

### 3.4. Course Outcome Statements (2017-18):

I BTECH - I SEMESTER

**SUBJECT : ENGLISH**

C111.1 The lesson encourages the readers to cater their abilities in the required areas of social and professional context of the life.

C111.2 The Lesson brings the public awareness in a society for implementing road safety measures.

C111.3 The lesson brings the consciousness in readers about how the mass production seems to be harmful for biological survival.

C111.4 The lesson gives a vivid sketch to the readers for streamlining the alternative energy sources suitable for rustic India.

C111.5 The lesson awakens the readers about the bondage between humans and animals in balancing ecology and maintaining protective measures.

C111.6 The lesson facilitates the learners to find out the various accidents taking place in professional and social context indicating the preventive measures.

**SUBJECT : MATHEMATICS-1**

C112.1 Identify, analyze and subsequently solve physical situations whose behavior can be described by ordinary differential equation. Use linear first order differential equations to solve application problems such as exponential growth, velocity solution and chemical reactions

C112.2 The linear differential equations with constant coefficients play an important role in the study of Electrical and Mechanical oscillatory system

C112.3 Using Laplace Transform technique we can determine directly the particular solution without finding the general solution. In many engineering application concerned with initial value problems, Laplace Transform is useful technique

C112.4 Know the physical interpretation of partial derivatives Student is able to know maxima and minima of functions of two and three variables

C112.5 Partial derivatives are used in solving sets of nonlinear equations and in min/max optimization analysis (i.e. set partial derivatives equal to zero to find critical points).

I use them occasionally in the study of CFD (Computational Fluid Dynamics) simulations.

C112.6 Identify and classify to solve different types of P.D.E

**SUBJECT : ENGINEERING CHEMISTRY**

C113.1 Student got the conceptual knowledge in preparation properties and applications of polymers

C113.2 Student ability to apply knowledge fuels and explosives

C113.3 student gains the required knowledge in understanding and using the latest techniques of corrosion in our day life

C113.4 Student gains the required knowledge in understanding and using the latest techniques of nano materials in our day life

C113.5 Student got the knowledge in softening of hard water

C113.6 Student gain knowledge in understanding and using the latest techniques in engineering materials and fuel cells

**SUBJECT : ENGINEERING MECHANICS**

C114.1 The students are to be able to do resolution of system of forces, friction and its application, analysis of trusses.

C114.2 The students are able to equilibrium conditions of rigid body for concurrent and non- concurrent force system, application of free body diagrams.

C114.3 The students are to be exposed to concepts of centroid and centre of gravity for different sections

C114.4 The students are to be exposed to properties of lines, areas and concepts of moment of inertia and polar moment of inertia including transfer formulae and their applications to different sections.

C114.5 The students are to be exposed to motion of a particle in straight line and in curvilinear paths (projectiles), its velocity and acceleration computation and methods of representing plane motion.

C114.6 The students are to be exposed to concepts of work, types of energy its relation to particle motion, impulse-momentum equation of the particle in motion.

**SUBJECT : COMPUTER PROGRAMMING**

C115.1 Students are able to understand the concept of Computer Hardware , Computer software ,Assembly language, high level language, compiler and assembler , Algorithm & flow chart

C115.2 Students are able to understand the concept of C character set identifiers and keywords, data type & sizes, variable names, declaration statements, operators, type conversion

C115.3 Students are able to understand the concept of Flow of Control and program Structure.

C115.4 Students are able to understand the built in functions and implementation of user defined functions

C115.5 Students are able to understand the concept of arrays and strings

C115.6 Students are able to understand the concept of Pointers, Structures , Union and Files

**SUBJECT : ENVIRONMENTAL SCIENCE**

C116.1 The Students have knowledge on the concept eco system and its fuction in the environment.

C116.2 The Student got the conceptual knowledge in natural resourses and their correct utilization.

C116.3 The Student gain knowledge of how to conservate the biodiversity and value of biodiversity.

C116.4 The Student gain the knowledge of how to control of various pollutions.

C116.5 The Students got the conceptual knowledge about social issues and the environment and gain knoledge about en environmental legislations of India towards sustainable development

C116.6 The Students have knoledge on the concepts of environmental assessment and the stages involved in EIA and the environmental audit.

**SUBJECT : ENGLISH COMMUNICATION SKILLS LAB - I**

C117.1 This unit provides a platform for the learners to know the professional etiquette on phone along with the necessity of being spoken in English.

