SMT. S.R.PATEL ENGINEERING COLLEGE, UNJHA
CIVIL ENGINEERING DEPARTMENT
COURSE OUTCOMES: CIVIL ENGINEERING

Course Outcomes (CO's):

On the completion of these following courses, the students will be able to:

B.E. (Civil) 1st Year

	Course Outcomes
Subject Code: 3110002 Subject Name: ENGLISH	CO1: Use various forms of vocabulary in varied situations in oral and written communication CO2: Understand the phonetics and the transcription pattern to learn correct pronunciation.. CO3: Comprehend the dynamics of various rules of grammar and check its validation while they speak and write language correctly. CO4: Use grammar effectively to make themselves competent Listener, Speaker, Reader and Writer by exposing to various set of situations CO5: Write various formal and informal documents of day to day life and professional set up. CO6: Demonstrate the qualities of writing in diverse situation by using the nuances such as conciseness, clarity, accuracy, organization, and coherence
Subject Code: 3110003 Subject Name: PROGRAMMING FOR PROBLEM SOLVING	CO:1 Formulate algorithm/flowchart for given arithmetic and logical problem CO-2 Translate algorithm/flowchart into C program using correct syntax and execute it CO-3 Write programs using conditional, branching, iteration, and recursion CO-4 Decompose a problem into function CO-5 Develop an application using the concepts of array, pointer, structure, and file management to solve engineering and/or scientific problems
Subject Code: 3110004 Subject Name: BASIC CIVIL ENGINEERING	CO-1 describe the use of different materials in Civil Engineering CO-2 interpret various aspect of the building and town planning CO-3 identify the various building components, method of constructions , and services CO-4 use different equipments for angular and linear measurements CO-5 describe various public transportation system, water conservation methods, water -waste water quality and advances in civil engineering
Subject Code: 3110005 Subject Name: BASIC ELECTRICAL ENGINEERING	CO-1 Apply fundamental electrical laws and circuit theorems to electrical circuits. CO-2 Analyze single phase and three phase AC circuits. CO-3 Describe operating principle and applications of static and rotating electrical machines. CO-4 Comprehend electrical installations, their protection and personnel safety
Subject Code: 3110006 Subject Name: Basic Mechanical Engineering	CO-1 Discuss the various sources of energy and basic terminology of Mechanical engineering CO-2 Make calculations for commonly used working fluids i.e. ideal gases and steam CO-3 Analyze various heat engine cycles and understand construction and working of IC engines CO-4 Discuss working and applications of steam boilers and various energy conversion systems CO-5 Discuss various power transmission elements and properties of various

