	2	3	2	2	-	1	-	-	-	-	-	2	2	-
CO 5	2	2	1	2	2	-	1	-	-	-	-	-	2	2	-

COURSE NAME: STRUCTURAL DYNAMICS & EARTHQUAKE ENGINEERING
COURSE CODE: PEC 601C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS :3

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:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	2	2	3	3	1	2	3	3	3	3	2	2	3
CO2	3	3	3	2	2	2	3	1	3	2	3	2	2	3	3
CO3	2	2	3	2	1	2	3	3	2	3	2	2	3	2	2
CO4	3	3	2	3	2	2	1	2	3	2	2	2	3	3	3
CO5	3	3	3	3	3	1	1	1	3	3	2	3	2	2	3

COURSE NAME: INFRASTRUCTURE PLANNING & DESIGN
COURSE CODE: PEC602A
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	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	3	-	3	2	2	3	2	2	2	-
CO2	1	2	-	-	2	1	2	1	2		1	2	2	2	-
CO3	3	-	3	-	-	-	-	-	-	2	3	2	2	2	-
CO4	2	-	2	2	3	2	3	2	3	2	1	2	2	2	-

OURSE NAME: PUBLIC TRANSPORT SYSTEM
COURSE CODE: PEC602B
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	PSO1	PSO2	PSO3
CO1	2	2	2	3	3	-	-	-	-	-	-	2	2	2	-
CO2	3	2	2	2	1	-	-	-	-	-	-	2	2	2	-
CO3	2	2	2	2	2	-	-	-	-	-	-	1	2	2	-
CO4	3	2	2	3	2	-	-	-	-	-	-	3	2	2	-

COURSE NAME: TRANSPORTATION ENGINEERING-II COURSE CODE: PEC602C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS

CREDITS : 3

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

Course Outcome:

CO1	Students will receive the introduction and history of highway engineering and economics also which will remain correct for long period of time.
CO2	Students will calculate and design the different component of the highway such as sight distances, horizontal curves, superelevation, extra widening, transition curves and gradient, vertical curves etc.
CO3	Students will learn about the design criteria of pavements by IRC guideline.
CO4	Students will get the knowledge about the traffic engineering and components of traffic.
CO5	Students will examine and test materials of highway such as Soil, Stone Aggregate, Bitumen, Marshal Stability Test etc. Also get knowledge about construction of highway.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	1	2	2	3	3	3	3	2	2	-
CO2	3	3	3	2	2	2	2	2	3	2	3	2	2	2	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-
CO4	3	3	3	3	2	2	2	2	3	2	2	2	2	2	-
CO5	3	3	3	3	2	3	2	2	3	2	1	2	2	2	-

COURSE NAME: OPERATIONS RESEARCH
COURSE CODE: OEC 601A
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

1)

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:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	-	-	-	-	-	3	2	-	3	-	-	3	2	2	-
CO 2	-	-	-	-	-	1	-	1	-	3	-	1	2	2	-
CO 3	-	-	-	-	-	2	-	-	-	-	-	1	2	2	-
CO 4	-	-	-	-	-	3	2	-	3	3	-	2	2	2	-

COURSE NAME: HUMAN RESOURCE MANAGEMENT
COURSE CODE: OEC 601B
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites: Basic concepts of Management and Planning

Course Outcome:

CO1 :To understand principles, processes and practices of human resource management.

CO2: To identify problems or barriers which complicate and distort the effectiveness of human resource planning.

CO3 :To understand various provisions contained in labour legislation relating to Industrial relations.
CO4 :Apply HR concepts and techniques in strategic planning to improve organizational performance.