C117.2 This unit makes the learners interactive and responsive in communicating with different kinds of people on different matters.

C117.3 This unit enables the learners to become effective communicators in their profession and develops the soft skills.

C117.4 This unit makes in understanding the variance between alphabet and sound in English Language.

C117.5 This unit helps the readers to know about the phonetic transcription for being identify with the variety of pronunciation exists in different English's of the World.

C117.6 This unit enables the readers in understanding the variety appears in pronunciation and how the "mood " in English Language is varied from context to context with intonation.

**SUBJECT : ENGINEERING CHEMISTRY LAB**

C118.1 Students gain knowledge on volumetric analysis

C118.2 Students are able to understand the Acid - Base Titration.

C118.3 Students gain knowledge in Redox titration.

C118.4 Students come to know precipitate Reactions.

C118.5 Students obtain knowledge on Conductometric titration.

C118.6 Students are able to understand complexometric titration.

**SUBJECT : COMPUTER PROGRAMMING LAB**

C119.1 Students should be able to Understand the concept of UNIX system commands and vi

C119.2 Students should be able to design the programs using decision making statements and iterative statements.

C119.3 Students should be able to design modular programs using built in functions and user defined functions.

C119.4 Students should be able to design programs using arrays.

C119.5 Students should be able to understand and use of pointers, memory allocation techniques.

C119.6 Students should be able to design programs using structures and files

**II YEAR-I SEMESTER**

**SUBJECT – C211 PROBABILITY AND STATISTICS**

C211.1 Describes the most commonly used types of distributions including binomial, Poisson, gamma, normal distribution

C211.2 Estimate probabilities, Expectations and other distribution characteristics

C211.3 estimate parameter of interest, test of hypothesis, fit regression, models & make fore cast

C211.4 summarizes the main concepts & reviews calculus and linear algebra in appendix

C211.5 standard probability & statistics to stochastic process, queuing system & stimulation techniques

C211.6 Select the suitable probability modal, estimate and test its parameters based on real data

#### **SUBJECT - C212 BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

C 212.1 Student completing this course will be able to Explain Basic Terminology of Electrical Engineering

C 212.2 Student completing this course will be able to Explain working & performance of a 1-  $\phi$  Transformer

C 212.3 Student completing this course will be able to Distinguish Constructional Features & Working of D.C Motors & D.C Generators

C 212.4 Student completing this course will be able to Briefly Explain working principles of 3- $\phi$  induction motor & Alternator

C 212.5 Student completing this course will be able to Briefly Explain working principles of diodes & amplifiers

C 212.6 Student completing this course will be able to Distinguish Working of NPN & PNP Transistors.

#### **SUBJECT – C213 STRENGTH OF MATERIALS**

C213.1 The students will get knowledge over basic concepts on mechanical behaviour of materials.

C213.2 The student will be able to understand general nature of forces and loads and how to draw shear force and bending moment diagrams.

C213.3 The student will be able to apply bending stress formulae and also design simple beam sections

C213.4 The student will be able to estimate shear stresses across various types of sections

C213.5 The student will be able to calculate slope and deflection of simple beams under different loading using different methods like moment area method

C213.6 The student will be able to gain knowledge over basic concepts on behaviour of thin cylinders and thick cylinders under hoop stress and longitudinal stress

#### **SUBJECT – C214 BUILDING MATERIALS AND CONSTRUCTION**

C214-1. The student will be able to explain basic building materials like stone, brick and tiles.

C214-2. The student will be able to draw various bonds in masonry and describe seasoning of timber.

C214-3. The student will be able to differentiate construction materials like lime and cement and the various methods of lime and cement manufacture and be able to conduct various tests on cement.

C214-4. The student will be able to describe different building components and draw their sketches.

C214-5. The student will be able explain about plastering, pointing, paints and formworks.

C214-6. The student will be able to classify aggregates and perform various tests on them.

### **SUBJECT - C215 SURVEYING**

C215.1 The student will be able to explain the cross staff survey and usage of surveying instruments (chain, compass and plain table) in the field.

C215.2 The student will be able to estimate the bearings in field and able to calculate omitted measurements in the field.

C215.3 The student will be able to find out the elevation in even and uneven surfaces using dumpy level.

C215.4 The student will be able to apply trigonometrical leveling and use theodolite for calculating tacheometric constants in field.