	engineering materials with their applications
Subject Code: 3110007 Subject Name: ENVIRONMENTAL SCIENCE	CO-1 Identify the types of pollution in society along with their sources CO-2 Realize the global environmental issues CO-3 Conceptualize the principles of Green Buildings and Smart cities CO-4 Implement the concept of recycle and reuse in all fields of engineering
Subject Code: 3110011 Subject Name: PHYSICS	CO-1 The student will gain knowledge of theoretical and mathematical concepts associated with properties of matter. CO-2 The student will demonstrate understanding the basic principles, properties and applications of associated with Waves, Motion and Acoustics. CO-3 The student will demonstrate the understanding of basic principles, properties, various method of production technique of Ultrasonic sound and its applications in NDT. CO-4 The student will demonstrate understanding of basic theory, properties and applications of Superconductivity. CO-5 The student will demonstrate understanding of basic principles, properties, type and application Lasers.
Subject Code: 3110012 Subject Name: WORKSHOP/ MANUFACTURING PRACTICES	CO-1 Understand various manufacturing processes in machine shop and perform basic operations of welding, fitting, smithy and carpentry work a) perform basic operations of welding, fitting, smithy and carpentry work b) Explain various manufacturing processes in machine shop CO-2 Discuss application of plumbing fitting, masonry items and about plastic molding and glass cutting for various engineering application CO-3 Measure different electrical quantities and trouble shoot electrical and electronics appliances. CO-4 Conduct experiments with various kits such as Raspberry and Arduino for embedded system development CO-5 Use basic commands of computer operating systems
Subject Code: 3110013 Subject Name: ENGINEERING GRAPHICS & DESIGN	CO-1 Know and understand the conventions and the methods of engineering drawing. CO-2 Interpret engineering drawings using fundamental technical mathematics. CO-3 Construct basic and intermediate geometry and comprehend the theory of projection. CO-4 Improve their visualization skills so that they can apply these skills in developing new products. CO-5 Improve their technical communication skill in the form of communicative drawings. CO-6 Use computer software for engineering drawing.
Subject Code: 3110014 Subject Name: Mathematics-1	CO: 1 To apply differential and integral calculus to improper integrals and to determine applications of definite integral. Apart from some other applications they will have a basic understanding of indeterminate forms, Beta and Gamma functions. CO: 2 To apply the various tests of convergence to sequence, series and the tool of power series and fourier series for learning advanced Engineering Mathematics. CO: 3 To compute directional derivative, maximum or minimum rate of change and optimum value of functions of several variables. CO: 4 To compute the areas and volumes using multiple integral techniques. CO: 5 To perform matrix computation in a comprehensive manner.
Subject Code: 3110015 Subject Name: Mathematics-2	CO: 1 To apply mathematical tools needed in evaluating vector calculus and their usage like Work, Circulation and Flux. CO: 2 To apply the laplace transform as tools which are used to solve differential equations and fourier integral representation. CO: 3 To apply effective mathematical tools for the solutions of first order ordinary differential equations.

	CO: 4 To apply effective mathematical methods for the solutions of higher order ordinary differential equations. CO: 5 To use series solution methods and special functions like Bessels' functions.
Subject Code: 3110017 Subject Name: Induction Program	----------

B.E. (Civil) 3rd Semester

Subject Code: 3130004 Subject Name: Effective Technical Communication	CO: 1Define and discuss dynamics of Verbal and Non Verbal aspects of Communication CO: 2 Write various formal documents of technical and professional communication CO:3 Communicate in diverse formal situations taking place in organizations CO: 4 Illustrate and examine the knowledge of ethical aspects of engineering CO: 5 Demonstrate and explain social and professional etiquettes CO:6 Plan self-development and practice self-assessment
Subject Code: 3130007 Subject Name: Indian Constitution	CO: 1 Enhance human values , create awareness about law enactment and importance of Constitution. CO-2 To Understand the Fundamental Rights and Fundamental Duties of the Indian Citizen to instill morality, social values, honesty, dignity of life and their social Responsibilities. CO-3 Create Awareness of their Surroundings, Society, Social problems and their suitable solutions while keeping rights and duties of the citizen keeping in mind. CO-4 Understand distribution of powers and functions of Local Self Government. CO-5 Understand the National Emergency, Financial Emergency and their impact on Economy of the country.
Subject Code: 3130008 Subject Name: Design Engineering 1 A	----------
Subject Code: 3130606 Subject Name: Geotechnical Engineering	CO-1 Classify the soil and will be able to understand its behaviour and will be able to compute/estimate index parameters. CO-2 Interpret soil behaviour through learning soil compaction, consolidation, and analyise various theories and calculate parameters needed in design. CO-3 Compute earth pressure, stress distributions and FOS for slopes using various graphical and analytical tools for various engineering projects/site. CO-4 Differentiate, compare, formulate, and evaluate soil parameters through performing various tests as per site conditions or project needs ethically and professionally. CO-5 Suggest suitable type of foundation as per soil type, estimate bearing capacity and demonstrate its socio-economic feasibility.
Subject Code: 3130607 Subject Name: Building Construction Technology	CO-1 Develop in- depth understanding about construction materials, building components, its construction process etc., and apply the knowledge to execute normal sized building construction project. CO-2 Recognize the associated entities involved in building construction process. CO-3 Identify the factors to be considered in planning and construction of buildings. CO-4 Understand the practices and techniques for Temporary/Special construction Works. CO-5 Able to apply learning to further research in sustainable civil engineering
Subject Code: 3130608 Subject Name: Mechanics of Solids	CO-1 Apply fundamental principles of mechanics, equilibrium and statics to practical problems of engineering CO-2 Determine centroid and moment of inertia of a different geometrical

