Outcome Based Education (OBE)

BOOKLET OF

B.Tech (Civil) Program

2021

CIVIL & STRUCTURAL ENGINEERING DEPARTMENT

Birla Vishvakarma Mahavidyalaya

(An Autonomous Institution)

Vallabh Vidyanagar, Gujarat, India

BIRLA VISHVAKARMA MAHAVIDYALAYA
(AN AUTONOMOUS INSTITUTION)

ABOUT BVM:

BVM is a premier institution in the field of technical education established in 1948 and is managed by Chartuar Vidya Mandal. The motto of the institute is "Work is worship". More than 20,000 engineers have graduated from this college and around a third of them are working aboard.

VISION OF INSTITUTE:-

"Produce globally employable innovative engineers with core values"

MISSION OF INSTITUTE:-

- Re-engineer curricula to meet global employment requirements.
- Promote innovative practices at all levels.
- Imbibe core values.
- Reform policies, systems and processes at all levels.
- Develop faculty and staff members to meet the challenges.

AFFILIATIONS OF THE COLLEGE:-

- Bombay University: June 1948 - May 1951
- Gujarat University: June 1951 - May 1957
- Sardar Vallabhbhai Vidyapeeth: June 1957 to June 2008
  (Re-named as Sardar Patel University in 1966)
- Gujarat Technological University: June 2008 Onwards
- First Autonomous Institute of Gujarat since June 2015

INFRASTRUCTURE:-

Land: 18.96 acres. Built-up area: 35704 sq. m.

UNDER GRADUATE PROGRAMS:

Sr. No	Branch	Seats
01	Civil Engineering	120
02	Computer Engineering	60
03	Electrical Engineering	60
04	Electronics Engineering	75
05	Mechanical Engineering	90
06	Production Engineering	30
	Total	**435**

07	Mechanical Engineering (SF)	30
08	Production Engineering (SF)	30
09	Information Technology (SF)	60
10	Electronics & Telecommunication (SF)	60
11	P.D.D.C (Mechanical) – Part Time	30
	Total	**645**

POST GRADUATE PROGRAMS (SF):

Sr. No.	**Branch**	**Seats**
01	M. Tech Structural Engineering	18
02	M. Tech Computer Engineering	25
03	M. Tech Construction Engineering & Management	18
04	M. Tech Environmental Engineering	18
05	M. Tech Machine Design	18
06	M. Tech Transportation System Engineering	18
07	M. Tech Power System Engineering	18
08	M. Tech Infrastructure Engineering & Technology	18
	Total	**151**

ABOUT CIVIL AND STRUCTURAL ENGINEERING DEPARTMENT:

Civil and Structural Engineering Department offer B. Tech and M. Tech programs and senior facultymembers are also guiding Ph. D. candidates registered in various universities. The departments have highly qualified, well experienced and dedicated faculty members. The departments are equipped with advanced instruments and equipments for research facilities. Experts from leading industries and educational institutes are invited frequently for guest lectures on recent developments for the benefit of student and faculty. The departments are organizing various training programs in thrust areas for students, faculty and industrial personnel. They have signed MoU with various industrial and research agencies under the auspices of Industry Institution Interaction initiative. The graduates of this departments are well placed in national and multinational companies in the core, IT and services sectors and academic institutions.

ABOUT OUTCOME BASED EDUCATION:

Globalization has brought in a clear shift from education as transmission of expert knowledge to education as building learner competencies which includes learning to learn and lifelong learning. Preparing global engineers who will required to shoulder unforeseen challenges. Outcome based education (OBE) is student centered instruction that focuses on measuring student performance i.e. outcomes. Outcomes include knowledge, skills, and attributes suggested by National Board of Accreditation.

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CIVIL ENGINEERING DEPARTMENT

1. VISION

"Produce globally employable innovative Civil Engineers with core values"

MISSION

1) Re-engineer curricula of Civil engineering to meet global employment requirements
2) Promote innovative practices in Civil and Structural Engineering Department.
3) Imbibe core values in Civil engineering endeavors undertaken
4) Reform policies, systems and processes at all levels in Civil Engineering education and research.
5) Develop faculty and staff members to meet challenges

2. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Plan, design, execute, operate and maintain civil engineering projects within specified time, cost and quality.

PEO2: Use of innovative material practices and techniques for sustainable eco-friendly and life-line infrastructures.

PEO3: Manage resources and demonstrate commitment to professional work.

PEO4: Adapt state of art development and R & D in the field of civil engineering.

3. PROGRAM OUTCOMES (POs)

Sr	Title	Program Outcome
PO1	Engineering knowledge:	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex civil engineering problems.
PO2	Problem analysis:	Identify, formulate, review research literature, and analyse complex civil engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions:	Design solutions for civil engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health & safety, cultural and societal & environmental considerations.
PO4	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.

PO5	Modern tool usage:	Apply appropriate techniques, resources, modern engineering and IT tools including prediction and modelling to civil engineering activities with an understanding of their limitations.
PO6	The engineer and society:	pplyreasoning informed bythe contextual knowledge to assess societal, health & safety, legal & cultural issues and the consequent responsibilities relevant to the professional civil engineering practice.
PO7	Environment and sustainability:	Understand the impact of the professional civil engineering solutions in societal and environmental contexts, demonstrate the knowledge of the same and need for sustainable development.
PO8	Ethics:	Apply ethical principles & commit to professional ethics and responsibilities & norms of the civil engineering practice.
PO9	Individual and team work:	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication:	Communicate effectively on civil 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.
PO11	Project management and finance:	Demonstrate knowledge and understanding of the civil engineering and management principles and apply those to one's own work, as a member and leader in a team, to manage civil engineering projects in multidisciplinary environments.
PO12	Life-long learning:	Recognize the need for, have the preparation and ability to engage in independent and life-long learning in the broadest context of civil engineering technological changes.

4. PROGRAM SPECIFIC OUTCOMES (PSO)

PSO1: Design civil engineering structures using relevant codes of practice, materials, techniques and software.

PSO2: Follow human values and ethics with team spirit in every civil engineering project undertaken.

PSO3: Adapt state-of-the-art practices and materials in the field of civil engineering

4. COURSE OUTCOMES

SEMESTER- 1

BS111: ADVANCED CALCULUS

1. Apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
2. The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
3. Acquire knowledge of advanced differential calculus for single variable and their applications.
4. Acquire knowledge of advanced differential calculus for single variable and their applications.
5. Apply knowledge of differential and integral calculus of several variables for engineering applications.

ES103: BASIC ELECTRICAL ENGINEERING

1. To understand and analyze basic electric and magnetic circuits.
2. To study the working principles of electrical machines and its applications.
3. To analyze the performance of power converters.
4. To understand and analyze components of low voltage electrical installations.
5. To demonstrate and analyze the performance of electrical circuits and machines.

ES110: BASIC MECHANICAL ENGINEERING

1. Explain the fundamentals of mechanical systems in context of energy conversion.
2. Describe thermodynamic properties of gases and steam, and apply it to systems of relevance.
3. Interpret the fundamentals of Heat engine and I C Engine.
4. Explain the operation and use of pumps, Air compressors, refrigerators and air-conditioners.
5. Understand power transmission elements, and applications of various engineering materials.

ES111: WORKSHOP

1. Understand the safety precautions in workshop.
2. Identify appropriate machine tools and their operations.
3. Identify basic manufacturing practices in workshop.
4. Appreciate the level of skill required in fitting, carpentry, tin smithy, welding.

HS112: ENVIRONMENTAL SCIENCE

1. Understand the scope, guiding principles and importance of Environmental Science
2. Gain scientific perspectives of critical environmental pollution, its effects and mitigation.

3. Evaluate critical role of human and develop ethical values for sustainable development of environment.
4. Inculcate the concepts of Reduce, Reuse, Recycle and recovery in all aspects

SEMESTER-2

BS112: LINEAR ALGEBRA AND FOURIER SERIES

1. Solve system of linear equations using different tools of linear algebra for the problems arising in the field of engineering.
2. Understand the concepts like vector space, Eigen values and Eigen vector and their application in various subjects of engineering.
3. Understand and apply use of linear transformation arising in different subject of engineering.
4. Do expansion of functions in terms of basic trigonometric functions.
5. Adapt tools of Fourier series and half range series for expansion of various functions for learning advanced engineering mathematics.

BS103: PHYSICS

1. Understand the basic fundamental properties of matter.
2. Understand and apply the knowledge of waves, motion and acoustic in engineering.
3. Understand the basic of ultrasonic and its applications.
4. Understand the fundamentals of optics.
5. Understand the working principle of laser components and working of different lasers with applications.

ES106: PROGRAMMING FOR ENGINEERS

1. Formulate simple algorithms for arithmetic and logical problems.
2. Translate the algorithms to MATLAB programs.
3. Use vectors and matrices for mathematical operations.
4. Implement conditional branching, iteration and recursions.
5. Decompose a problem into functions.
6. Apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
7. Apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

ES109: ENGINEERING GRAPHICS AND DESIGN

1. Use the drawing instruments effectively and dimension the given figure.
2. Interpret and correlate Orthographic and Isometric views of objects.

3. Construct engineering curves for various engineering applications.
4. Apply projection of lines, planes and solids in the context of design.
5. Explain the use of computer software meant for creating drawing.

ES115: BASIC CIVIL ENGINEERING

1. Possess knowledge of scope & role of civil engineering and suitability of materials.
2. Apply fundamental principles of surveying, leveling to comprehend field measurements.
3. Understand importance of building drawing and processes for building construction.
4. Understand water resources and transportation system
5. Gain awareness of advancements in Civil Engineering.

HS101: ENGLISH

1. Comprehend word formation and enrich vocabulary.
2. Develop formal discourse with accurate sentence formation.
3. Communicate in social setting and workplace.
4. Exhibit language skills -LSRW.
5. Design and execute formal presentations and Group Discussion.
6. Formulate formal letters effective

SEMESTER-3

2BS02: DIFFERENTIAL EQUATIONS AND STATISTICS

1. Understand effective mathematical tools for the solutions of ordinary and partial differential equations.
2. Analyze and solve ordinary and partial differential equations.
3. Apply effective mathematical tools for the solutions of ordinary and partial differential equations.
4. Understand the concepts and tools of Statistics.
5. Analyze and solve various engineering problems through the tools of Statistics.
6. Adapt tools of applied statistics and sampling theory and apply them in engineering problems.

2CE01: FLUID MECHANICS

1. Understand the importance of different fluid properties.
2. Solve manometer problems, calculate hydrostatic forces on plane and curved surfaces and forces on floating bodies.
3. Use principles of mass, energy and momentum conservation to calculate acceleration, discharge, pressure variation and forces in moving fluids.
4. Understand laminar and turbulent flow through pipes and basic concepts of boundary layer flow.
5. Solve hydraulic pipe flow problems for pipes connected in series and parallel.