C215.5 The student will be able to design the simple circular curve by using field methods and understand the basic concept of GIS.

C215.6 the student will be able to find the area and volumes from given elevation points in a field by using trapezoidal and Simpson's one-third rule.

### **SUBJECT – C216 FLUID MECHANICS**

C216.1 The students will be able to solve problems over basic concepts in fluid mechanics.

C216.2 The student will be able to analyze general nature of hydrostatic forces and how to calculate them

C216.3 The student will be able to apply Bernoulli's energy theorem and impulse momentum equation for simple flow problems

C216.4 The student will be able to identify different types of flow and explain the laws of fluid friction.

C216.5 The student will be able to estimate the volume of fluid passing through pipes using venture-meter and orifice-meter and also flow over notches and weirs.

C216.6 The student will be able to explain basic concepts of boundary layer theory

### **SUBJECT – C217 SURVEYING FIELD WORK-1**

### **SUBJECT – C218 STRENGTH OF MATERIALS LAB**

### **III YEAR -I SEMESTER**

#### **SUBJECT: C311 ENGINEERING GEOLOGY**

C311.1 Student will be able to explain the importance of geology in civil engineering and gain the basic knowledge about allied branches in geology and weathering process of rocks.

C311.2 Student will be able to analyze the physical properties of mineral and rocks by megascopic identification

C311.3 Student will be able to differentiate secondary structures like strike, dip, folds, faults, joints and unconformities in practical point of view.

C311.4 Student will be able to describe about ground water, earth quakes and landslides.

C311.5 Student will be able to explain about geological methods find the properties of rocks

C311.6 Student will get basic knowledge about selection of dam site and reservoir, tunnels and safety measures.

### **SUBJECT – C312 STRUCTURAL ANALYSIS – II**

C312.1 The student will be able to analyze a basic three hinged, two hinged arch with different types of loading

C312.2 The student will be able to apply the general procedure for analyzing a structural frame under lateral loading using portal frame method and cantilever method

C312.3 The student will be able to explain the basic concepts underlying the analysis of cable bridge and suspension bridge

C312.4 The student will be able to analyze a general continuous beam under different loading using Moment Distribution Method

C312.5 The student will be able to analyze a simple frame undergoing sway using kani's method.

C312.6 The student will be able to apply over matrix methods like stiffness method and flexibility method.

### **SUBJECT – C313 DESIGN AND DRAWING OF CONCRETE STRUCTURES**

C313.1 Student will be exposed different code books and hand book used for designing of various RCC structures with different methodology

C313.2 Student will learn to design the beams for collapse loads.

C313.3 Student will be able to draw details of different type of reinforcement provided against the serviceability of flexure members

C313.4 Student will be able to design the different type of columns

C313.5 Student will be able to describe sub structures and choosing and designing category of footings required for the variety conditions

C313.6 Student will be able to draw detailing provided for various slabs

### **SUBJECT – C314 GEOTECHNICAL ENGINEERING – 1**

C314.1 The student will be able to describe the clay minerals and determine various basic parameters of soil.

- C314.2 The student will be able to define various index properties and determine them to classify soil.
- C314.3 The student will be able to determine the permeability of soil and calculate the various stresses in soils.
- C314.4 The student will be able to determine the vertical stress in soil due to different applied loads.
- C314.5 The student will be able to describe consolidation and determine the coefficient of consolidation.
- C314.6 The student will be able to apply the Mohr- Columb Theory and determine the shear strength parameters.

#### **SUBJECT –C315 TRANSPORTATION ENGINEERING**

- C315.1 Student will be able to explain the history of road development in India and various plans related to it. They can also demonstrate the factors affecting the highway alignment.
- C315 .2 Students will be able to identify different elements involved in geometrical design of highway and can design a simple highway.
- C315 .3 Student will be able to state various parameters related to traffic engineering and can prepare traffic management plan..
- C315 .4 Students will be able to categorize different types of highway materials available and can judge suitability of materials.
- C315 5 Student will be able to design flexible and rigid pavements and can differentiate them.
- C315.6 Student will be able to describe the construction and maintenance processes..