	shape and its use in engineering problem. CO-3 Determine different types of stresses and strains developed in the member subjected to axial, bending, shear torsion & thermal loads. CO-4 Determine principal stresses and strains for two dimensional system using analytical and graphical methods. CO-5 Differentiate behavior and properties of different engineering materials. CO-6 Apply the basics of simple machines and their working mechanism
Subject Code: 3130609 Subject Name: Building and Town Planning	CO-1 Comprehend local building bye-laws and provisions of National Building Code in respect of building and town planning resulting in functionally efficient, economically viable and legally acceptable buildings. CO-2 Discuss and apply various aspects of principles of building planning and town planning CO-3 Understand and implement various aspects of Principles of Architectural composition CO-4 Explain the principles of planning and design considerations to construct earthquake resistant building CO-5 Understand, interpret and prepare working drawings, foundation plans, perspective drawing and other executable drawings and prepare the drawing using software
BEYAOND SYLLABUS AUTOCAD	CO 1. To enable students to create a basic 2D drawing in CO 2. AutoCAD. To understand the tools and techniques available to increase your productivity and customize your AutoCAD CO 3. workspace. To visualize and creating surfaces; solid modeling; and manipulating and working with drawings and 3D objects.
BEYOND SYLLABUS APTITUDE FOR TRAINING AND PLACEMENT	CO 1: To make one understand and solve the problems of General intelligence and Aptitude. CO 2: To develop a sense for solving the verbal and Non verbal, Computational and Non- Computational Aptitude Problems. CO 3: To complete the understanding of topics from the domain of

B.E. (Civil) 4rd Semester

Subject Code: 3140005 Subject Name: Design Engineering 1 B	----------
Subject Code:3140601 Subject Name: SURVEYING	CO-1 Conduct Plane table, Theodolite, Trigonometric levelling, Tachometric, Geodetic survey at identified site. CO-2 Set out simple and transition curve at given location CO-3 Compute area and volume using standard rule and equipments such as Plannimeter CO-4 Apply principles of theory of error for correction of measurements CO-5 Conduct the survey by modern tools such as Digital Level, Total station, GPS
Subject Code: 3140603 Subject name: Structural Analysis-I	CO-1 Apply principles of statics to determine reactions, internal actions in statically determinate framed structures including arches & cables. CO-2 Compute strain energy stored member subjected to axial & flexural forces. CO-3 Determine displacement in a statically determinate beams by different methods CO-4 Perform stability checks to various structures such as chimney, retaining wall, dam subjected to gravity and lateral loading. CO-5 Differentiate the buckling behavior of columns & struts with different end conditions. CO-6 Determine response of structure using professional software.
Subject Code: 3140609 Subject Name: Civil Engineering - Societal & Global Impact	CO-1 Outline the role of Civil engineering in evolution and revolution of mankind and globally present status of development in India. CO-2 Estimate the level of resource utilization for present and future infrastructural projects using various tools/methods