2HS01: PROFESSIONAL SOFT SKILLS

1. Understand the communication process and communicate professionally
2. Participate in Group Discussion and evaluate the same.
3. Develop Interview skills and Write Reports.
4. Make effective Presentations.
5. Conduct meetings and conferences.
6. Effectively manage time and stress.

2CE02: ENGINEERING SURVEYING

1. Use conventional instruments to map the parcels of land.
2. Show effectiveness of modern surveying instruments to improve accuracy and to save time and for surveying operations.
3. Analyze the problems of computation of area and volume, setting out of curves and works using surveying knowledge.
4. Appreciate the use of modern techniques for surveying and mapping.

2SE01: CONSTRUCTION MATERIAL AND CONCRETE TECHNOLOGY

1. Create understanding about the use of different construction materials and latest development.
2. Understand the behavior of different ingredients and their significance in fresh and hardened concrete properties and sustainability.

3. Design the concrete mix of desired workability strength and sustainability for actual field requirements.
4. Conduct different types of tests in lab as well as field to assess the strength and sustainability of concrete structures and identify and apply special types of concrete in field.

2ES01: MECHANICS OF SOLIDS

1. Apply fundamental principles of mechanics & principles of equilibrium to simple and practical problems of engineering.
2. Determine centroid and moment of inertia of a different geometrical shape and able to understand its importance.
3. Understand behaviour & properties of engineering materials, analyze different types of stresses & strains developed in the member subjected to axial, bending, shear, torsion & thermal loads.

SEMESTER-4

2BS03: NUMERICAL METHODS IN CIVIL ENGINEERING

1. Solve civil engineering problems using numerical methods.
2. Use computational soft tools.

2CE03: HYDRAULIC ENGINEERING

1. Solve pipe flow problems for branching pipes and pipe network; and understand the analysis of turbulent flows including water hammer phenomenon.
2. Apply the knowledge of fluid mechanics to address the uniform flow problems in open channels.
3. Solve the problems of gradually and rapidly varied flows in open channels under steady state conditions.
4. Perform dimensional and model analysis for different fluid flow problems.
5. Understand the functions and working principles of hydraulic machineries (pumps and turbines).

2CE04: ENGINEERING GEOLOGY

1. Recognize relative geo-dynamics and geo environment pertaining to civil works.
2. Assess the influence of geological actions on civil project.
3. Analyze and interpret geological process, tools-techniques, products for feasibility of site selection.
4. Ascertain safe, suitable and economic civil engineering projects.

2CE05: CONSTRUCTION TECHNOLOGY

1. Select appropriate structural and functional components for building.
2. Develop comprehensive understanding about construction process of building components.
3. Apply obtained knowledge to execute normal sized building construction project.

2SE02: GEOTECHNICAL ENGINEERING

1. Understand basic definitions, relationships and apply the knowledge to solve different geotechnical problems.
2. Able to classify & identify the soil and thereby evaluate the effect of soil type on different basic as well as important properties viz. permeability, compaction etc.
3. Analyze the geotechnical problems related to flow through soil mass, quick sand condition, capillary rise etc. by applying knowledge of permeability and effective stress principle.
4. Apply the knowledge of field compaction and compaction control of soils for achieving benefits of compaction.
5. Recognise importance and extent of subsurface investigation and plan the same for different types of projects.

2SE03: STRUCTURAL ANALYSIS I

1. Understand the fundamentals of structures and compute internal forces as well as displacements in statically determinate structures.
2. Apply the concept of Strain Energy to compute displacements in statically determinate structures.
3. Understand the influence line diagrams of various quantities for beams and members of trusses.
4. Analyze different arches and cables under various loading condition

SEMESTER-5

3CE01: WATER AND WASTE WATER ENGINEERING

1. Understand assessment procedure and significance of physical, chemical and biological characteristics of water and wastewater.
2. Explain the process of self-purification of the sources of disposal and determine the degree of treatment of sewage based on the source of disposal of wastewater.
3. Evaluate the quantity estimation for public water supplies and sewage generation.
4. Describe and design various parameters of collection and conveyance of water and wastewater.
5. Design of water and wastewater treatment units.

3CE02: HIGHWAY AND TRAFFIC ENGINEERING

1. Perform traffic surveys and implementation of surveys.
2. Carry out highway planning and its classification.
3. Design highway geometrics.
4. Conduct tests aggregates and bituminous materials.
5. Design flexible and rigid pavement.
6. Understand pavement failures, importance of drainage, hill roads and their challenges.

3SE01: ADVANCED GEOTECHNICAL ENGINEERING

1. Compute stresses induced in soil due to different types of loading and apply the knowledge to settlements problems in the foundation engineering.
2. Determine the shearing strength of soils and apply it in different geotechnical solutions viz. foundation engineering, stability analysis of slopes and earth pressures computations.
3. Select most suitable type of foundation and evaluate load carrying capacity of shallow and deep foundations.
4. Understand the applications of geosynthetics in civil engineering projects.

3SE02: STRUCTURAL ANALYSIS II

1. Analyze various structures with secondary effects for various loadings.
2. Apply Plastic method of analysis.
3. Determine the stresses in prestressed elements.

3SE03: DESIGN OF STEEL STRUCTURES

1. Estimate design loads on the structural steel components.
2. Design various steel structural components of structures.
3. Design various types of steel connections.

3SE81: DISASTER MANAGEMENT AND MITIGATION (OE)

1. Understand disasters, disaster preparedness and apply the mitigation measures
2. Understand role of IT, remote sensing, GIS and GPS in risk reduction
3. Apply knowledge of disaster management acts and guidelines.

3CE81: ENVIRONMENT AND HEALTH

1. Understand assessment procedure of various pollutants of air water and land.
2. Appreciate the effects of various types of pollution on human health

3CE83: EARTH SYSTEM AND GEO-ENVIRONMENT

1. Acquire knowledge of earth system, natural resources, material and energy exchange, dynamics of earth system, linkage of earth system and geo-environmental issues.
2. Think critically and discriminate the natural and anthropogenic causatives of geoenvironmental disaster, wicked, super-wicked problems and future challenges.
3. Associate developed cognizance and perception to accomplish project and research work in a prolific way.
4. Employ tool, techniques and software in the respective field to enlarge the future scope and for the career enrichment.

SEMESTER-6

3CE03: BUILDING PLANNING, COSTING AND VALUATION

1. Prepare building drawings for different purpose.
2. Associate building bye laws, principles of planning and principles of architectural composition.
3. Calculate quantity estimates for Buildings, roads and canal structures as per specifications.
4. Draft detailed specifications, work out rate analysis and ascertain the quantity of materials for all works related to building projects.
5. Workout cost estimate, valuation and tenders & contract documents of building works.

3HS01: ETHICS AND CONSTITUTION OF INDIA

1. Practice the moral values that ought to guide the engineering profession.
2. Discover the set of justified moral principles and apply them to concrete situation.
3. Appreciate the ethical issues and know the code of ethics in different professional bodies.
4. Discover the Federal structure and Constitution of India.
5. Know the successful functioning of democracy in India.
6. Apply the statutes available in the Constitution to the field of engineering.

3CE04: RAILWAY AND BRIDGE ENGINEERING

1. Apply the knowledge of railway track components, materials and fixtures and fastenings.
2. Solve problems of railway track geometrics, train resistance, points and crossings, Signaling and control system.
3. Carry out feasibility study of rail tracks.
4. Compute economical spans, hydraulic design of bridge and carry out erection and maintenance of bridge.

3CE05: HYDROLOGY AND WATER RESOURCES ENGINEERING

1. Compute mean precipitation, infiltration rate and runoff from a catchment area and work out yield from a well.
2. Construct unit hydrograph and S-hydrograph, and compute peak flood flow and design flood for hydraulic structures.
3. Workout reservoir capacity using a mass curve, develop idea about reservoir sedimentation and its control.
4. Estimate seepage through embankment dam using seepage theory and work out factor of safety of gravity dam for different forces acting on it.
5. Calculate irrigation water requirement for the given cropping pattern in canal command and design of lined canals.
6. Suggest measures of water conservation in drought prone areas.

3CE82: GEOINFORMATICS

1. Apply up-to-date information of optical remote sensing to map surface of earth.
2. Ability to develop various thematic maps.
3. Use Geoinformatics for location based mapping and monitoring.
4. Understand to apply Geoinfromatics to solve problems related with utility sector.

3SE04: DESIGN OF RC STRUCTURES

1. Understand design philosophies and material behavior of RC elements.
2. Understand the load distribution mechanism and Behaviour in RC multi-storied structures.
3. Design RC elements as per IS codes of practice.
4. Design suitable foundation for different structures.

3SE82: ADVANCED STRENGTH OF MATERIALS

1. Apply the strain energy concept to structural elements.
2. Apply theories of failure in structural elements.
3. Analyze curved elements.
4. Analyze different stresses in thin-walled sections, thick shells and rotating elements.

3SE83: BASIC CONCEPTS OF STRUCTURAL BEHAVIOUR

1. Understand different structural systems and their behaviour.
2. Compute internal forces and moments induced in structural systems due to different types of loading and apply the knowledge of building materials to structural engineering problems.
3. Analyze different structural systems and apply design concepts to them.
4. Understand plate and grid structures and their behaviour.

CEIS2: INTERNSHIP-II

1. To learn the application of knowledge in real world problems.
2. To apply knowledge and skills in real world problems through construction activities.
3. To get exposure to team-work and leadership quality.
4. To deal with industry-professionals and ethical issues in the work environment.

SEMESTER-7

4CE01: PROJECT MANAGEMENT AND EQUIPMENT

1. Demonstrate construction project management skills and apply tools of project management.
2. Select appropriate Network-based management technique and carryout Network-Analysis.
3. Apply up-to-date information about equipment and its management for civil engineering works.
4. Recommend most appropriate equipment for construction project.

4CE02: CONSTRUCTION SAFETY AND QUALITY MANAGEMENT

1. Prepare QAQC plan for a construction project.
2. Apply quality assurance tools and quality control, with national and international standards of construction safety.
3. Implement safety concepts, safety principles and safety requirements to construction Project.
4. Analyze and evaluate workplace to occupational safety and health hazards.

4CE31: PROJECT – I

1. Identify, define and analyze the peculiar Civil engineering problems of Industry/Society/Governments/ User.
2. Apply knowledge of mathematics, science & engineering all together to find the solution of problem/project under study.
3. Develop/Design solution of problem under study through literature survey and engineering insights with reference to the present context of study.
4. Able to work efficiently as individual investigator as well as in team-work.
5. Prepare presentation and communicate authentically about the problems under study with appropriate solution, at appropriate audience.
6. Draft/write/present/publish 'technical paper' on the problem/project/topic under study at seminar/conference/engineering journal/competition.

4CE42: AIR POLLUTION AND CONTROL

1. Classify and identify the sources of air pollutants and predict the effects of air pollutant on human health and environment.
2. Apply and relate the significance of various air pollution dispersion models.
3. Analyze the air quality and relate with air pollution regulation
4. Design various air pollution control equipment and evaluate its use.