#### **SUBJECT –C316 INTELLECTUAL PROPERTY RIGHTS**

- C316.1 To know the importance of ipr rights and agencies which are responsible for intellectual property rights.
- C316.2 this lesson gives an idea about copyrights with its uses, infringement activity
- C316.3 this is to identify importance of patents for new innovations and inventions, and gives idea about how a patent is useful for industry
- C316.4 this lesson is to understand about trademark and its effectiveness with various interparty proceedings
- C316.5 this is to know that how to maintain trade secrets with necessary techniques.
- C316.6 this lesson to aware about information technology acy with sections which are avialable for various cyber crimes.

#### **IV YEAR-I SEMESTER**

#### **SUBJECT: ENVIRONMENTAL ENGINEERING-II**

C411.1 Student will be able to list the different types of sewerage systems and will be able to design a simple sewer line

C411.2 Student will be able to state the necessities and components involved in a pumping station and will be able to explain plumbing accessories and systems of plumbing and will be able to design a simple building drainage.

C411.3 Student will be able to analyze the character of waste water by using BOD concept and will be able to design the treatment units

C411.4 Student will be able to compare aerobic and anaerobic treatment processes in secondary treatment and will be able to design a simple trickling filter.

C411.5 Student will be able to describe about the miscellaneous treatment methods available and will be able to also design a simple septic tank and imhoff tank.

C411.6 Student will be able to summarize about different methods of sewage disposal and able to interpret oxygen sag curve and sludge thickening.

### **SUBJECT - PRESTRESSED CONCRETE**

C412.1 Student will be able to explain the basic concepts of prestressing, advantages and applications of the prestressed concrete

C412.2 Student will be able to differentiate different prestressing systems and analysis of resultant stresses

C412.3 Student will be able to estimate losses in prestressing systems

C412.4 Student will be able to design the flexural resistance of different prestressing systems

C412.5 Student will be able to design the shear and of different prestressing systems

C412.6 Student will be able to analyze the process of the transfer of prestress in pre tensioned members

### **SUBJECT – C413 CONSTRUCTION TECHNOLOGY AND MANAGEMENT**

C413.1 Student will be able to understand the importance of project management and also will be familiar with different project management types.

C413.2 Student will be able to explain about the PERT method of project management.

C413.3 Student will be able to differentiate equipments used in construction.

C413.4 Student will be able to identify earthwork equipment like cranes, tractors, bulldozers, scrapers, dragline and clamshells etc.

C413.5 Student will be able to describe the concreting equipment and aggregate production.

C413.6 Student will be able to find the importance of quality control and safety engineering in construction.

### **SUBJECT NAME – C414 WATER RESOURCES ENGINEERING-II**

C414.1 The students will be able to explain about the different types of crops, crop seasons in India and the duty and delta of the irrigation water.

C414.2 The students will be able to design a simple canal by using the silt theories.



C414.3 Different types of canal structures like canal falls, Cross drainage works can be explained by the students.

C414.4 Students will be able to describe the components of Diversion head works.

C414.5 Students will be able to draw the elementary and practical profiles of the gravity dams.

C414.6 All types of spillways in a dam structure can be identified by the student.

**SUBJECT NAME – C415 REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM**

C415.1 Student will be able to explain the components involved in remote sensing.

C415.2 Student can apply the concept of DIP in remote sensing imageries

C415.3 Student will be able to identify the components of GIS.

C415.4 Student will be able to do different types of operations in GIS Software

C415.5 Student will be able to research on resources available on surface of earth at basic level using GIS software.

C415.6 Student will be able to locate hydraulic structures on streams using GIS Software

**SUBJECT – C416 GROUND IMPROVEMENT TECHNIQUES**

C416.1 Student will be able to explain insitu densification methods in cohesive and cohesion less soil.

C416.2 Student will be able to describe different dewatering techniques.

C416.3 Student will be to list different types of soil stabilization methods.

C416.4 Student will be able to design a simple reinforced earth by considering stability checks.

C416.5 Student will be able to classify different type's geosynthetic materials available and will be able to interpret its properties and applications.

C416.6 Student will be able to discuss the method of grouting and its applications

**BVC ENGINEERING COLLEGE, ODALAREVU**

**B.TECH PROGRAM**

**ACDEMIC YEAR 2017-18**

**SECOND SEMESTER**

**COURSE OUTCOMES**

**DEPARTMENT OF CIVIL ENGINEERING**

First year Second semester

English - II	C121
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Mathematics – II (Mathematical Methods)	C122
Mathematics – III	C123
Engineering Physics	C124
Professional Ethics and Human Values	C125
Engineering Drawing 1 3 3	C126
English-Communication Skills Lab - II 2	C127
Engineering Physics Laboratory 2	C128
Engineering Physics – Virtual Labs	C129
Engineering Workshop & IT Workshop	C1210

**SUBJECT : ENGLISH**

C121.1 This unit benefits the readers in differentiating the textual knowledge with their applicable abilities in reality.