	CO-3 Infer the necessity of different conventional as well as futuristic infrastructural projects. 30 CO-4 Incorporate the goal of sustainable development to minimize the potential impacts on the global environment. CO-5 Associate various measures for enhancing the build environment, thereby improving quality of life of the occupants. CO-6 Evaluate the potential of Civil Engineering for employment creation and its contribution to the GDP.
Subject Code: 3140610 Subject Name: Complex Variables and Partial Differential Equations	CO-1 convert complex number in a polar form, plot the roots of a complex number in complex plane, find harmonic conjugate of analytic functions and apply conformal mapping in geometrical transformation CO-2 evaluate complex integration by using various result, test convergence of complex sequence and series and expand some analytic function in Taylor's series CO-3 find Laurent's series and pole of order, and apply Cauchy Residue theorem in evaluating some real integrals CO-4 form and solve first order linear and nonlinear partial differential equations CO-5 apply the various methods to solve higher order partial differential equations, modeling and solve some engineering problems related to Heat flows, Wave equation and Laplace equation
Subject Code: 3140611 Subject Name: Fluid Mechanics & Hydraulics	CO-1 Analyze forces on floating bodies and understand fluids in relative equilibrium CO-2 Calibrate and demonstrate fluid flow measuring devices like venturimeter, orificemeter, notches, orifice, mouthpieces. CO-3 Analyze fluid flow through pipes in series, parallel and pipe networks under laminar and turbulent flow conditions CO-4 Analyze open channel flow and design optimal sections; calculate forces on sluice gates considering specific energy and momentum principle CO-5 Carry out model studies for fluid flow problems
BEYOND SYLLABUS SOFTWARE AUTOCAD	CO1. To understand the design and planning aspects, develop design CO2. Learn the details of the requirements of building components with predominance CO3.To Understanding the functional and structural requirements CO 4.TO Design principles and designing of building components.

B.E. (Civil)5th Semester

Course code-Name	Course Outcomes
2150001-Management - II	CO1: Understand the basic concepts of Management and Training CO2: Able to identify the problems occurring in management and try to resolve them CO3: Better plan and execute the severity and circumstances in management
2150601-Highway Engineering	CO1:Understand the planning of highway, its development and Field surveys. CO2: Able to identify and pursue knowledge of road materials and road sub-grade. CO3: Design the highway pavements of both types, flexible and

	rigid pavements. CO4: Plan the highway drainage, roadside development, concepts of hill road. CO5: Understand Traffic Engineering including Road user characterstics, Vehicularcharacteristics,
2150602- Hydrology and Water Resources Engineering	CO1:Understand the concepts of hydrology, precipitation, forms, types and classification. CO2: Able to develop hyetograph and hydrograph of a catchment/basin/sub-basin. CO3: Measure the rainfall and infiltration using advanced and conventional methods CO4: Able to classify, Investigate and Site selection of reservoir. Understand Zones of storage, Safe yield, Reservoir capacity, Reservoir sedimentation and control CO5: Grasp the knowledge of Hydroelectric power plants. CO6: Test the ground water before use, perform recuperation tests on ground water. CO7: Estimate the Design flood, able to perform frequency analysis. CO8: Able to do flood routing reservoirs and open channels, Storm drainage design. CO9: Plan drought management and also will be able to do water resources, planning and development.
2150603- Environmental Engineering	CO1: Able to understood components of environment, Types of microbes, Growth and their role in environment CO2: Assessment of water quality as per standards from sources of water. CO3: Able to identify physical, chemical and biological characteristics of domestic and industrial wastewater. Industrial water and wastewater CO4: Grasp the concepts of house drainage and solid waste management.
2150604- Soil Mechanics	CO1: Able to get the concept and knowledge of index properties of soil and particle size distribution. CO2: Understand the terminologies of soil structure, soil consistency. CO3: Able to classify the soils as per different standards and schemes. CO4: Understand the permeability, seepage, compaction and consolidation. CO5: Able to calculate the shear strength of soil.
2150605- Structural Analysis - III	CO1:Analyse the structures through Matrix methods. CO2: Analyse the domes and get the knowledge of spherical and conical domes. CO3: Analyse the beams curved in plan. CO4: Adopt plastic methods of analysis for structures.

BEYOND SYALLABUS SOFTWARE STAAD PRO	CO 1: Basic modeling in STAAD pro CO 2: Analysis of various elements like beam, column, truss, frame CO 3: Interpretation the data from STAAD