4CE43: GEOMATICS ENGINEERING

1. Apply up-to-date information of photogrammetry and remote sensing to prepare LU/LC maps.

2. Ability to develop various thematic maps.
3. Use Geomatics engineering for location based mapping.
4. Understand to apply Geomatics engineering to solve problems related with Civil engineering.

4CE44: HYDRAULIC MACHINES

5. Work out the hydrodynamic force by liquid jet on plane surface and curved vanes for fixed and moving conditions.
6. Apprehend working of impulse and reaction turbines and their component parts.
7. Design & analyze performance characteristics of Pelton wheel, Kaplan turbine and Francis turbine.
8. Comprehend working of different types of pumps and work out the efficiency of centrifugal pump.
9. Compare hydropower plants with other types of power plants and calculate load factor and capacity factor for the hydropower plant.

4CE45: IRRIGATION AND HYDRAULIC STRUCTURES

1. Design weirs on permeable foundations using various theories and suggest suitable type of cross drainage structures and canal regulation works.
2. Carry out stability analysis of embankment dam under sudden drawdown and steady seepage conditions.
3. Calculate normal stresses, principle stresses and shear stresses at heel and toe of dam and factor of safety of gravity dam against overturning, sliding and shear friction factor.
4. Design an ogee spillway and a chute spillway.
5. Suggest suitable energy dissipation measures.

4CE46: URBAN TRANSPORTATION SYSTEM

1. Apply up-to-date information for planning and operation of urban transport.
2. Execute various transportation related surveys.
3. Evaluate relative importance of various modes and their capacities.
4. Solve travel demand forecasting problems.
5. Recommend most appropriate transport modes based on performance evaluation.

4SE01: EARTHQUAKE ENGINEERING

1. Understand the basics concepts of earthquake engineering.
2. Perform the static and dynamic seismic analysis of buildings.
3. Apply the concepts of ductile detailing for beam, column and beam-column joints.
4. Understand the concepts of structural control strategies and reinforced masonry buildings.

4SE51: GROUND IMPROVEMENT TECHNIQUES

1. Understand about soil distribution in India and need of ground improvement techniques.
2. Analyze and decide the suitable method of Compaction and dewatering of soil as per need of the project.
3. Understand and apply the suitable method of chemical stabilization.
4. Understand different applications of geosynthetics and the suitable method of application.
5. Analyze and select effective method of soil reinforcement as well as grouting.

4SE41: ADVANCED DESIGN OF STEEL STRUCTURES

1. Design industrial steel structural components subjected to gravity and lateral loads.
2. Design suitable connections for steel structures.
3. Analyse and design Foot Bridge.
4. Design industrial components using cold formed steel sections/composite sections.

4SE42: ADVANCED STRUCTURAL ANALYSIS

1. Understand the theory of shear deformation in addition to bending theory.
2. Apply the concept of shear centre to various sections used in steel structures.
3. Apply failure theories to different types of materials used in structures.
4. Analyse the complex structures with symmetrical and unsymmetrical loadings using different methods.

SEMESTER-8

4CE32: PROJECT – II

1. Identify, define and analyze the peculiar Civil engineering problems of Industry/Society/Governments/ User.
2. Apply knowledge of mathematics, science & engineering all together to find the solution of problem/project under study.
10. Develop/Design solution of problem under study through literature survey and engineering insights with reference to the present context of study.
11. Able to work efficiently as individual investigator as well as in team-work.
12. Prepare presentation and communicate authentically about the problems under study with appropriate solution, at appropriate audience.
13. Draft/write/present/publish 'technical paper' on the problem/project/topic under study at seminar/conference/engineering journal/competition.

4CE33: INDUSTRIAL PROJECT

1. Identify, define and analyze the peculiar Civil engineering problems of Industry/Society/Governments/ User.
2. Apply knowledge of mathematics, science & engineering all together to find the solution of problem/project under study.

3. Develop/Design solution of problem under study through literature survey and engineering insights with reference to the present context of study.
4. Able to work efficiently as individual investigator as well as in team-work.
5. Prepare presentation and communicate authentically about the problems under study with appropriate solution, at appropriate audience.
6. Draft/write/present/publish 'technical paper' on the problem/project/topic under study at seminar/conference/engineering journal/competition.

4CE47: GREEN BUILDING MATERIALS AND TECHNIQUES

1. Demonstrate green concept skills and apply tools of Green building assessment.
2. Select appropriate green building material and technique.
3. Design sustainable and energy efficient civil engineering project.
4. Carry out Green Building rating using IGBC guidelines.

4CE48: PAVEMENT ANALYSIS AND DESIGN

1. Analyze the stresses and strains in a flexible pavement using multi-layered elastic theory.
2. Analyze stresses and strains in a rigid pavement using Westergaard's theory.
3. Design a flexible pavement using IRC, Asphalt Institute, and AASHTO methods.
4. Design a rigid pavement using IRC and AASHTO methods.

4CE49: DIGITAL LAND SURVEY PROJECT

1. Perform surveying measurements using Digital surveying instruments.
2. Prepare maps from collected survey data.
3. Apply digital techniques in mapping of parcels of land

4CE50: TRAFFIC ENGINEERING AND FIELD STUDIES

1. Apply knowledge of traffic, its components, and factors affecting road traffic in intersection design.
2. Carryout sampling data in conducting various surveys and analysis.
3. Estimate the capacities of roadways and intersections and level of service.
4. Design road islands, intersections, road lightings, traffic signals, for traffic movement and regulations

4CE51: BUILDING CONSTRUCTION PROJECT

1. Design, execute and manage the Building Project.
2. Prepare the detailed project report with all required sanctions.
3. Carry out tendering and contracting of Building Projects.

4CE52: BUILDING SERVICES AND TREATMENTS

1. Acquire knowledge of building services and treatments.
2. Supervise various building services maintenance.
3. Achieve overall performance and maintainability of building services.

4CE53: SOLID WASTE MANAGEMENT

1. Explain the various functional elements involved in solid waste management system.
2. Categorize and quantify the generation rate of solid waste.
3. Analyze the routes for collection, transfer and transportation of solid waste.
4. Suggest suitable treatment and disposal option for waste management facility.

4CE54: IRRIGATION WATER MANAGEMENT

1. Prepare layout of irrigation and drainage systems for fields.
2. Apply design aspects of border strip method, check basin method and furrow irrigation method.
3. Perform hydraulic design of sprinkler and drip irrigation system.
4. Calculate Irrigation efficiencies and understand scheduling aspects of irrigation system
5. Carry out performance evaluation of an irrigation system and understand the irrigation water management aspects.

4CE55: DOCK, HARBOUR & AIRPORT ENGINEERING

1. Identify various component parts of dock, harbour and airports.
2. Apply ship and aircraft characteristics in planning of harbour and airports.
3. Orienting runway using wind rose data.
4. Design airport components Runway and Taxiway.
5. Know importance of navigation aids at harbour and airport.

4CE56: SOFTWARE TRAINING IN CIVIL ENGINEERING

1. Demonstrate the knowledge of Civil Engineering software.
2. Select and use appropriate software during lifelong learning process.

4SE43: ADVANCED DESIGN OF CONCRETE STRUCTURES

1. Design Grid Floor and Flat slab.
2. Design suitable foundation for different structures.
3. Design water tanks and earth retaining structures.

4SE44: COMPUTER AIDED STRUCTURAL ANALYSIS

1. Analyze different framed structures using computational methods.
2. Understand FDM and FEM applications.
3. Carry out programming using professional software tools.

4SE45: STRUCTURAL DESIGN PRACTICES

1. Design of RCC Structures as per recent practices.
2. Design of Steel Structures as per recent practices.

4SE46: DESIGN OF SPECIAL STRUCTURES

1. Design of Various special RCC Structures.
2. Carryout structural analysis and design of masonry buildings.

4SE47: REPAIRS AND REHABILITATION OF STRUCTURES

1. Achieve the knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures by different NDT methods.
2. Understanding different repairing materials and its techniques.
3. Apply the different techniques of demolition, rehabilitation, protection and maintenance of structures.

4SE48: PRESTRESSED CONCRETE

1. Design prestressed concrete elements for various load conditions.
2. Analyze composite and continuous prestressed beams.
3. Apply the concept of Prestressing in Special structures.

4SE49: FOUNDATION ENGINEERING

1. Recommend most suitable type of foundation system and carry out soil design for the same.
2. Analyze problems related to expansive soils.
3. Recognize effect of liquefaction along with the remedial measures.
4. Understand the applications of geotechnical suits.

4SE50: SOFTWARE TRAINING IN STRUCTURAL ENGINEERING

1. Perform the analysis and design of various structural elements and structures.
2. Understand the output and interpretation of results.
3. Prepare the report of analysis, design and structural detailing

5. Course Articulation Matrix, Mapping of COs with POs and PSOs

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	Engineering Knowledge	Problem Analysis	Design of solution	Conduct investigations of	Modern tool usage	The Engineer and Society	Environment and Stability	Ethics	Individual and Team Work	Communication	Project management	Lifelong learning	Design civil engineering	Follow human values and ethics…	Adapt state-of-thee – art
SEMESTER 1															
BS 111: ADVANCED CALCULUS															
BS 111.1	3	1	-	-	-	-	-	-	2	1	-	3			
BS 111.2	1	2	-	-	-	-	-	-	2	1	-	3			
BS 111.3	3	2	1	1	3	-	1	-	2	2	-	3			
BS 111.4	3	2	-	1	1	-	1	-	2	2	-	3			
BS 111.5	2	2	-	3	2	-	1	-	2	2	-	1			
BS 111.6	3	2	2	3	3	-	1	-	2	2	-	3			
BS 111	**2.50**	**1.83**	**0.50**	**1.33**	**1.50**	**0.00**	**0.67**	**0.00**	**2.00**	**1.67**	**0.00**	**2.67**			
ES103: BASIC ELECTRICAL ENGINEERING															
ES103.1	3	3	3	3	2	2	2	1	2	2	2	1			
ES103.2	3	3	3	2	2	2	1	1	1	2	2	1			
ES103.3	3	3	3	2	3	3	1	1	1	1	2	1			
ES103.4	3	3	2	3	2	2	1	1	2	2	2	1			
ES103	**3**	**3**	**2.75**	**2**	**2.25**	**2.25**	**3**	**1**	**1.75**	**1.75**	**2**	**1**			

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ES110: BASIC MECHANICAL ENGINEERING															
ES110.1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ES110.2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ES110.3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
ES110.4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ES110.5	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0
ES110	**3.00**	**1.60**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ES111: WORKSHOP															
ES111.1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
ES111.2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES111.3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES111.4	3	-	-	-	-	-	-	-	3	-	-	-	-	-	-
ES111	**2.25**	**0.00**	**0.00**	**0.00**	**0.00**	**0.75**	**0.00**	**0.00**	**0.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
HS112: ENVIRONMENTAL SCIENCE															
HS112.1	1	-	-	-	-	1	1	1	1	1	-	2			
HS112.2	1	1	-	1	1	2	2	1	1	1	-	2			
HS112.3	1	2	-	1	1	2	2	3	2	1	-	2			
HS112.4	2	1	-	-	-	2	2	2	1	1	-	2			
HS112	**1.25**	**1**	**-**	**0.5**	**0.5**	**1.75**	**1.75**	**1.75**	**1.25**	**1**	**-**	**2**			