CO-PO mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	2	-	-	2	-	-	-	-	3	2	-	3	2	2	-
CO 2	-	2	-	3	-	2	-	2	-	3	-	2	2	2	-
CO 3	-	2	-	3	-	-	-	-	-	3	2	2	2	2	-
CO 4	2	-	-	-	-	3	2	-	-	2	3	-	2	2	-

COURSE NAME: STUDIES ON SIX SIGMA
COURSE CODE: OEC 601C
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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	1	-	1	-	-	-	-	-	-	-	1	2	2	-
CO 2	2	1	1	1	1	-	-	-	-	-	-	1	2	2	-
CO 3	3	3	3	2	2	-	-	-	-	-	-	1	2	2	-
CO 4	3	3	3	3	3	-	-	-	2	2	2	1	2	2	-

COURSE NAME: STRUCTURAL DESIGN AND DETAILING
COURSE CODE: CE 691
CONTACT: 0:0:3
CREDITS : 1.50

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	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	2	2	2	1	1	2	1	1	1	2	2	2	2
CO2	3	2	2	2	2	2	2	2	2	2	2	1	2	3	3
CO3	3	2	2	2	2	1	1	1	2	1	2	2	3	2	3
CO4	3	1	1	1	1	2	1	1	3	2	2	2	3	2	3
CO5	3	3	3	1	1	1	2	2	2	2	2	2	3	2	2

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COURSE NAME: COMPUTER AIDED DESIGN
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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	1	3	1	1	1	3	3	1	3	3	3	3
CO 2	3	3	3	1	2	2	1	-	2	2	2	3	3	3	3
CO 3	3	3	3	1	3	2	2	-	3	3	2	3	3	3	3
CO 4	2	2	2	1	2	2	1	2	3	2	2	3	3	3	3
CO 5	3	3	2	2	3	1	2	1	3	3	2	3	3	3	3

COURSE NAME: STRUCTURAL LAB
COURSE CODE: PEC 691
CONTACT: 0:0:3
CREDITS : 1.00

PRE REQUISITES

Student should knowledge about structural analysis.

COURSEOBJECTIVE:

Prepare students to understand and take up various test procedures and behaviours under different loading conditions for different members.

COURSE OUTCOME:

After going through this course, the students will be able to:

CO1- Demonstrate the method and findings of tension and compression tests

CO2- Understand the deflection behavior of members under bending.

CO3- Explain the method of bending tests on mild steel beam and concrete beam.

CO4- Demonstrate the method and findings of deflection of Plates under various load application points.

CO-PO mapping

CO	PO1	PO2	PO3	PO 4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	2	-	1	2	1	2	3	3	2	2	2	-
CO2	3	3	3	3	1	2	1	1	2	1	2	2	2	2	-
CO3	3	3	3	2	2	2	1	2	3	3	2	2	2	2	-
CO4	3	3	3	2	2	2	1	2	3	3	2	2	2	2	-

COURSE NAME: CONSTITUTION OF INDIA
COURSE CODE: MC 601
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	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	2	3	-	-	-	2	2	2	-
CO2	-	-	-	-	-	3	2	3	-	-	-	2	2	2	-
CO3	-	-	-	-	-	3	2	3	-	1	-	2	2	2	-
CO4	-	-	-	-	-	3	2	3	-	1	-	2	2	2	-
CO5	-	-	-	-	-	3	2	3	-	1	-	2	2	2	-

COURSE NAME: WATER RESOURCE ENGINEERING
COURSE CODE: PEC701A
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Prerequisite: Introduction to Fluid Mechanics in Civil Engineering.

Course Outcome: CO1. The Student should Understand the fundamentals of flow in open channels.
CO2.TheStudentswilllearntheconceptsofirrigation.
CO3. The student should understand estimating the different water requirement of different types of crops
CO4. The student should learn the design of irrigation channels soil conservation, flood control and other watermanagementprojects.
CO5. The Student should understand about groundwater resources, aquifers and wells.

Course Objectives: Students will gain knowledge on the hydrologic cycle, rainfall Calculation and measurement and frequency analysis of rainfall intensity curve. students will also be familiar with direct and indirect method of stream flow measurement to acquire the basic engineering technique of calculating hydrograph S curve flood routing. students will gain knowledge on irrigation methods duty, delta and crop seasons. To acquire knowledge on Canal irrigation and design of Alluvial channel by silt theories kennedy's method, lacey's theory. Familiarity with water logging and Drainage with basic knowledge on groundwater flow, Darcy's law, well , tube well.