B.E. (Civil)6th Semester

Course code-Name	Course Outcomes
2160601-Advanced Construction Equipments	CO1: Efficient in knowledge of pile foundation, selection, type, failure. CO2: Design of coffer dams, Design features and types of caissons construction materials. CO3: Understand and learning about Controlling Methods-pumping, well points, bored wells, electro-osmosis, injections withcement, clays and chemical, freezing process, vibro-flotation CO4: understand the concepts of Form work for R.C.C. wall, slab, beam and column CO5: Analyse and plan for the construction Technology methods
2160602- Applied Fluid Mechanics	CO1: Identify and learn about governing Equations of Fluid Dynamics, Navier-Stokes equation of motion-Initial and boundary conditions CO2: Understand and analyse practically about Laminar flow, Turbulent flow, Water hammer equations. CO3: Able to develop the boundary layer concept, Drag and Lift of spherical and Cylindrical bodies. CO4:Basic concept of open channel flow, uniform & non-uniform flow, Velocity distribution, gradually varied flow, Rapidly Varied flow, Hydraulic Jumps, Specific energy concepts. CO5: Understand the turbomachinery, turbines, pumps and will be able to carry out Similitude and Dimensional analysis of a hydraulic body.
2160603- Railway, Bridge and Tunnel Engineering	CO1: Gain the knowledge of Railway history, types of tracks, details, alignment, ballast, track and track stresses. CO2: Understand the concepts of Bridge engineering in details and will be able to understand the types, construction methods of bridges. CO3: Able to get the knowledge of Necessity/Advantage of a tunnel, Classification of Tunnels, Size and shape of a tunnel, Alignment of a Tunnel, Portals and Shafts, Methods of Tunneling in Hard Rock and Soft ground
2160604- Water and Waste water Engineering	CO1:Gain the knowledge of per capita demand of water, its Calculation, collection and conveyance of water, water losses. CO2: Able to understand the water treatment process and gain the knowledge of treatment plants.

	CO3:Understanding the Distribution of water and sewerage collection& Disposal. CO4: Hydraulic Design of the sewer can be done. CO5: Understand the concepts of Water treatment units.
2160605-Earthquake Engineering	CO1: Able to understand the basics and fundamental of earthquake vibrations. CO2: Understand the earthquake resistant masonry features and also get the knowledge of IS-codes used for earthquack resistant buildings in construction. CO3:Philosophy of earthquake resistant design, earthquake proof v/s earthquake resistant design, four virtues of earthquake resistant structures can be understood. CO4: Develop design concepts for Lateral loads on the buildings and also will get the knowledge of ductile detailing.
2160606-Geotechnical Engineering – II	CO1: Understood the stability of slopes, slope failures and design principles. CO2: Identify the earth pressures, active and passive and to use it in stability and construction aspect. CO3: Analyze the stress distribution of soils, contact pressure and other loading. CO4: Get the knowledge of foundations and its types, bearing capacity of soils and the concepts of Pile foundation on soil.
BEYOND SYALLABUS SOFTWARE STAAD PRO	CO 1: Application different types of loads like dead load, live load, earthquake load, wind load CO 2:Design of the structural elements using different design codes

B.E. (Civil)7th Semester

Course code-Name	Course Outcomes
2170601-Construction Management and Equipment's	CO1: Understand the basic concepts of construction management. CO2: Apply Conventional and Advanced methods such as Critical path method for management analysis. CO3: Identify the knowledge of Construction Equipment's to be used at different industries for different processes.
2170602-Irrigation Engineering	CO1: Water Requirements of the crop can be estimated. CO2: Identify the best suitable type of irrigation to be used depending upon the situation. CO3: Design the irrigation channel; Estimate the water requirements at field for particular type of corps. CO4: Design the various diversion head works, falls, weirs. CO5: Get the knowledge of cross drainage works and canal