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
SEMESTER 2															
BS112: LINEAR ALGEBRA AND FOURIER SERIES															
BS112.1	3	-	1	1	2	-	-	-	-	1	-	3			
BS112.2	3	2	3	2	1	2	-	-	2	2	-	2			
BS112.3	2	2	2	2	1	2	-	-	2	1	-	2			
BS112.4	3	2	1	-	1	-	-	-	2	2	-	3			
BS112.5	2	3	3	2	2	-	-	-	3	2	-	3			
BS112	**2.6**	**1.8**	**2.0**	**1.4**	**1.4**	**0.8**	**0.0**	**0.0**	**1.8**	**1.6**	**0.0**	**2.6**			
BS103: PHYSICS															
BS103.1	3	3	-	3	2	-	-	-	2	3	-	2	-	-	-
BS103.2	3	2	1	1	-	-	-	-	2	-	-	2	-	-	-
BS103.3	3	3	-	3	2	-	-	-	1	-	-	2	-	-	-
BS103.4	3	3	2	2	3	-	-	-	1	-	-	2	-	-	-
BS103.5	3	1	2	2	2	-	-	-	1	-	-	2	-	-	-
BS103	**3.00**	**2.40**	**1.0**	**2.20**	**1.80**	**0.00**	**0.0**	**0.0**	**1.50**	**0.60**	**0.0**	**2.00**			
ES106: PROGRAMMING FOR ENGINEERS															
ES106.1	3	3	2	-	3	-	-	-	-	3	-	3	-	-	-
ES106.2	3	-	-	-	3	-	-	-	-	-	-	2	-	-	-
ES106.3	3	3	3	3	-	-	-	-	-	-	-	3	-	-	-
ES106.4	3	2	3	3	3	-	-	-	-	-	-	3	-	-	-
ES106.5	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ES106.6	3	-	3	3	3	-	-	-	-	-	-	3	-	-	-
ES106.7	3	-	3	-	3	-	-	-	-	-	-	3	-	-	-
ES106	**3.00**	**1.14**	**2.00**	**1.28**	**2.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.42**	**0.00**	**2.42**	**0.00**	**0.00**	**0.00**
ES109: ENGINEERING GRAPHICS AND DESIGN															
ES109.1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES109.2	3	-	-	-	-	-	-	-	2	3	-	2	-	-	-
ES109.3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES109.4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES109.5	3	-	-	-	3	-	-	-	3	-	-	2	-	-	-
ES109	**3.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.00**	**0.60**	**0.00**	**0.80**	**0.00**	**0.00**	**0.00**
ES115: BASIC CIVIL ENGINEERING															
ES115.1	3	2	1	-	-	1	1	1	-	-	-	-			
ES115.2	3	3	3	3	3	1	1	1	3	2	2	2			
ES115.3	3	2	-	1	3	1	-	-	-	-	-	-			
ES115.4	3	-	-	-	-	1	1	1	-	-	-	1			
ES115.5	3	-	-	-	-	1	1	1	-	-	-	1			
ES115	**3**	**2.33**	**2**	**2**	**3**	**1**	**1**	**1**	**3**	**2**	**2**	**2**			
HS101: ENGLISH															
HS101.1	-	-	-	-	-	-	-	-	1	3	-	3			
HS101.2	-	-	-	-	-	-	-	2	1	3	-	3			
HS101.3	-	-	-	-	-	-	-	-	1	3	-	3			

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
HS101.4	-	-	-	-	-	-	-	1	-	3	-	3			
HS101.5	-	-	-	-	-	-	-	2	3	3	-	3			
HS101.6	-	-	-	-	-	-	-	2	1	3	-	3			
HS101	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.2**	**1.2**	**3**	**0.00**	**3**			
SEMESTER 3															
2BS01: DIFFERENTIAL EQUATIONS AND STATISTICS															
2BS01.1	-	-	2	-	2	-	-	-	2	1	-	2			
2BS01.2	-	3	-	-	3	-	-	-	2	2	-	2			
2BS01.3	3	-	3	-	2	-	-	-	2	1	-	2			
2BS01.4	-	-	2	-	3	-	-	-	2	2	-	2			
2BS01.5	-	3	3	-	2	-	-	-	2	1	-	2			
2BS01.6	3	-	3	-	3	-	-	-	2	1	-	2			
2BS01	**1.00**	**1.00**	**1.83**	**0.00**	**2.50**	**0.00**	**0.00**	**0.00**	**2.00**	**1.60**	**0.00**	**2.00**	**0.00**	**0.00**	**0.00**
2SE01: CONSTRUCTION MATERIAL AND CONCRETE TECHNOLOGY															
2SE01.1	3	3	3	2	1	2	2	1	1	2	2	3	1	1	2
2SE01.2	3	3	3	3	3	2	2	2	1	2	2	3	2	3	2
2SE01.3	3	3	2	3	3	2	2	3	3	3	2	3	3	3	3
2SE01.4	3	3	2	3	1	2	2	3	3	2	2	3	3	3	3
2SE01	**3**	**3**	**2.5**	**2.75**	**2**	**2**	**2**	**2.25**	**2**	**2.25**	**2**	**3**	**2.25**	**2.5**	**2.5**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
2ES01: MECHANICS OF SOLIDS															
2ES01.1	3	2	2	-	1	-	1	1	1	1	-	1	2	-	-
2ES01.2	3	2	2	-	1	-	1	1	1	1	-	1	2	-	-
2ES01.3	3	2	2	-	1	-	1	1	1	1	-	1	2	-	-
2ES01	**3**	**2**	**2**	**0**	**1**	**0**	**1**	**1**	**1**	**1**	**0**	**1**	**2**	**0**	**0**
2CE01: FLUID MECHANICS															
2CE01.1	1	1	1	--	--	--	--	--	1	1	--	1	--	--	2
2CE01.2	2	2	3	2	--	1	1	--	--	1	--	1	2	--	2
2CE01.3	2	2	2	2	--	1	1	--	2	1	--	1	2	--	2
2CE01.4	2	2	2	1	--	1	1	--	1	1	--	--	2	--	1
2CE01.5	2	2	3	1	2	1	1	--	1	1	--	1	2	--	2
2CE01	**1.8**	**1.8**	**2.2**	**1.5**	**2.0**	**1.0**	**1.0**	**--**	**1.25**	**1.0**	**--**	**1.0**	**2.0**	**--**	**1.8**
2HS01: PROFESSIONAL SOFT SKILLS															
HS01.1	-	-	1	-	-	-	1	2	2	3	-	2	-	-	-
HS01.2	-	-	1	-	-	2	2	2	3	3	1	2	-	-	-
HS01.3	-	-	-	-	-	-	1	2	2	3	2	2	-	-	-
HS01.4	-	-	-	-	-	-	1	-	1	3	2	1	-	-	-
HS01.5	-	-	-	-	-	-	-	1	2	1	2	1	-	-	-
HS01.6	-	-	-	-	-	1	1	2	2	2	2	2	-	-	-
HS01	**-**	**-**	**0.3**	**-**	**-**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**1.5**	**1.6**	**-**	**-**	**-**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
2CE02: ENGINEERING SURVEYING															
2CE02.1	1	3	-	2	-	1	-	2	1	-	-	-	-	1	-
2CE02.2	3	3	-	1	3	1	-	2	1	-	-	2	-	1	1
2CE02.3	3	3	1	3	2	1	-	3	1	-	-	1	-	1	-
2CE02.4	1	2	-	2	3	3	3	3	1	2	-	3	-	2	2
2CE02	**2.0**	**2.7**	**1.0**	**2**	**2.7**	**1.5**	**3**	**2.5**	**1.0**	**2.0**	**-**	**2.0**	**-**	**1.25**	**1.5**
SEMESTER 4															
2BS03: NUMERICAL METHODS IN CIVIL ENGINEERING															
2BS03.1	3	3	1	-	2	-	-	-	2	2	-	-			
2BS03.2	3	3	-	-	3	-	-	-	2	2	-	-			
2BS03	**3**	**3**	**0.5**	**-**	**2.5**	**-**	**-**	**-**	**2**	**2**	**-**	**-**			
2CE03: HYDRAULIC ENGINEERING															
2CE03.1	3	2	3	1	3	1	--	--	1	1	--	--	2	--	3
2CE03.2	2	2	2	1	--	--	--	--	1	1	--	1	2	--	2
2CE03.3	3	2	3	1	--	--	--	--	1	1	--	2	2	--	1
2CE03.4	--	--	1	1	--	--	--	--	1	1	--	1	1	--	1
2CE03.5	2	1	2	--	--	--	--	--	--	1	--	1	1	--	--
2CE03	**2.5**	**1.75**	**2.2**	**1.0**	**3.0**	**1.0**	**--**	**--**	**1.0**	**1.0**	**--**	**1.25**	**1.6**	**--**	**1.75**
2SE02: GEOTECHNICAL ENGINEERING															
2SE02.1	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2SE02.2	2	1	--	--	--	--	--	--	--	--	--	--	--	3	--
2SE02.3	2	2	--	--	1	1	--	--	--	--	--	1	--	--	--