C121.2 This unit encourages the learners for looking to words science as a practical object but not as a theoretical subject.

C121.3 This unit guides the learners for being recovered from culture shocks with right way of balancing attitude

C121.4 This unit benefits the readers for knowing the behavioural patterns of people being involved with social games.

C121.5 This unit makes the learners digested with solutions needed for reducing the health threats caused by climatic changes.

C121.6 This unit inspires the readers in tuning their efforts to words professional and social developments while working with team.

**SUBJECT : MATHEMATICS-II**

c122.1 Calculate a root of algebraic and transcendental equation, explains relation between the finite difference operators.

c122.2 Computer interpolation polynomial for the given data.

c122.3 Solve ordinary differential equations numerically using Euler and R.K.method

c122.4 Find analytical function of complex variable using Milne Thomson method.

c122.5 Find the integral complex function using Cauchy's integral formula.

c122.6 Find the complex power series and residues for complex function.

**SUBJECT : MATHEMATICS-III**

- C123.1 Describe the rank, Eigen values and eigen vectors of a given matrix
- C123.2 Solve simultaneous linear equations numerically using various matrix methods
- C123.3 Calculate the gradient of scalar functions divergence and curl of a vector function
- C123.4 Determine line,surface and volume intergal
- C123.5 Apply green's gauss and stokes's theorem to calculate line,surface and volume integral
- C123.6 Determine double integral over regions and triple integral over a volume

**SUBJECT : ENGINEERING PHYSICS**

- C124.1 Student gain knowledge on basic principle of interference and working details of interferometer
- C124.2 Student can know the difference between fresnel and fraunhofer diffraction effects and application
- C124.3 Student can learn types of polarization, working principle of nicol's prism
- C124.4 Student will be able to understand the electromagnetic waves through dielectric medium
- C124.5 Student came to know about quantum mechanics and their application in explanation microscopic physical system by solving schrodinger wave equation
- C124.6 Student gain knowledge on how to get concentration of electrons and holes in intrinsic and extrinsic semi conductors and how the concentration and conductivity various with temperature

**SUBJECT : EME**

- C125.1 Student will be able to understand the working of boiler and types of boilers
- C125.2 Student will know about metal joining, metal forming, machine tools and lathe.
- C125.3 Student will be able to understand rotary and reciprocating compressors and about refrigeration
- C125.4 Student will know about internal combustion engines.
- C125.5 Student will understand about power transmission systems.
- C125.6 Student will know about transmission of power by different gears Student will know about transmission of power by different gears

**SUBJECT : ENGINEERING DRAWING**

- C126.1 Get the information about the important tools of engineering drawing. This will give the students basic knowledge of technical drawing and means of communications to others.
- C126.2 Learn how to draw the shapes, angles, lines and others which are essential for engineer.
- C126.3 Familiarize with different drawing equipment , technical standards and procedures for construction of geometric figures. This will give the students ability to draw the two dimensional objects on the paper and to draw the pictorial drawings.
- C126.4 Understand the main idea of using the dimensions for engineering drawing.
- C126.5 Develope student's imagination and ability to represent the shape, size and specifications of engineering objects.

C126.6 Understand the principle of projections and to get the ability to understand the objects by looking at its views.

Second year second semester

Building Planning & Drawing	C221
Managerial Economics and Financial ANALYSIS	C222
Strength of Materials- II	C223
Hydraulics and Hydraulic Machinery	C224
Concrete Technology	C225
Structural Analysis - I	C226

**SUBJECT: C221 Building Planning and Drawing**

C221.1 Student will be able to use the Bye-laws for Drawing Plans.

C221.2 Student will be able to understand the minimum standards of Residential Buildings.

C221.3 Student will be able to understand the minimum standards of Public Buildings.

C221.4 Student will be able to identify the different sign Conventions used in Civil Engineering Drawing.

C221.5 Student will be able to draw different parts of Buildings.

C221.6 Student will be able to draw plan Elevation and section of any type of Building as per Bye-Laws.