	regulation works.
2170603- DRCS	CO1: Get the knowledge of design, design process and design philosophy. CO2: Able to design the R.C.C. structures using Limit State Design method.
	CO3: Able to design steel elements using Limit Sate Design Method.
2170604- Urban Transportation Engineering (Department Elective – I)	CO1: Understand the importance of urbanization and analyze the travel demand for a particular area. CO2: Get the concepts of transportation surveys and travel forecasting. CO3: Understand the basic Urban Transportation Planning(UTP) system. CO4:Able to get concepts of Corridor identification, Mass transit systems and transportation plan preparation.
2170605- Advanced Structural Analysis (Department Elective –I)	CO1: Analyze Stiffness members. CO2: Use Finite-Element method. CO3: Computer programming in analysis
2170606- Application of Geoinformatics in Civil Engineering (Department Elective –I)	CO1: Get adequate knowledge and basic concepts of remote sensing. CO2: Able to understand the concepts of digital image processing, and microwave remote sensing. CO3: GIS and GPS techniques can be well learnt.
2170001- Project – I	CO1: Identifying projects and project objectives. CO2: Determining the project goal and scope of the study and deciding the project site. CO3: Efficient Literature reviews to be done for the project requirement. CO4: Deciding the methodology and methods for project.
BEYOND SYALLABUS SOFTWARE ESTIMATOR	CO 1: To Prepare Quantity and Estimate using Software. CO 2 : To Prepare Rate analysis using Software CO 3 : To Prepare Bill of Contractor

B.E. (Civil) 8th semester

Course code- Name	Course Outcomes
2180611- Construction Management	CO1: Understand the basic concepts of construction management. CO2: Apply Conventional and Advanced methods such as Critical path method for management analysis. CO3: Identify the knowledge of Construction Equipment's to be used at different industries for different processes.
2180601- Design of Hydraulic Structures	CO1:Get the efficient knowledge of elements of dam engineering. CO2: Understand the embankment dam engineering and

	concrete dam engineering with special reference to hydraulics. CO3: Able to pursue the knowledge of dam outlet works such as spillways, energy dissipaters, stilling basins and plunge pools. CO4: Design the drop structures such as Sarda and Glacis type fall
2180602- Dock, Harbour and Airport Engineering	CO1: Get the knowledge of Harbour planning, natural phenomena, marine structures, docks and locks, port amenities, navigation aids. CO2: General understanding of airport planning, runway design, taxiway design, terminal area design, Grading and drainage, Air traffic control and visual aids.
2180603- Professional Practice & Valuation	CO1:Purpose of estimating and valuation, Types of estimates. CO2: Understand Main items and their unit of measurement, methods of measurement-Methods of estimating quantities, Estimating quantities of building. CO3:Estimate Civil engineering structures. Specification: Objectives and importance of specification CO4:Learn market survey, rate analysis, abstracting and billing. CO5: Able to get and pursue knowledge of tender and contracts
2180604- Design of Steel Structures	CO1: Able to practice Loading standards as per I.S, distribution & flow of loads, lateral load due to wind as per IS:875(Part - III) CO2:Analysis, design & detailing of G+3 RC framed building for residential /commercial Purpose including ductile detailing in beams and columns CO3:Design & detailing of underground and elevated circular & rectangular RC water tanks CO4:Design & detailing of cantilever & counter fort retaining wall for various ground Conditions. CO5:Design of bolted / welded plate girder for static and rolling loads, design of supporting systems CO6: Structural layout of industrial building, design of various systems like roofing system, bracing system, columns, gantry girder etc. CO7: Structural system for through & deck type's bridges, design of foot over bridge &its Supporting system CO8: Design principles for tall steel structures like microwave towers, transmission line tower, chimney etc.
2180605- Project II	CO1: To carry out a project with best teamwork and efficient leadership. CO2: To assess the optimization techniques in carrying out best possible works.
2180607- Repair & Rehabilitation of Structures (Department Elective – II)	CO1: Plan and understand the repair strategies for buildings and structure. CO2: Understand and analyze the serviceability and Durability of concrete. CO3: Able to understand the materials and repair techniques or methods.
	CO4: Understand repairs, rehabilitation and retrofitting of Structures CO 5: Able to get knowledge of "DEMOLITION TECHNIQUES"

	Engineered demolition techniques for Dilapidated structures – case studies
2180608- Air PollutionControl(Department Elective – II)	CO1:Understand knowledge of Air pollution, sources, types, lapse rate and decreasing measures. CO2:Understand and analyse Air Quality Sampling and Monitoring: Stack sampling, instrumentation and methods of analysis of SO2, CO etc, legislation for control of air pollution automobile pollution.