2SE02.4	2	2	--	--	1	--	--	1	1	--	--	1	--	3	1
2SE02.5	2	1	--	--	--	--	--	--	1	--	--	1	--	--	1
2SE02	**2**	**1.2**	**0**	**0**	**0.4**	**0.2**	**0**	**0.2**	**0.4**	**0**	**0**	**0.6**	**0**	**1.2**	**0.4**
2SE03: STRUCTURAL ANALYSIS - I															
Course Code	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
2SE03.1	3	2	1	1	1	-	-	-	2	1	-	1	1	2	1
2SE03.2	3	2	1	1	1	-	-	-	2	1	-	1	1	2	1
2SE03.3	3	2	1	1	1	-	-	-	2	1	-	1	1	2	1
2SE03.4	3	2	1	1	1	-	-	-	2	1	-	1	1	2	1
2SE03	**3**	**2**	**1**	**1**	**1**	**-**	**-**	**-**	**2**	**1**	**-**	**1**	**1**	**2**	**1**
2CE04: ENGINEERING GEOLOGY															
CE 204.1	1	1	-	-	-	1	2	1	2	2	1	2	1	2	1
CE 204.2	1	1	-	-	2	2	2	2	1	2	2	3	1	2	1
CE 204.3	2	2	1	2	2	2	2	2	2	2	2	3	1	3	1
CE 204.4	3	2	2	2	2	3	2	2	2	3	2	2	2	3	2
CE 204.5	3	2	2	3	2	3	2	2	3	3	2	3	3	3	3
CE 204	**2.0**	**1.6**	**1**	**1.4**	**1.6**	**2.1**	**2**	**1.8**	**2**	**2.4**	**1.8**	**2.6**	**1.6**	**2.3**	**1.6**
2CE05: CONSTRUCTION TECHNOLOGY															
CE206.1	1	2	3	2	1	2	3	3	2	2	3	2	1	2	3
CE206.2	3	2	3	2	3	3	3	3	3	3	2	3	3	3	3
CE206.3	2	2	2	3	2	2	2	1	3	3	3	3	1	3	2
CE206	**2.00**	**2.00**	**2.67**	**2.33**	**2.00**	**2.33**	**2.67**	**2.33**	**2.67**	**2.67**	**2.67**	**2.67**	**1.67**	**2.67**	**2.67**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
SEMESTER 5															
3SE01: ADVANCED GEOTECHNICAL ENGINEERING															
3SE01.1	3	3	2	3	1	--	--	--	1	--	--	--	2	--	2
3SE01.2	3	3	2	3	1	--	--	1	2	1	--	3	2	2	3
3SE01.3	3	3	2	3	1	--	--	1	2	1	--	3	3	2	3
3SE01.4	1	1	--	1	1	--	--	1	--	--	--	3	--	--	3
3SE01	**2.5**	**2.5**	**1.5**	**2.5**	**1**	**0**	**0**	**0.75**	**1.25**	**0.5**	**0**	**2.25**	**1.75**	**1**	**2.75**
3SE02: STRUCTURAL ANALYSIS II															
3SE02.1	3	3	2	3	3	1	--	1	1	2	--	3	2	1	2
3SE02.2	3	3	2	3	2	1	--	1	1	2	--	2	2	1	2
3SE02.3	3	3	2	3	3	1	--	1	1	2	--	3	2	1	2
3SE02	**3**	**3**	**2**	**3**	**2.67**	**1**	**--**	**1**	**1**	**2**	**--**	**2.67**	**2**	**1**	**2**
3SE03: DESIGN OF STEEL STRUCTURES															
3SE03.1	3	3	3	2	2	2	1	2	2	2	1	3	3	3	3
3SE03.2	3	3	3	2	2	2	1	2	2	2	1	3	3	3	3
3SE03.3	3	3	3	2	2	2	1	2	2	2	1	3	3	3	3
3SE03	**3**	**3**	**3**	**2**	**2**	**2**	**1**	**2**	**2**	**2**	**1**	**3**	**3**	**3**	**3**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3CE02: HIGHWAY AND TRAFFIC ENGINEERING															
3CE02.1	2	2	2	-	1	1	1	2	2	2	1	1	2	2	2
3CE02.2	2	-	-	-	-	1	1	1	1	1	1	1	2	1	2
3CE02.3	2	2	2	2	2	1	1	1	2	2	1	1	3	1	3
3CE02.4	2	-	-	-	1	2	1	1	1	1	-	1	2	2	2
3CE02.5	2	2	3	2	2	1	1	1	1	1	1	1	3	2	2
3CE02.6	2	2	3	2	2	2	1	1	1	1	1	0	2	1	2
3CE02	**2.00**	**2.00**	**2.50**	**2.00**	**1.60**	**1.33**	**1.00**	**1.17**	**1.33**	**1.33**	**1.00**	**0.83**	**2.33**	**1.50**	**2.17**
3CE01: WATER AND WASTE WATER ENGINEERING															
3CE01.1	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-
3CE01.2	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
3CE01.3	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
3CE01.4	1	1	-	-	-	-	-	-	-	-	-	1	1	-	1
3CE01.5	-	2	-	-	-	-	-	-	-	-	-	1	1	-	1
3CE01	**1.25**	**1.5**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
3CE81: ENVIRONMENT AND HEALTH															
3CE81.1	1	1	1	-	-	-	-	-	-	-	-	-			
3CE81.2	1	1	-	-	-	-	1	-	-	-	-	-			
3CE81	**1**	**1**	**1**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**			

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3CE83: EARTH SYSTEM AND GEO-ENVIRONMENT															
3CE83.1	1	0	0	0	0	1	1	1	0	1	0	0	0	0	0
3CE83.2	2	1	0	0	0	2	2	2	0	1	0	1	0	0	0
3CE83.3	1	1	0	2	0	1	2	0	0	1	0	1	0	0	0
3CE83.4	0	0	0	1	2	0	1	0	0	0	0	1	0	0	0
3CE83	**1**	**0.5**	**0**	**0.75**	**0.5**	**1**	**1.5**	**0.75**	**0**	**0.75**	**0**	**0.75**	**0**	**0**	**0**
3SE81: DISASTER MANAGEMENT AND MITIGATION															
3SE81.1	3	1	1	-	2	3	2	2	2	2	1	3	-	-	-
3SE81.2	3	1	1	-	3	3	2	2	2	2	1	3	-	-	-
3SE81.3	3	1	1	2	3	3	2	2	2	2	1	3	-	-	-
3SE81	**3**	**1**	**1**	**0.67**	**2.67**	**3**	**2**	**2**	**2**	**2**	**1**	**3**	**0**	**0**	**0**
SEMESTER 6															
3CE03: BUILDING PLANNING, COSTING AND VALUATION															
3CE03.1	3	3	3	3	3	3	-	-	-	1	-	3	3	-	3
3CE03.2	3	3	-	-	-	-	2	2	-	-	-	3	3	2	3
3CE03.3	3	3	3	3	3	-	-	-	-	-	-	3	3	-	3
3CE03.4	3	3	3	-	-	-	-	-	-	-	-	3	3	-	3
3CE03.5	3	3	3	3	-	2	-	-	1	1	-	3	3	-	3
3CE03	**3**	**3**	**3**	**3**	**3**	**2.5**	**2**	**2**	**1**	**1**	**0**	**3**	**3**	**2**	**3**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3HS01: ETHICS AND CONSTITUTION OF INDIA															
3HS01.1	-	-	1	1	-	1	1	3	1	2	2	2	-	3	-
3HS01.2	-	-	1	1	-	1	1	3	1	1	1	2	-	3	-
3HS01.3	-	-	1	1	-	1	1	3	1	1	2	2	-	3	-
3HS01.4	-	-	1	1	-	2	1	1	-	1	-	2	-	-	-
3HS01.5	-	-	1	1	-	2	1	1	-	1	-	2	-	-	-
3HS01.6	-	-	1	1	-	2	1	1	-	1	-	2	-	-	-
3HS01	**-**	**-**	**1.0**	**1.0**	**-**	**1.5**	**1.0**	**2.0**	**0.5**	**1.1**	**0.8**	**2.0**	**-**	**1.5**	**-**
3CE04: RAILWAY AND BRIDGE ENGINEERING															
3CE04.1	1	_	1	_	_	1	1	_	1	1	_	1	2	2	2
3CE04.2	2	_	_	2	_	_	_	_	2	1	_	1	2	1	2
3CE04.3	1	_	_	_	_	1	1	_	1	1	_	1	3	1	3
3CE04.4	2	_	_	1	_	_	1	_	1	1	_	1	2	2	2
3CE04	**1.5**	**_**	**0.25**	**0.75**	**_**	**0.5**	**0.75**	**_**	**1**	**1**	**_**	**1**	**2.25**	**1.5**	**2.25**
3CE05: HYDROLOGY AND WATER RESOURCES ENGINEERING															
3CE05.1	2	1	2	-	-	1	-	-	-	1	-	1	-	-	-
3CE05.2	3	2	2	1	-	2	-	-	-	1	-	2	-	-	-
3CE05.3	2	1	3	-	-	2	-	-	-	1	-	2	-	-	1
3CE05.4	3	2	3	1	1	2	-	-	-	1	-	2	2	-	2
3CE05.5	2	1	2	-	-	2	-	-	-	1	-	2	1	-	2
3CE05.6	2	1	2	-	-	2	-	-	-	2	-	3	-	-	-
3CE05	**2.33**	**1.33**	**2.33**	**1**	**1**	**1.83**	**-**	**-**	**-**	**1.17**	**-**	**2**	**1.5**	**-**	**1.67**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3CE82: GEOINFORMATICS															
3CE82.1	2	1	1	1	2	1	1	3	-	-	-	3			
3CE82.2	1	1	1	1	1	2	1	3	-	-	-	3			
3CE82.3	1	1	1	1	1	-	-	3	-	-	-	3			
3CE82.4	1	3	3	3	1	3	2	3	1	1	1	3			
3CE82	**1.25**	**1.5**	**1.5**	**1.5**	**1.25**	**2**	**1.33**	**3**	**1**	**1**	**1**	**3**			
3SE04: DESIGN OF RC STRUCTURES															
3SE04.1	3	2	3	2	1	3	3	1	1	1	1	3	3	1	3
3SE04.2	3	3	3	2	2	3	3	2	2	2	1	3	3	3	3
3SE04.3	3	3	3	2	2	3	3	2	2	2	1	3	3	3	3
3SE04.4	3	3	3	2	2	3	3	2	2	2	1	3	3	3	3
3SE04	**3**	**2.75**	**3**	**2**	**1.75**	**3**	**3**	**1.75**	**1.75**	**1.75**	**1**	**3**	**3**	**2.5**	**3**
3SE82: ADVANCED STRENGTH OF MATERIALS															
3SE82.1	3	3	1	1	1	-	1	-	-	-	2	1	-	-	-
3SE82.2	3	3	3	3	3	-	3	1	-	1	2	3	-	-	-
3SE82.3	3	3	3	3	3	-	2	1	-	-	3	3	-	-	-
3SE82.4	3	3	1	1	1	2	1	-	-	-	3	1	-	-	-
3SE82	**3**	**3**	**2**	**2**	**2**	**0.5**	**1.75**	**0.5**	**0**	**0.25**	**2.5**	**2**	**0**	**0**	**0**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3SE83: BASIC CONCEPTS OF STRUCTURAL BEHAVIOUR															
3SE83.1	3	3	1	1	1	-	1	-	-	-	2	1	-	-	-
3SE83.2	3	3	3	3	3	-	3	1	-	1	2	3	-	-	-
3SE83.3	3	3	3	3	3	-	2	1	-	-	3	3	-	-	-
3SE83.4	3	3	1	1	1	2	1	-	-	-	3	1	-	-	-
3SE83	**3**	**3**	**2**	**2**	**2**	**0.5**	**1.75**	**0.5**	**0**	**0.25**	**2.5**	**2**	**0**	**0**	**0**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
SEMESTER 7															
4CE01: PROJECT MANAGEMENT AND EQUIPMENT															
4CE01.1	03	03	02	03	03	02	-	-	03	03	03	03	02	03	03
4CE01.2	03	03	03	03	03	-	-	-	03	02	03	03	03	03	03
4CE01.3	03	03	02	03	03	-	-	-	03	01	03	03	02	03	03
4CE01.4	03	03	02	02	03	-	-	-	-	-	03	03	03	03	03
4CE01	**03**	**03**	**2.25**	**2.75**	**03**	**02**	**-**	**-**	**03**	**2.0**	**03**	**03**	**2.5**	**03**	**03**
4CE02: CONSTRUCTION SAFETY AND QUALITY MANAGEMENT															
4CE02.1	03	03	03	03	01	03	02	-	-	-	02	03	03	03	02
4CE02.2	03	03	03	03	01	01	01	-	-	-	02	03	03	02	02
4CE02.3	03	03	03	03	03	02	01	-	-	-	03	03	03	03	02
4CE02.4	03	03	03	03	03	02	01	-	-	-	03	03	03	03	02
4CE02	**03**	**03**	**03**	**03**	**02**	**02**	**1.3**	**-**	**-**	**-**	**2.5**	**03**	**03**	**2.75**	**02**
4CE31: PROJECT - I															
4CE31.1	03	03	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.2	02	03	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.3	02	02	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.4	-	-	-	-	-	-	-	-	03	-	-	-	-	-	-
4CE31.5	-	-	-	-	-	-	01	-	03	03	01	03	-	-	-
4CE31.6	03	03	03	03	03	02	01	-	03	03	01	03	-	-	03
4CE31	**2.5**	**2.72**	**03**	**03**	**03**	**02**	**01**	**-**	**03**	**03**	**01**	**03**	**03**	**03**	**03**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
4SE01: EARTHQUAKE ENGINEERING															
4SE01.1	3	1	2	2	2	2	1	1	2	3	-	1	3	1	2
4SE01.2	3	3	3	3	3	1	1	2	3	3	-	3	3	3	3
4SE01.3	3	3	3	3	3	3	1	3	3	3	2	3	3	3	3
4SE01.4	3	3	3	3	3	2	1	1	2	3	-	2	3	1	3
4SE01	**3**	**2.5**	**2.75**	**2.75**	**2.75**	**2**	**1**	**1.75**	**2.5**	**3**	**2**	**2.25**	**3**	**2**	**2.75**
4SE51: GROUND IMPROVEMENT TECHNIQUES															
4SE51.1	1	1	1	1	--	--	--	--	--	--	--	--	--	--	--
4SE51.2	3	3	3	3	3	--	3	3	3	3	3	3	--	3	3
4SE51.3	3	3	3	3	3	--	3	3	3	3	3	3	--	3	3
4SE51.4	3	3	3	3	3	--	3	3	3	3	3	3	3	3	3
4SE51.5	3	3	3	3	3	--	3	3	3	3	3	3	--	3	3
4SE51	**2.60**	**2.60**	**2.60**	**2.60**	**3**	**--**	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**	**0.60**	**2.40**	**2.40**
4SE41: ADVANCED DESIGN OF STEEL STRUCTURES															
4SE41.1	3	3	3	3	3	2	1	3	2	2	2	3	3	2	3
4SE41.2	3	3	3	3	3	2	1	3	2	2	1	3	3	2	3
4SE41.3	3	3	3	3	3	2	1	3	2	2	1	3	3	2	3
4SE41.4	3	3	3	3	3	2	3	3	2	2	3	3	3	2	3
4SE41	**3**	**3**	**3**	**3**	**3**	**2**	**1.5**	**3**	**2**	**2**	**1.75**	**3**	**3**	**2**	**3**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
4CE42: AIR POLLUTION AND CONTROL															
4CE42.1	1	-	-	-	-	1	1	-	-	-	-	-	-	-	-
4CE42.2	2	2	-	-	-		-	-	-	-	-	-	-	-	-
4CE42.3	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
4CE42.4	1	2	1	-	-	-	1	-	-	-	-	1	-	1	-
4CE42	**1**	**2**	**1**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**-**	**1**	**-**
4CE43: GEOMATICS ENGINEERING															
4CE43.1	1	1	1	0	1	-	-	-	-	-	-	-	0	0	0
4CE43.2	1	1	1	0	0	-	-	-	-	-	-	-	0	0	0
4CE43.3	1	1	1	0	0	-	-	-	-	-	-	-	0	0	0
4CE43.4	2	2	2	2	1	-	-	-	-	-	-	-	0	2	2
4CE43	**1.25**	**1.25**	**1.25**	**0.5**	**0.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0**	**0.5**	**0.5**
4CE44: HYDRAULIC MACHINES															
4CE44.1	2	2	1	-	-	-	-	-	-	-	-	-	1		-
4CE44.2	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
4CE44.3	3	3	3	2	-	-	-	-	-	-	-	-	2	-	-
4CE44.4	3	2	3	-	-	-	-	-	-	-	-	-	1	-	-
4CE44.5	2	2	3	2	-	-	-	-	-	-	-	-	1	-	-
4CE44	**2.2**	**2**	**2.2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.25**	**-**	**-**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
4CE45: IRRIGATION AND HYDRAULIC STRUCTURES															
4CE45.1	3	3	3	-	-	-	-	-	-	-	-	-	2	-	-
4CE45.2	3	3	3	-	-	-	-	-	-	-	-	-	2	-	-
4CE45.3	3	3	3	-	-	-	-	-	-	-	-	-	2	-	-
4CE45.4	3	3	3	-	-	-	-	-	-	-	-	-	2	-	-
4CE45.5	3	3	3	-	-	-	-	-	-	-	-	-	2	-	-
4CE45	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
4CE46: URBAN TRANSPORTATION SYSTEM															
4CE46.1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4CE46.2	2	2	2	2	2	2	2	2	2	3	1	2	2	2	2
4CE46.3	3	3	2	2	2	2	2	2	1	2	2	2	2	2	2
4CE46.4	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2
4CE46.5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4CE46	**2.2**	**2.2**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**1.33**	**2.2**	**1.6**	**2.0**	**2.0**	**2.0**	**2.0**
4SE42: ADVANCED STRUCTURAL ANALYSIS															
4SE42.1	3	2	3	2	3	-	-	-	3	-	-	1	3	1	2
4SE42.2	3	2	3	1	2	-	-	-	3	-	-	1	3	1	2
4SE42.3	3	1	3	2	1	-	-	-	3	-	-	1	3	1	2
4SE42.4	3	3	3	3	3	-	-	-	3	-	-	1	3	1	2
4SE42	**3**	**2**	**3**	**2**	**2.25**	**-**	**-**	**-**	**3**	**-**	**-**	**1**	**3**	**1**	**2**