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	-	-	2	3	-	1	2	-	1	2	2	-
CO2	2	-	1	2	1	1	-	2	2	-	2	2	2	2	-
CO3	-	1	1	2	3	2	1	-	2	1	-	-	2	2	-
CO4	1	2	-	1	1	3	1	2	1	-	1	2	2	2	-
CO5	-	1	1	-	1	-	-	-	-	2	1	1	2	2	-

COURSE NAME: HYDROLOGY AND IRRIGATION ENGINEERING
COURSE CODE: PEC701B
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.
CO4: The Student will learn Canal Irrigation, canal Lining and effect and prevention of water logging.

CO-PO mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	2	3	-	2	2	-	-	2	1	3	1	2	**2**	**2**	-
CO 2	1	2	1	-	3	-	3	2	2	1	2	-	**2**	**2**	-
CO 3	1	-	2	3	-	3	1	1	1	2	3	3	**2**	**2**	-
CO 4	-	1	3	1	1	2	2	1	1	1	1	2	**2**	**2**	-

COURSE NAME: HYDRAULIC STRUCTURE
COURSE CODE: PEC701C
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	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	2	3	-	-	-	-	-	-	-	-	-	2	2	-
CO 2	2	2	3	-	-	-	-	-	-	-	-	-	2	2	-
CO 3	2	1	2	1	-	-	-	-	-	-	-	1	2	2	-
CO 4	2	2	3	1	-	-	-	-	-	-	-	2	2	2	-
CO 5	1	2	3	-	-	-	-	-	-	-	-	-	2	2	-

COURSE NAME: WATER AND WASTEWATER ENGINEERING
COURSE CODE: PEC702A
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 of treatment
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

CO	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	2	3	2	-	-	2	1	3	1	-	-	2	2	-
CO2	2	1	1	-	3	2	-	2	-	2	3	2	2	2	-
CO3	-	1	-	-	2	1	1	-	1	1	1	2	2	2	-
CO4	2	1	-	3	1	2	2	2	-	-	1	1	2	2	-

COURSE NAME: ENVIRONMENTAL ENGINEERING
COURSE CODE:PEC702B
CONTACT: 3:0:0
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 Quantityestimation.

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 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	2	3	1	1	3	3	3	1	1	1	2	1	2	3
CO2	2	2	3	2	1	3	3	2	1	1	1	2	1	2	3
CO3	3	3	3	3	2	2	3	2	3	3	3	2	3	3	3
CO4	3	3	3	3	3	2	3	2	3	2	3	2	3	3	2
CO5	3	3	3	3	3	1	3	2	2	3	3	1	3	3	3
CO6	3	3	3	2	3	3	2	1	2	3	3	1	3	3	2

COURSE NAME: WATER POLLUTION AND ITS CONTROL
COURSE CODE: PEC702C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites:

. This course is intended for undergraduates and first year graduate students. It is a science- based course that the students to be comfortable with mathematical calculations, physics and chemistry. Students who do not feel comfortable with these prerequisites will need to do outside self-study to progress satisfactorily through the course.

Course Outcome:

CO1 :Identify sources, types and quantities of pollutants and determine their impact on the environment
CO2. Analyse pollutant transport issues in the environment and Development of transport equations
CO3. Describe the operational principles of pollution measurement devices and discover their respective application
CO4. Analyse and select appropriate treatment process for specific effluents emerging from industries
CO5. Analyse and select and design various pollution control devices

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	1	1	2	-	-	3	-	1	1	2	2	2	-
CO 2	2	-	-	2	1	2	3	1	1	2	2	1	2	2	-
CO 3	-	2	1	1	2	2	1	1	2	-	-	-	2	2	-
CO 4	1	1	2	-	-		-	-		1	2	1	2	2	-
CO 5	-	-	1	2	1	1	1	-	2	-	1	2	2	2	-