**SUBJECT – C223 STRENGTH OF MATERIALS – II**

C223.1 – The student will be able to identify principal planes and stresses on them and will be able to understand the five theories of failure

C223.2 – the student will be to explain the role of torsion in structural elements and will betoanalyse deflection of springs

C223.3 – the student will be calculate crippling load on columns using Euler’s and Rankine formulae

C223.4 – the student will be able to estimate stresses induced due to direct stresses and direct and bending stresses in a structural member

C223.5 – the student will be able to understand how stresses in beams subjected to unsymmetrical bending are calculated

C223.6 – the student will be able to analyze simple pin jointed trusses and frames using method of joints and method of sections

**SUBJECT C224 HHM**

C224 .1 The student will be able to explain chezy's and manning's formulae for uniform flow and determine critical depth.

C224.2 The student will be able to describe the dynamic equation, surface profiles and hydraulic jump.

C224.3 The student will be able to apply Rayleigh's method and Buckingham's pi theorem and dimensionless numbers.

C224.4 The student will be able to determine hydrodynamic forces of jets in various conditions.

C224.5 The student will be able to explain and analyse pelton wheel, Francis and kaplan turbines.

C224.6 The student will be able to explain centrifugal and reciprocating pumps

**Subject C225 Concrete Technology**

C225.1 The student able to describe the properties of cement and admixtures and student able to understand properties of aggregates

C225.2 The students able to describe the manufacturing of concrete and test on fresh concrete

C225.3 The students able to conduct different tests on hardened concrete

C225.4 The students able to define the concept of elasticity, creep, shrinkage of concrete

C225.5 The students able to apply the design mix of different grades of concrete by using BIS method

C225.6 The student able to define the concept of special concrete and their applications

**Subject - C226 Structural analysis -1**

C226.1 Student will be able to analyze the propped cantilever beams with different loading conditions by using MCD method

C226.2 Student will be able to analyze the fixed beams with different loading conditions by using moment area method

C226.3 Student will be able to analyze the continuous beams by using clapeyrons theorem of three moments method

C226.4 Student will be able to analyze the continuous beams by using slope deflection method

C226.5 Student will be able to analyze the simple beams and pin joint trusses by using Castiglion's strain energy method

C226.6 Student will be able to analyze the moving loads and influence lines on beams

**Third year second semester**

Design and Drawing of Steel Structures	C321
Geotechnical Engineering – II	C322
Water Resources Engineering–I	C323
Environmental Engineering – I	C324
Transportation Engineering – II	C325
<b>OPEN ELECTIVE</b>	C326
Computer Aided Engineering Drawing 2	C327
Transportation Engineering Lab 2	C328

### **SUBJECT C321 DESIGN AND DETAILING STEEL STRUCTURES**

C321.1 Student will be able to explain about types of connections used in the erection of the different steel structures.

C321.2 Student will be able to design requirements of the beams as per IS Code – Design.

C321.3 Student will be able to design and connection detailing of both Compression and flexure members.

C321.4 Student will be able to design the different type of columns.

C321.5 Student will be able to draw designing of slab base and gusseted base.

C321.6 Student will be able to draw reinforcement detailing provided for Plate Girder and Gantry Girder

### **SUBJECT C322 GEOTECHNICAL ENGINEERING-II**

C322. 1. Students will be able to explain different methods of soil exploration.

C322. 1. Students will be able to analyze the stability of slopes by Swedish arc method and method of slices.

C322. 3. Students will be able to determine the bearing capacity of the shallow foundation.

C322. 4 Students will be able to determine the allowable settlements of structures.

C322. 5 Students will be able to determine the load carrying capacity of piles and pile groups.

C322. 6. Students will be able to explain types and components of well foundation

### **SUBJECT: C323 WATER RESOURCES ENGINEERING-I**

C233.1 Student will be able to explain of theories and principles governing the hydrologic process.

C232.2 Student will be able to quantify major hydrologic components like precipitation evaporation, evapotranspiration infiltration etc.

C232.3 Student will be able to develop design storms and carry out frequency analysis .And will be able to develop unit hydrograph and synthetic hydrograph.

C233.4 Student will be able to estimate flood magnitude and will be able to carry out flood routing.

C232.5 Student will be able to determine aquifer parameters and yield of wells.