SEMESTER 8															
4CE32: PROJECT - II															
Course Code	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
4CE31.1	03	03	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.2	02	03	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.3	02	02	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.4	-	-	-	-	-	-	-	-	03	-	-	-	-	-	-
4CE31.5	-	-	-	-	-	-	01	-	03	03	01	03	-	-	-
4CE31.6	03	03	03	03	03	02	01	-	03	03	01	03	-	-	03
4CE31	**2.5**	**2.72**	**03**	**03**	**03**	**02**	**01**	**-**	**03**	**03**	**01**	**03**	**03**	**03**	**03**
4CE33: INDUSTRIAL PROJECT															
4CE31.1	03	03	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.2	02	03	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.3	02	02	03	03	03	02	01	-	03	-	01	03	03	03	03
4CE31.4	-	-	-	-	-	-	-	-	03	-	-	-	-	-	-
4CE31.5	-	-	-	-	-	-	01	-	03	03	01	03	-	-	-
4CE31.6	03	03	03	03	03	02	01	-	03	03	01	03	-	-	03
4CE31	**2.5**	**2.72**	**03**	**03**	**03**	**02**	**01**	**-**	**03**	**03**	**01**	**03**	**03**	**03**	**03**

4CE47: GREEN BUILDING MATERIALS AND TECHNIQUES															
4CE47.1	03	03	02	03	03	02	03	-	-	-	-	03	02	03	03
4CE47.2	03	02	03	03	03	02	03	-	-	-	03	03	03	03	03
4CE47.3	03	03	02	02	03	02	03	-	-	-	03	03	02	03	03
4CE47.4	03	03	02	02	03	02	03	-	03	-	-	03	02	03	03
4CE47	**03**	**2.75**	**2.25**	**2.5**	**03**	**02**	**03**	**-**	**03**	**-**	**03**	**03**	**2.5**	**03**	**03**
4CE48: PAVEMENT ANALYSIS AND DESIGN															
4CE48.1	2	1	0	0	0	1	1	1	1	1	1	2	1	1	1
4CE48.2	2	2	2	2	3	1	0	1	2	2	2	2	2	1	1
4CE48.3	3	3	3	3	3	1	1	2	3	3	2	3	3	1	1
4CE48.4	2	2	2	2	1	1	1	1	2	2	2	2	2	1	1
4CE48	**2.25**	**2.0**	**1.75**	**1.75**	**1.75**	**1.0**	**0.75**	**1.25**	**2.0**	**2.0**	**1.75**	**2.25**	**2.0**	**1.0**	**1.0**
4CE49: DIGITAL LAND SURVEY PROJECT															
Course Code	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
4CE49.1	2	1	0	0	2	-	-	1	-	-	-	-	0	0	1
4CE49.2	1	1	0	0	1	-	-	-	-	-	-	-	0	0	1
4CE49.3	1	1	0	0	2	-	-	-	-	-	-	-	0	0	1
4CE49	**1.33**	**1**	**0**	**0**	**1.67**	**-**	**-**	**0.33**	**-**	**-**	**-**	**-**	**0**	**0**	**1**

4CE50: TRAFFIC ENGINEERING AND FIELD STUDIES															
Course Code	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
4CE01.1	03	03	02	03	03	02	-	-	03	03	03	03	02	03	03
4CE01.2	03	03	03	03	03	-	-	-	03	02	03	03	03	03	03
4CE01.3	03	03	02	03	03	-	-	-	03	01	03	03	02	03	03
4CE01.4	03	03	02	02	03	-	-	-	-	-	03	03	03	03	03
4CE01	**03**	**03**	**2.25**	**2.75**	**03**	**02**	**-**	**-**	**03**	**2.0**	**03**	**03**	**2.5**	**03**	**03**
4CE51: BUILDING CONSTRUCTION PROJECT															
4CE51.1	03	03	03	03	03	-	03	-	03	-	01	-	03	03	03
4CE51.2	03	03	03	03	03	-	03	-	03	-	01	-	03	03	03
4CE51.3	03	03	03	03	03	-	01	-	03	-	01	-	03	03	03
4CE51	**03**	**03**	**03**	**03**	**03**	**-**	**2.33**	**-**	**03**	**-**	**01**	**-**	**03**	**03**	**03**
4CE52: BUILDING SERVICES AND TREATMENTS															
4CE52.1	02	01	02	00	02	03	03	03	02	02	03	03	02	03	03
4CE52.2	01	00	02	00	02	02	03	03	03	03	02	03	03	03	03
4CE52.3	01	00	03	00	02	03	03	03	02	03	03	03	03	03	03
4CE52	**1.33**	**0.33**	**2.33**	**00**	**02**	**2.66**	**03**	**03**	**2.33**	**2.66**	**2.66**	**03**	**2.66**	**03**	**03**
4CE53: SOLID WASTE MANAGEMENT															
4CE53.1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
4CE53.2	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-
4CE53.3	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-
4CE53.4	2	2	1	-	-	1	1	-	-	-	-	-	1	1	-