COURSE NAME: ENGINEERING MATERIALS
COURSE CODE: OEC 701A
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	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO 1	3	3	3	2	3	1	1	1	3	3	3	3	2	2	-
CO 2	3	3	3	2	2	2	1	1	3	2	3	2	2	2	-
CO 3	1	1	1	1	3	2	3	2	3	3	2	1	2	2	-

COURSE NAME: HYDROLOGY AND IRRIGATION ENGINEERING
COURSE CODE: PEC701B
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.
CO4: The Student will learn Canal Irrigation, canal Lining and effect and prevention of water logging.

CO-PO mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	2	3	-	2	2	-	-	2	1	3	1	2	**2**	**2**	-
CO 2	1	2	1	-	3	-	3	2	2	1	2	-	**2**	**2**	-
CO 3	1	-	2	3	-	3	1	1	1	2	3	3	**2**	**2**	-
CO 4	-	1	3	1	1	2	2	1	1	1	1	2	**2**	**2**	-

COURSE NAME: HYDRAULIC STRUCTURE
COURSE CODE: PEC701C
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	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	2	3	-	-	-	-	-	-	-	-	-	2	2	-
CO 2	2	2	3	-	-	-	-	-	-	-	-	-	2	2	-
CO 3	2	1	2	1	-	-	-	-	-	-	-	1	2	2	-
CO 4	2	2	3	1	-	-	-	-	-	-	-	2	2	2	-
CO 5	1	2	3	-	-	-	-	-	-	-	-	-	2	2	-

COURSE NAME: WATER AND WASTEWATER ENGINEERING
COURSE CODE: PEC702A
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 of treatment
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

CO	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	2	3	2	-	-	2	1	3	1	-	-	2	2	-
CO2	2	1	1	-	3	2	-	2	-	2	3	2	2	2	-
CO3	-	1	-	-	2	1	1	-	1	1	1	2	2	2	-
CO4	2	1	-	3	1	2	2	2	-	-	1	1	2	2	-

COURSE NAME: ENVIRONMENTAL ENGINEERING
COURSE CODE:PEC702B
CONTACT: 3:0:0
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 Quantityestimation.

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 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	2	3	1	1	3	3	3	1	1	1	2	1	2	3
CO2	2	2	3	2	1	3	3	2	1	1	1	2	1	2	3
CO3	3	3	3	3	2	2	3	2	3	3	3	2	3	3	3
CO4	3	3	3	3	3	2	3	2	3	2	3	2	3	3	2
CO5	3	3	3	3	3	1	3	2	2	3	3	1	3	3	3
CO6	3	3	3	2	3	3	2	1	2	3	3	1	3	3	2

COURSE NAME: WATER POLLUTION AND ITS CONTROL
COURSE CODE: PEC702C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites:

. This course is intended for undergraduates and first year graduate students. It is a science- based course that the students to be comfortable with mathematical calculations, physics and chemistry. Students who do not feel comfortable with these prerequisites will need to do outside self-study to progress satisfactorily through the course.

Course Outcome:

CO1 :Identify sources, types and quantities of pollutants and determine their impact on the environment
CO2. Analyse pollutant transport issues in the environment and Development of transport equations
CO3. Describe the operational principles of pollution measurement devices and discover their respective application
CO4. Analyse and select appropriate treatment process for specific effluents emerging from industries
CO5. Analyse and select and design various pollution control devices

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	1	1	2	-	-	3	-	1	1	2	2	2	-
CO 2	2	-	-	2	1	2	3	1	1	2	2	1	2	2	-
CO 3	-	2	1	1	2	2	1	1	2	-	-	-	2	2	-
CO 4	1	1	2	-	-		-	-		1	2	1	2	2	-
CO 5	-	-	1	2	1	1	1	-	2	-	1	2	2	2	-