C233.6 Student will be able to model hydrologic processes

### **SUBJECT – C324 ENVIRONMENTAL ENGINEERING - I**

C324.1 the student will be able to explain the necessity of water supply system and estimate water demand for a small residential area

C324.2 the student will be able to recollect the various sources of water and will be able to explain how water will be conveyed for human needs

C324.3 the student will be able analyse physical, chemical and biological characteristics of water and will be able to analyse the quality of water

C324.4 the student will be able to summarize the process of treatment of water, sedimentation and coagulation

C324.5 the student will be able to explain importance of disinfection and removal of iron and manganese and also understand reverse osmosis and ultra filtration

C324.6 the student will be able to develop a simple distribution network and will be able to apply Hardy cross method and equivalent pipe method to analyse it

**SUBJECT: TRANSPORTATION ENGINEERING-II**

C325.1 The student will get basic idea about the components of railway engineering like rails, sleepers and ballast and creep.

C325.2 The student will be able to design the geometry of railway track like cant and different types of curves

C325.3 The student will get fundamental idea about the good transportation network by providing crossings and signaling systems.

C325.4 The student will get elemental idea about airport planning such as runway orientation, taxiway and air traffic control

C325.5 The student will be able to design the runway and also describe pavement evaluation, maintenance and drainage conditions.

C325.6 The student will get simple knowledge on planning, layout, construction and maintenance of docks and harbors.

**SUBJECT - C326 Architecture and Town planning**

C326.1 At the end of the session the student will be able to describe the history of architecture in various regions.

C326.2 At the end of the session the student will be able to explain the designing elements of architecture.

C326.3 At the end of the session the student will be able to find the different principles involved in the planning of a residential building.

C326.4 At the end of the session the student will be able to differentiate between post classic architecture with reference to number of architects.

C326.5 At the end of the session the student will be able to explain the historical background of town planning

C326.6 At the end of the session the student will be able to find various standards for modern town planning

**Fourth Year - Second semester**

Estimating, Specifications & Contracts	C421
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<b>ELECTIVE –II (engineering with geosynthetics)</b>	C422
<b>ELECTIVE – III (watershed management)</b>	C423
<b>ELECTIVE – IV (repair and rehabilitation of structures)</b>	C424
Project Work	

**SUBJECT: C421 ESTIMATING, SPECIFICATIONS & CONTRACTS**

- C421.1 Student will be able to measure the various items in structures in different dimensions.
- C421.2 Student will be able to assess the rates of various items of works.
- C421.3 Student will be able to calculate the quantities for roads, canals and reinforcement.
- C421.4 Student will be able to evaluate the buildings by different valuation methods and evaluate the tenders and contracts.
- C421.5 Student will be able to estimate the work quantity of buildings by individual wall method.
- C421.6 Student will be able to estimate the work quantity of buildings by center line method

**SUBJECT: C422 ENGINEERING WITH GEO-SYNTHETICS**

- C422.1 Student can be able to know the importance of geo- synthetic materials, properties and its applications.
- C422.2 Student will be able to describe the design criteria of geo-textiles and geo-grids for different functions
- C422.3 Student will be able to explain different applications in the field pavements.
- C422.4 Student will be able to design retaining wall reinforcement with geo-synthetics.
- C422.5 Student will be able to know use of geo-synthetic materials in different field applications like pond liners, reservoirs, canals , moisture barriers,etc
- C422.6 Student will be able to know use of natural fibers in geotextiles and combination of different natural fibers

**SUBJECT: C423 WATERSHED MANAGEMENT**

- C423.1. The student will be able to paraphrase the concept, objectives and need for watershed management.
- C423.2. The student will be able to explain the basic characteristics of watersheds like size and shape physiography, slope etc.
- C423.3. The student will be able to summarize the different principles incurred in erosion and measures to control erosion in different fields.



C423.4. The student will be able to describe the different methods of harvesting techniques.

C423.5. The student will be able to explain management of forest, agricultural grassland and wild land.

C423.6. The student will be able to enumerate the applications of watershed models and advances of watershed models.

**SUBJECT – C424 REPAIR AND REHABILITATION OF STRUCTURES**

After the completion of this course the student will be able to

C424.1. Explain deterioration of concrete in structures and assessment of cracks.

C424.2. Carryout analysis using NDT and evaluate structures

C424.3. Investigation of failures and causes of failures in structures

C424.4. Explain importance of materials used for rehabilitation of concrete structures.

C424.5. Describe the repair techniques

C424.6. Carryout Physical evaluation and submit report on condition of the structure.