AVG	1.25	1.33	1	-	-	1	1	-	-	-	-	-	1	1	-
4CE54: IRRIGATION WATER MANAGEMENT															
Course Code	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
4CE54.1	2	1	-	-	-	-	-	-	-	1	-	-	-	-	-
4CE54.2	3	3	3	-	-	-	-	-	-	2	2	-	2	-	-
4CE54.3	3	3	3	-	-	-	-	-	-	2	2	-	2	-	-
4CE54.4	2	2	1	1	-	-	-	-	-	2	2	-	-	-	-
4CE54.5	2	2	1	2	-	-	-	-	-	2	2	-	-	-	-
4CE54	**2.4**	**2.2**	**2**	**1.5**	**-**	**-**	**-**	**-**	**-**	**1.8**	**2**	**-**	**2**	**-**	**-**
4CE55: DOCK, HARBOUR & AIRPORT ENGINEERING															
4CE55.1	2	2	1	1	1	1	1	2	2	2	1	2	2	2	2
4CE55.2	2	2	1	1	2	2	1	2	2	2	1	2	2	2	2
4CE55.3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4CE55.4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4CE55.5	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2
4CE55	**2.4**	**2.0**	**1.6**	**1.67**	**1.8**	**1.8**	**1.6**	**2.0**	**2.0**	**2.0**	**1.6**	**2.0**	**2.0**	**2.0**	**2.0**
4CE56: SOFTWARE TRAINING IN CIVIL ENGINEERING															
4CE56.1	03	03	03	03	03	-	03	-	03	-	01	-	03	03	03
4CE56.2	03	03	03	03	03	-	03	-	03	-	01	-	03	03	03
4CE56	**03**	**03**	**03**	**03**	**03**	**-**	**03**	**-**	**03**	**-**	**01**	**-**	**03**	**03**	**03**

4SE43: ADVANCED DESIGN OF CONCRETE STRUCTURES															
4SE43.1	3	3	3	3	2	2	2	3	2	2	2	2	3	2	3
4SE43.2	3	3	3	2	3	2	2	3	2	3	2	3	3	3	3
4SE43.3	3	3	3	2	3	2	2	3	2	3	2	3	3	3	3
4SE43	**3**	**3**	**3**	**2.33**	**2.33**	**2.67**	**2**	**3**	**3**	**2.67**	**2**	**2.67**	**3**	**2.67**	**3**
4SE44: COMPUTER AIDED STRUCTURAL ANALYSIS															
4SE44.1	3	3	2	3	2	2	2	1	2	2	1	3	3	3	1
4SE44.2	3	3	2	3	1	2	2	1	2	1	1	3	2	3	2
4SE44.3	3	3	2	3	1	2	2	1	2	1	1	3	2	3	1
4SE44	**3**	**3**	**2**	**3**	**1.33**	**2**	**2**	**1**	**2**	**1.33**	**1**	**3**	**2.33**	**3**	**1.33**
4SE45: STRUCTURAL DESIGN PRACTICES															
Course Code	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
4SE45.1	3	3	3	3	3	2	2	3	2	3	2	3	3	3	3
4SE45.2	3	3	3	3	3	2	2	3	2	3	2	3	3	3	3
4SE45	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**
4SE46: DESIGN OF SPECIAL STRUCTURES															
4SE46.1	3	3	3	2	3	2	2	3	2	3	2	3	3	3	3
4SE46.2	3	3	3	2	3	2	2	3	2	3	2	3	3	3	3
4SE46	**3**	**3**	**3**	**2**	**3**	**2**	**2**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**

4SE47: REPAIRS AND REHABILITATION OF STRUCTURES															
4SE47.1	3	3	3	3	3	2	2	1	2	2	1	2	3	2	2
4SE47.2	3	3	2	1	3	2	2	1	2	2	1	2	2	2	2
4SE47.3	3	3	3	3	3	2	2	1	2	2	1	2	3	2	2
4SE47	**3**	**3**	**2.67**	**2.33**	**3**	**2**	**2**	**1**	**2**	**2**	**1**	**2**	**2.67**	**2**	**2**
4SE48: PRESTRESSED CONCRETE															
4SE48.1	3	3	3	3	1	1	1	1	1	1	1	2	3	1	3
4SE48.2	3	3	3	2	3	2	2	3	2	3	2	3	3	3	3
4SE48.3	3	3	3	2	3	2	2	3	2	3	2	3	3	3	3
4SE48	**3**	**3**	**3**	**2.6**	**2.6**	**3**	**2.4**	**1.8**	**2**	**2.6**	**1.8**	**3**	**1.4**	**1**	**2.8**
4SE49: FOUNDATION ENGINEERING															
4SE49.1	3	3	3	3	3	--	3	3	3	3	3	3	3	3	3
4SE49.2	3	3	3	3	3	--	3	3	3	3	3	3	3	3	3
4SE49.3	3	3	3	3	3	--	3	3	3	3	3	3	3	3	3
4SE49.4	2	2	2	2	2	--	2	2	2	2	2	2	2	2	2
4SE49	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**--**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**
4SE50: SOFTWARE TRAINING IN STRUCTURAL ENGINEERING															
4SE50.1	3	3	3	3	3	2	3	2	2	2	3	3	3	3	3
4SE50.2	3	3	3	3	3	2	3	2	2	2	3	2	3	3	3
4SE50.3	3	3	3	3	3	3	1	3	2	2	2	2	3	3	3
4SE50	**3**	**3**	**3**	**3**	**3**	**2.33**	**2.33**	**2.33**	**2**	**2**	**2.67**	**2.33**	**3**	**3**	**3**

6. Mapping of Courses with POs and PSOs

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	Engineering knowledge	Problem Analysis	Design of solution	Conduct investigations of complex problems	Modern tool usage	The Engineer and Society	Environment and Stability	Ethics	Individual and Team Work	Communication	Project management and finance	Lifelong learning	Design civil engineering Structures …	Follow human values and ethics….	Adapt state-of-thee –art practices and …
SEMESTER 1															
BS 111: ADVANCED CALCULUS	2.5	1.83	0.5	1.33	1.5	0	0.67	0	2	1.67	0	2.67			
ES103: BASIC ELECTRICAL ENGINEERING	3	3	2.75	2	2.25	2.25	3	1	1.75	1.75	2	1			
ES110: BASIC MECHANICAL ENGINEERING	3	1.6	0	0	0	0	0	0	0	0	0	0	0	0	0
ES111: WORKSHOP	2.25	0	0	0	0	0.75	0	0	0.75	0	0	0	0	0	0
HS112: ENVIRONMENTAL SCIENCE	1.25	1	-	0.5	0.5	1.75	1.75	1.75	1.25	1	-	2			
SEMESTER 2															
BS112: LINEAR ALGEBRA AND FOURIER SERIES	2.6	1.8	2	1.4	1.4	0.8	0	0	1.8	1.6	0	2.6			
BS103: PHYSICS	3	2.4	1	2.2	1.8	0	0	0	1.5	0.6	0	2			
ES106: PROGRAMMING FOR ENGINEERS	3	1.14	2	1.28	2.57	0	0	0	0	0.42	0	2.42	0	0	0
ES109: ENGINEERING GRAPHICS AND DESIGN	3	0	0	0	0	0	0	0	1	0.6	0	0.8	0	0	0

ES115: BASIC CIVIL ENGINEERING	3	2.33	2	2	3	1	1	1	3	2	2	2			
HS101: ENGLISH	0	0	0	0	0	0	0	1.2	1.2	3	0	3			

Course Code	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
SEMESTER 3															
2BS01: DIFFERENTIAL EQUATIONS AND STATISTICS	1	1	1.83	0	2.5	0	0	0	2	1.6	0	2	0	0	0
2SE01: CONSTRUCTION MATERIAL AND CONCRETE TECHNOLOGY	3	3	2.5	2.75	2	2	2	2.25	2	2.25	2	3	2.25	2.5	2.5
2ES01: MECHANICS OF SOLIDS	3	2	2	0	1	0	1	1	1	1	0	1	2	0	0
2CE01: FLUID MECHANICS	1.8	1.8	2.2	1.5	2	1	1	--	1.25	1	--	1	2	--	1.8
2HS01: PROFESSIONAL SOFT SKILLS	-	-	0.3	-	-	0.5	1	1.5	2	2.5	1.5	1.6	-	-	-
2CE02: ENGINEERING SURVEYING	2	2.7	1	2	2.7	1.5	3	2.5	1	2	-	2	-	1.25	1.5
SEMESTER 4															
2BS03: NUMERICAL METHODS IN CIVIL ENGINEERING	2.5	1.75	2.2	1	3	1	--	--	1	1	--	1.25	1.6	--	1.75
2SE02: GEOTECHNICAL ENGINEERING	2	1.2	0	0	0.4	0.2	0	0.2	0.4	0	0	0.6	0	1.2	0.4
2SE03: STRUCTURAL ANALYSIS - I	3	2	1	1	1	-	-	-	2	1	-	1	1	2	1
2CE04: ENGINEERING GEOLOGY	2	1.6	1	1.4	1.6	2.1	2	1.8	2	2.4	1.8	2.6	1.6	2.3	1.6
2CE05: CONSTRUCTION TECHNOLOGY	2	2	2.67	2.33	2	2.33	2.67	2.33	2.67	2.67	2.67	2.67	1.67	2.67	2.67

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
SEMESTER 5															
3SE01: ADVANCED GEOTECHNICAL ENGINEERING	2.5	2.5	1.5	2.5	1	0	0	0.75	1.25	0.5	0	2.25	1.75	1	2.75
3SE02: STRUCTURAL ANALYSIS II	3	3	2	3	2.67	1	--	1	1	2	--	2.67	2	1	2
3SE03: DESIGN OF STEEL STRUCTURES	3	3	3	2	2	2	1	2	2	2	1	3	3	3	3
3CE02: HIGHWAY AND TRAFFIC ENGINEERING	2	2	2.5	2	1.6	1.33	1	1.17	1.33	1.33	1	0.83	2.33	1.5	2.17
3CE01: WATER AND WASTE WATER ENGINEERING	1.25	1.5	-	-	-	-	1	-	-	-	-	1	1	-	1
3CE81: ENVIRONMENT AND HEALTH	1	1	1	-	-	-	1	-	-	-	-	-			
3CE83: EARTH SYSTEM AND GEO-ENVIRONMENT	1	0.5	0	0.75	0.5	1	1.5	0.75	0	0.75	0	0.75	0	0	0
3SE81: DISASTER MANAGEMENT AND MITIGATION	3	1	1	0.67	2.67	3	2	2	2	2	1	3	0	0	0
SEMESTER 6															
3CE03: BUILDING PLANNING, COSTING AND VALUATION	3	3	3	3	3	2.5	2	2	1	1	0	3	3	2	3
3HS01: ETHICS AND CONSTITUTION OF INDIA	-	-	1	1	-	1.5	1	2	0.5	1.1	0.8	2	-	1.5	-
3CE04: RAILWAY AND BRIDGE ENGINEERING	1.5	_	0.25	0.75	_	0.5	0.75	_	1	1	_	1	2.25	1.5	2.25
3CE05: HYDROLOGY AND WATER RESOURCES ENGINEERING	2.33	1.33	2.33	1	1	1.83	-	-	-	1.17	-	2	1.5	-	1.67
3CE82: GEOINFORMATICS	1.25	1.5	1.5	1.5	1.25	2	1.33	3	1	1	1	3			
3SE04: DESIGN OF RC STRUCTURES	3	2.75	3	2	1.75	3	3	1.75	1.75	1.75	1	3	3	2.5	3