COURSE NAME: ENGINEERING MATERIALS
COURSE CODE: OEC 701A
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	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO 1	3	3	3	2	3	1	1	1	3	3	3	3	2	2	-
CO 2	3	3	3	2	2	2	1	1	3	2	3	2	2	2	-
CO 3	1	1	1	1	3	2	3	2	3	3	2	1	2	2	-

COURSE NAME: ELECTRICAL & ELECTRONICS MEASUREMENT
COURSE CODE: OEC 701B
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 blockdiagram.
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	PSO1	PSO2	PSO3
CO1	2	2	2	3	1	-	-	-	-	-	-	1	2	2	-
CO2	3	2	2	2	1	-	-	-	-	-	-	1	2	2	-
CO3	2	2	2	2	2	-	-	-	-	-	-	1	2	2	-
CO4	3	2	2	3	2	-	-	-	-	-	-	1	2	2	-
CO5	3	2	2	2	1	-	-	-	-	-	-	1	2	2	-

COURSE NAME: WATER POLLUTION AND ITS CONTROL
COURSE CODE: PEC702C
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36 HRS
CREDITS : 3

Pre requisites:

. This course is intended for undergraduates and first year graduate students. It is a science- based course that the students to be comfortable with mathematical calculations, physics and chemistry. Students who do not feel comfortable with these prerequisites will need to do outside self-study to progress satisfactorily through the course.

Course Outcome:

CO1 :Identify sources, types and quantities of pollutants and determine their impact on the environment
CO2. Analyse pollutant transport issues in the environment and Development of transport equations
CO3. Describe the operational principles of pollution measurement devices and discover their respective application
CO4. Analyse and select appropriate treatment process for specific effluents emerging from industries
CO5. Analyse and select and design various pollution control devices

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	1	1	2	-	-	3	-	1	1	2	2	2	-
CO 2	2	-	-	2	1	2	3	1	1	2	2	1	2	2	-
CO 3	-	2	1	1	2	2	1	1	2	-	-	-	2	2	-
CO 4	1	1	2	-	-		-	-		1	2	1	2	2	-
CO 5	-	-	1	2	1	1	1	-	2	-	1	2	2	2	-

COURSE NAME: ENGINEERING MATERIALS
COURSE CODE: OEC 701A
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	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO 1	3	3	3	2	3	1	1	1	3	3	3	3	2	2	-
CO 2	3	3	3	2	2	2	1	1	3	2	3	2	2	2	-
CO 3	1	1	1	1	3	2	3	2	3	3	2	1	2	2	-

COURSE NAME: ELECTRICAL & ELECTRONICS MEASUREMENT
COURSE CODE: OEC 701B
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 blockdiagram.
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	PSO1	PSO2	PSO3
CO1	2	2	2	3	1	-	-	-	-	-	-	1	2	2	-
CO2	3	2	2	2	1	-	-	-	-	-	-	1	2	2	-
CO3	2	2	2	2	2	-	-	-	-	-	-	1	2	2	-
CO4	3	2	2	3	2	-	-	-	-	-	-	1	2	2	-
CO5	3	2	2	2	1	-	-	-	-	-	-	1	2	2	-

COURSE NAME: MATERIAL HANDLING
COURSE CODE: OEC 701C
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	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	2	-	-	-	-	2	-	2	2	-
CO2	2	3	-	2	2	-	-	-	-	-	-	2	2	2	-
CO3		2	3	-	-	2	-	-	-	-	2	-	2	2	-
CO4	2	1	3	-	-	3	-	-	-	-	-	2	2	2	-

COURSE NAME: INTRODUCTION TO INTERNET OF THINGS
COURSE CODE: OEC 702B
CONTACT:3:0:0
TOTAL CONTACT HOURS: 36 HRS

CREDITS : 3

Prerequisite:

1. Fundamental knowledge in computer networking.

2. Basic knowledge of Microcontroller fundamentals.

Course Objective(s):

Students will understand the concepts of Internet of Things and can able to build IoT applications.

Course Outcome(s):

On completion of the course students will be able:

CO1 Understand and differentiate the concepts of Internet of Things and Internet

CO2 Identify appropriate MAC protocols and routing protocols while solving a problem

CO3 Analyze and compare the basic protocols in wireless sensor network and IoT

CO4 Solve different real life problems in different domains based upon the concept of IoT and sensor network

CO5 Implement basic IoT applications on embedded platform

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2								**2**	**2**	**-**
CO2	3	3	3	3	2								**2**	**2**	**-**
CO3	3	3	3	2	2		1						**2**	**2**	**-**
CO4	3	3	3	3	3	2	2						**2**	**2**	**-**
CO5	3	3	3	3	3	2	2		2	2	1	1	**2**	**2**	**-**

COURSE NAME: URBAN PLANNING
COURSE CODE: OEC 702A
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	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	-	-	2	-	-	-	3	2	-	2	2	-
CO 2	2	3	-	2	2	-	2	-	3	-	-	2	2	2	-
CO 3		2	3	-	-	2	-	2	-	3	2	-	2	2	-
CO 4	2	1	3	-	-	3	-	-	-	1	-	2	2	2	-

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

Pre requisites: Basic course of environmental engineering with preliminary knowledgeof 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	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	2	3	2	3	3	3	2	1	2	2	1	2	2	2
CO2	3	3	3	3	2	1	3	3	3	2	1	2	2	2	2
CO3	3	3	3	3	2	2	3	3	2	3	2	2	3	3	3
CO4	3	3	3	3	3	3	3	1	3	2	3	3	3	3	3
CO5	2	2	3	3	1	2	3	1	3	1	3	1	3	2	1

COURSE NAME: ADVANCED PROGRAMMING FOR PROBLEM SOLVING
COURSE CODE: OEC 791
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 Cprograms.
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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	3	-	-	-	-	-	3
CO2	3	3	3	2	-	-	-	-	3	-	-	-	-	-	3
CO3	3	3	3	3	-	-	-	-	3	-	-	-	-	-	3
CO4	3	3	3	3	-	-	-	-	3	-	-	-	-	-	3
CO5	3	3	3	3	-	3	-	-	3	-	2	-	-	-	3

COURSE NAME: ENTREPRENEURSHIP & INNOVATION SKILL

COURSE CODE: MC701

CONTACTS: 0:0:3

TOTAL CONTACT HOURS: 24

Prerequisite: None

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

CO1: Comprehend the role of bounded rationality, framing, causation and effectuation in entrepreneurial decision making.

CO2: Demonstrate an ability to design a business model canvas.

CO3: Evaluate the various sources of raising finance for startup ventures.

CO4: Explain the fundamentals of developing and presenting business pitching to potential investors.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1	2	3			2		2	3	3	1	2	3
CO2	3	1		1			1		1		3	3		1	
CO3	3		2		2	3				2	3	3	2		2
CO4	3	2		1				2	2		3	3		1	

8Th SEMESTER

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1	2	2	1	2	2	3	2	2	3
CO2	3	3	1	2	2	2	2	2	3	2	1	3	2	2	3
CO3	3	3	2	2	3	2	2	3	3	2	2	3	3	2	3
CO4	3	3	3	2	1	2	2	2	2	2	2	3	3	3	3
CO5	3	3	3	2	2	3	3	2	2	2	2	3	3	3	3

COURSE NAME: FINITE ELEMENT ANALYSIS
COURSE CODE: CE801B
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 : Make the students to apply the knowledge of mathematics, science and engineering to do the analysis of simple and complex elastic structures using the finite element analysis.
CO4: Learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analysis

CO-PO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	2	2	3	3	2	2	3	3	3	2	3	3	3
CO2	3	3	3	3	2	2	2	3	2	3	3	3	3	2	3
CO3	3	3	3	3	2	3	3	2	3	2	2	2	2	3	2
CO4	2	2	2	3	2	2	2	2	1	1	2	1	1	3	2