3SE82: ADVANCED STRENGTH OF MATERIALS	3	3	2	2	2	0.5	1.75	0.5	0	0.25	2.5	2	0	0	0
3SE83: BASIC CONCEPTS OF STRUCTURAL BEHAVIOUR	3	3	2	2	2	0.5	1.75	0.5	0	0.25	2.5	2	0	0	0
3CE03: BUILDING PLANNING, COSTING AND VALUATION	3	3	3	3	3	2.5	2	2	1	1	0	3	3	2	3
SEMESTER 7															
4CE01: PROJECT MANAGEMENT AND EQUIPMENT	3	3	2.25	2.75	3	2	-	-	3	2	3	3	2.5	3	3
4CE02: CONSTRUCTION SAFETY AND QUALITY MANAGEMENT	3	3	3	3	2	2	1.3	-	-	-	2.5	3	3	2.75	2
4CE31: PROJECT - I	2.5	2.72	3	3	3	2	1	-	3	3	1	3	3	3	3
4SE01: EARTHQUAKE ENGINEERING	3	2.5	2.75	2.75	2.75	2	1	1.75	2.5	3	2	2.25	3	2	2.75
4SE51: GROUND IMPROVEMENT TECHNIQUES	2.6	2.6	2.6	2.6	3	--	2.4	2.4	2.4	2.4	2.4	2.4	0.6	2.4	2.4
4SE41: ADVANCED DESIGN OF STEEL STRUCTURES	3	3	3	3	2	1.5	3	2	2	1.75	3	3	2	3	
4CE42: AIR POLLUTION AND CONTROL	1	2	1	-	-	1	1	-	-	-	-	1	-	1	-
4CE43: GEOMATICS ENGINEERING	1.25	1.25	1.25	0.5	0.5	-	-	-	-	-	-	-	0	0.5	0.5
4CE44: HYDRAULIC MACHINES	2.2	2	2.2	2	-	-	-	-	-	-	-	-	1.25	-	-
4CE45: IRRIGATION AND HYDRAULIC STRUCTURES	3	3	3	-	-	-	-	-	-	-	-	-	2	-	-
4CE46: URBAN TRANSPORTATION SYSTEM	2.2	2.2	2	2	2	2	2	2	1.33	2.2	1.6	2	2	2	2
4SE42: ADVANCED STRUCTURAL ANALYSIS	3	2	3	2	2.25	-	-	-	3	-	-	1	3	1	2

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
SEMESTER 8															
4CE32: PROJECT - II	2.5	2.72	3	3	3	2	1	-	3	3	1	3	3	3	3
4CE33: INDUSTRIAL PROJECT	2.5	2.72	3	3	3	2	1	-	3	3	1	3	3	3	3
4CE47: GREEN BUILDING MATERIALS AND TECHNIQUES	3	2.75	2.25	2.5	3	2	3	-	3	-	3	3	2.5	3	3
4CE48: PAVEMENT ANALYSIS AND DESIGN	2.25	2	1.75	1.75	1.75	1	0.75	1.25	2	2	1.75	2.25	2	1	1
4CE49: DIGITAL LAND SURVEY PROJECT	1.33	1	0	0	1.67	-	-	0.33	-	-	-	-	0	0	1
4CE50: TRAFFIC ENGINEERING AND FIELD STUDIES	3	3	2.25	2.75	3	2	-	-	3	2	3	3	2.5	3	3
4CE51: BUILDING CONSTRUCTION PROJECT	3	3	3	3	3	-	2.33	-	3	-	1	-	3	3	3
4CE52: BUILDING SERVICES AND TREATMENTS	1.33	0.33	2.33	0	2	2.66	3	3	2.33	2.66	2.66	3	2.66	3	3
4CE53: SOLID WASTE MANAGEMENT	1.25	1.33	1	-	-	1	1	-	-	-	-	-	1	1	-
4CE54: IRRIGATION WATER MANAGEMENT	2.4	2.2	2	1.5	-	-	-	-	-	1.8	2	-	2	-	-
4CE55: DOCK, HARBOUR & AIRPORT ENGINEERING	2.4	2	1.6	1.67	1.8	1.8	1.6	2	2	2	1.6	2	2	2	2
4CE56: SOFTWARE TRAINING IN CIVIL ENGINEERING	3	3	3	3	3	-	3	-	3	-	1	-	3	3	3
4SE43: ADVANCED DESIGN OF CONCRETE STRUCTURES	3	3	3	2.33	2.33	2.67	2	3	3	2.67	2	2.67	3	2.67	3

4SE44: COMPUTER AIDED STRUCTURAL ANALYSIS	3	3	2	3	1.33	2	2	1	2	1.33	1	3	2.33	3	1.33
4SE45: STRUCTURAL DESIGN PRACTICES	3	3	3	3	3	2	2	3	2	3	2	3	3	3	3
4SE46: DESIGN OF SPECIAL STRUCTURES	3	3	3	2	3	2	2	3	2	3	2	3	3	3	3
4SE47: REPAIRS AND REHABILITATION OF STRUCTURES	3	3	2.67	2.33	3	2	2	1	2	2	1	2	2.67	2	2
4SE48: PRESTRESSED CONCRETE	3	3	3	2.6	2.6	3	2.4	1.8	2	2.6	1.8	3	1.4	1	2.8
4SE49: FOUNDATION ENGINEERING	2.75	2.75	2.75	2.75	2.75	--	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
4SE50: SOFTWARE TRAINING IN STRUCTURAL ENGINEERING	3	3	3	3	3	2.33	2.33	2.33	2	2	2.67	2.33	3	3	3

7. Mapping of Laboratory Component with POs and PSOs

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	Engineering knowledge	Problem Analysis	Design of solution	Conduct investigations of complex problems	Modern tool usage	The Engineer and Society	Environment and Stability	Ethics	Individual and Team Work	Communication	Project management and finance	Lifelong learning	Design civil engineering Structures ….	Follow human values and ethics…	Adapt state-of-thee –art practices and …..
SEMESTER 1															
ES111: WORKSHOP	2.25	0	0	0	0	0.75	0	0	0.75	0	0	0	0	0	0

5. Mapping of Academic & Students Activities with POs and PSOs.

1. INDUCTION PROGRAM:

ACTIVITIES DURING INDUCTION PROGRAM:

1. Visit to the Institute.
2. Visit to Industries: Elecon, Atlanta, Amul, Finecast and Rhino Industries etc.
3. Visit to Villages: Valsan, Jol, Mogar, Sarsa, Adas, Vaghasi, Navali, Sandeshar, Napadvanta and Vadod.
4. Expert Lectures By: Collector, Entrepreneur, Corporate leaders, Cyber Security Personnel, Spiritual & Motivational Leaders, Professional Trainer, Police Superintendent, Artists.

OUTCOMES

1. It has provided students the confidence and skills to successfully transition to college.
2. Students have been familiarized with BVM College and its resources.
3. It has built positive relationships between new students and peers, faculty, and staff at BVM College.
4. It has assisted students in their personal development of life skills, ethical judgment and moral fortitude.
5. It has helped students for enhancing critical thinking skills through self-exploration and class experiences.
6. Student will able to develop strategies and resources for students to balance school, work, and personal commitments.
7. It has given exposure to college life in a structured and supportive learning community.

2. TECHNICAL VISITS:

1. Technical visits to core industries
2. Technical visits to civil construction sites
3. Technical visits to Research Centers.

OUTCOMES

1. Industrial visits enhance student practical knowledge and challenges faced by the organization in the business world.
2. It gives greater clarity about various technical concepts for students as they can practically see how the classroom concepts are put into action.
3. It motivates students to achieve essential Program Outcomes like life-long

learning, communication, engineer & society,

4. Students get exposure to the usage of modern tools
5. Students are motivated for learning beyond syllabus.
6. Report writing being part of every industrial visit, it enhance the writing and presentation skills.

3. INDUSTRIAL TRAINING/INTERNSHIP:

As mandatory part of the program structure, a student is required to undergo internship or industrial training in core industry or research institution for a period of total 6 weeks during his/her undergraduate program.

OUTCOMES:

1. Identify, define and analyze the peculiar Civil engineering problems of Industry/ Society/Governments/ User.
2. Apply knowledge of mathematics, science & engineering all together to find the solution of problem/project under study.
3. Develop/Design solution of problem under study through literature survey and engineering in-sights with reference to the present context of study.
4. Able to work efficiently as individual investigator as well as in team-work.
5. Prepare presentation and communicate authentically about the problems under study with appropriate solution, at appropriate audience.
6. Draft/write/present/publish 'technical paper' on the problem/project/topic under study at seminar/conference/engineering journal/competition.

4. MEMORANDUM OF UNDERSTANDING

The Institution or department has signed various MoU with Professional Training Agencies, Industrial units, Research Institutions to share the synergies for mutual benefits.

OUTCOMES:

1. Knowledge of state-of-the-art technologies through Extension Lectures.
2. Sensitizing social issues like energy conservation and management through agencies like GEDA
3. Industrial visits, internship, undertaking projects etc are the activities undertaken under this auspices.

5. STUDENTS ACTIVITIES

The college organizes various co-curricular and extra-curricular activities appropriately spaced during the academic calendar of the institution.

ACTIVITIES:

1. Student Training Program: In the domain subjects, pedagogies, communication skills, Personality Development Programs etc.

2. Social & Environmental issues: Blood donation camp, Tree Plantation, NSS & NCC activities, social activities under the aegis of NGO 'Bachpan' etc.

3. Annual Festival- 'Udaan': Comprising of about 50 events under the category of design, problem solving, coding, innovations, literature, dramatics, fine arts, music, etc…

OUTCOMES:

1. Enhance skills related to Project and financial management
2. Enhance design & innovation skills, creativity in subject domain, effective communication skills
3. Built team spirit as a member or leader of a diverse team. Build amicable personality
4. Sensitizes the social issues and the commitment of engineers toward society
5. Improve learning capacity and assimilate lifelong learning

Mapping of Activities Outcomes with POs and PSOs															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
Induction Program	1	-	-	-	-	2	2	1	-	1	-	-	-	-	-
Technical Visits	1	1	1	-	1	1	1	-	-	1	1	1	1	1	1
Internship	2	2	2	1	2	-	-	1	2	2	2	1	1	1	1
MoU	-	-	1	-	1	-	-	1	1	-	1	1	1	1	1
Students Activities	1	2	1	-	-	2	1	2	3	2	3	2	1	1	1