COURSE NAME: ADVANCED STRUCTURAL ANALYSIS
COURSE CODE: CE801C
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

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	2	2	3	3	3	2	2	2	2	2	2	3
CO2	3	2	2	2	3	3	1	1	3	3	2	2	3	3	2
CO3	3	2	3	3	3	1	3	2	3	3	3	3	3	2	2
CO4	3	2	2	2	2	3	2	2	2	3	3	1	2	3	3

COURSE NAME: ADVANCED FOUNDATION ENGINEERING
COURSE CODE: CE 801A
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 thedesigns
CO5 : Understand limitations and uncertainties in geotechnical design

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	3	2	1	2	1	2	2	3	3	2	3	3
CO2	3	3	3	2	2	1	2	2	2	1	3	3	3	3	3
CO3	3	1	1	2	2	2	3	3	3	2	3	3	3	2	3
CO4	3	3	3	3	3	2	3	2	2	2	2	3	3	3	3
CO5	3	3	3	3	3	1	2	2	2	2	2	3	2	2	3

COURSE NAME: ADVANCED TRANSPORTATION ENGINEERING
COURSE CODE: CE 801B
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 Outcome:

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

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	-	3	-	-	3	3	3	2	2	2	-
CO2	3	2	2	2	-	-	2	2	2	-	1	2	2	2	-
CO3	3	2	2	2	-	1	-	-	1	-	2	2	2	2	-

COURSE NAME: PAVEMENT DESIGN
COURSE CODE: CE 801C
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	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO 1	3	3	3	2	3	1	1	1	3	3	3	3	2	2	-
CO 2	3	3	3	2	2	2	1	1	3	2	3	2	2	2	-

COURSE NAME: METRO SYSTEM AND ENGINEERING
COURSE CODE: CE802A
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	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO 1	3	3	2	3	3	2	3	3	2	3	3	2	2	2	-
CO 2	3	3	-	3	3	-	3	3	-	3	3	-	2	2	-
CO 3	3	2	3	3	2	3	3	2	3	3	2	3	2	2	-

COURSE NAME: AIR & NOISE POLLUTION & CONTROL
COURSE CODE: CE802B
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

CO	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	1	3	2	1	3	3	3	1	3	2	2	2	2	2
CO2	2	3	3	3	2	3	3	2	2	3	2	2	3	3	2
CO3	3	3	3	3	3	2	3	1	2	1	2	3	3	3	3
CO4	3	3	3	3	2	1	3	3	3	2	3	3	3	3	3
CO5	3	3	3	3	3	3	3	2	3	2	3	3	3	2	3

COURSE NAME: ADVANCED SURVEY COURSE
CODE: CE802C
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 theproblems.
CO4 : Student will able to know about the astronomy and GPS system.
CO5 : Student will able to know about GIS concept.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	1	1	1	3	3	3	3	3	3	3
CO2	3	3	3	2	2	2	1	1	3	2	3	2	3	3	3
CO3	1	1	1	1	1	-	-	-	1	1	1	2	3	2	3
CO4	3	3	2	3	2	2	1	1	3	2	2	2	3	3	3
CO5	3	3	2	3	2	1	1	1	3	2	1	2	3	2	2

COURSE NAME: ESSENCE OF INDIAN KNOWLEDGE TRADITION
COURSE CODE: MC 881
CONTACT:3:0:0

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	PO 1	PO 2	PO 3	PO4	PO 5	PO6	PO 7	PO8	PO 9	PO1 0	PO1 1	PO1 2	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	1	-	-	2	1	2	1	**2**	**2**	-
CO2	-	-	-	-	-	-	-	3	2	1	2	2	**2**	**2**	-
CO3	-	-	-	-	-	-	-	-	2	2	-	1	**2**	**2**	-
CO4	-	-	-	-	-	-	-	-	1	2	-	1	**2**	**2**	-

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