ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES
RAJAMPET - 516126
(AUTONOMOUS)

www.aitsrajampet.ac.in

DEPARTMENT OF CIVIL ENGINEERING
COURSE STRUCTURE & SYLLABI – II B.Tech.

For the students admitted to

B. Tech., Regular Four Year Degree Programme in CBCS
for the Academic Year 2017-18
and
B.Tech Lateral Entry Scheme from the Academic Year 2018-19

B. Tech., CIVIL ENGINEERING

VISION AND MISSION OF THE INSTITUTION

Vision

We impart futuristic technical education and instill high patterns of discipline through our dedicated staff who set global standards, making our students technologically superior and ethically strong, who in turn shall improve the quality of life of the human race.

Mission

Our mission is to educate students from the local and rural areas, and from other states so that they become enlightened individuals, improving the living standards of their families, industry and society. We provide individual attention, world-class quality of Technical education and take care of character building.

VISION AND MISSION OF THE DEPARTMENT

Vision

The department of civil engineering strives to help its graduates to become technically sound and ethically strong engineers and to be recognized as one of the best civil engineering program's in the country through its pursuit of excellence in teaching, research and service activities, besides imparting basic knowledge.

Mission

- To impart training to the students in order to make themselves suitable for the changing technologies in civil engineering field.
- To provide an environment which inspires the students to enhance their analytical thinking and creativity to solve the problems of rural public and problems of the world related to civil engineering.
- To nurture leadership and team work in the students so as to make them good leaders, entrepreneurs and responsible citizens.

CURRICULUM STRUCTURE

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

DEPARTMENT OF CIVIL ENGINEERING

Regulations:**R17** Programme Code: **G6**

II Year B. Tech., I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
7GC33	Aptitude and Reasoning Skills	--	2	--	1
7G631	Building Materials and Construction	3	1	0	3
7G632	Fluid Mechanics	3	1	0	3
7G633	Strength of Materials	3	1	0	3
7G634	Surveying	3	1	0	3
7G537	Electrical and Mechanical Technology	3	1	0	3
7GC32	Engineering Mathematics-III	3	1	0	3
7G635	Fluid Mechanics Lab	0	--	3	2
7G636	Strength of Materials Lab	0	--	3	2
7G637	Surveying Lab-I	0	--	3	2
	Sports and Extensional Activities	--	--	1	0
	Total	**18**	**08**	**10**	**24**

II Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
7G641	Advanced Strength of Materials	3	1	0	3
7G642	Building Planning and Drawing	3	1	0	3
7GC41	Environmental Science	3	1	0	3
7G643	Hydraulics and Hydraulic Machinery	3	1	0	3
7GC42	Probability and Statistics	3	1	0	3
7G644	Structural Analysis-I	3	1	0	3
7G645	Auto CAD Lab	0	--	3	2
7G646	Hydraulics & Hydraulic Machinery Lab	0	--	3	2
7G647	Surveying Lab- II	0	--	3	2
7G648	Seminar – I	0	--	1	1
	Total	**18**	**06**	**10**	**25**

Note: L - Lecture; T-Tutorial; P – Practical; C – Credits

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech I Semester

(7GC33) APTITUDE AND REASONING SKILLS

(Common to CE, ME & CSE)

L	T	P
0	2	0

Course Objectives

- To equip students with aptitude and reasoning skills in order to help them succeed in competitive exams.
- To help students improve their knowledge of quantitative and reasoning skills, which in turn helps them comprehend and solve various mathematical problems in professional life.

UNIT I

Quantitative Aptitude 1: Number Systems- HCF and LCM -Square Roots and Cube Roots-Averages-Problems on ages-Allegations-Percentages-Profit and loss - Mensuration-Area, Volume and Surface Areas- Permutation and Combination-Decimal Fractions-Simplification. (12 contact hours)

UNIT II

Reasoning 1: Directions-Blood Relations-Problems on Cubes-Series and Sequences- Odd man out- Coding and Decoding. (8 contact hours)

UNIT III

Quantitative Aptitude 2: Ratio and Proposition and variation-Inequalities-Time and Work-Time and Distance-Pipes and Cisterns -Simple interest and Compound-interest-Calendar-Clocks-True Discount, Banker's Discounts-Data Interpretation, Tabulation, Bar Graphs, Pie charts, Line Graphs (10 contact hours)

UNIT IV

Reasoning 2: Data Sufficiency-Logical deductions-Arrangements and Combinations-Groups and Teams-Puzzles. (7 contact hours)

Text Books:

1. R.S. Agarwal, Quantitative Aptitude, S. Chand Publishers, New Delhi, 2005.
2. R.S.Agarwal, Verbal and Non-Verbal Reasoning, S.Chand Publishers, New Delhi, 1998.
3. Shakuntala Devi, Puzzles to Puzzle you, Orient Paper Backs Publishers(OPB), New Delhi, 2005.

References:

1. Arun Sharma, How to Prepare for Quantitative Aptitude, TMH Publishers, New Delhi, 2003.
2. Sharon Weiner-Green, IrnK.Wolf, Barron's GRE, Galgotia Publications, New Delhi, 2006.
3. Shakuntala Devi, More Puzzles, OPB, New Delhi, 2006.
4. Ravi Narula, Brain Teasers, Jaico Publishing House, New Delhi, 2005.
5. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005

Course Outcomes:

1. The student will be able to apply the knowledge of general mathematical models discussed to solve a variety of problems pertaining to Quantitative functions.
2. The Student will be able to read between the lines and understand various mathematical and reasoning concepts, puzzles, charts and interpret their logic.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	-	-	-	-	-	-	-	-	-	-	2
2	2	-	-	-	-	3	-	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech I Semester

(7G631) BUILDING MATERIALS AND CONSTRUCTION

L T P

3 1 0

Course Objective:

- To give the students a basic idea about the construction materials, building components and to introduce component methodologies.

UNIT I

STONES AND BRICKS: Properties of building stones – relation to their structural requirements. Classification of stones – Stone quarrying – precautions in blasting, Dressing of stone, Composition of good brick earth, various methods of manufacture of bricks. Comparison between clam burning and kiln burning.

UNIT II

ROOFING MATERIALS Characteristics of good tile – manufacturing methods, Types of tiles. Use of Materials like aluminium, gypsum, glass and bituminous materials – their quality.

LIME & CEMENT: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime, various ingredients of cement, types of cement.

UNIT III

WOOD: Structure – properties – Seasoning of timber. Classification of various types of woods used in buildings – Defects in timber. Alternative materials for wood, Galvanized Iron, Fiber-reinforced plastics.

UNIT IV

MASONARY: Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry, cavity and partition walls.

FOUNDATIONS: Shallow foundations – Spread, combined, strap and mat foundations.

UNIT V

BUILDING COMPONENTS: Lintels, Arches, and stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazo floors, Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs.

FINISHINGS: Damp proofing- materials used. Plastering, pointing, white washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish – Form work and scaffolding.

Text Books:

1. Building material by S K Duggal – New Age International Publishers; Second Edition.
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.
3. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi.
4. Building materials by R.S.Rangwala,Charotar publications

References:

1. R.Chudly "Construction Technology "– Volumes I and II" 2nd Edition, Longman, UK, 1987.
2. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi.

Course Outcomes

1. Student would have a basic knowledge about the planning of the residential as well as public building.
2. Student would have knowledge of preparation of the working drawing.
3. Student will be able to prepare of submission drawing according to the local bylaws.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	-	-	-	-	-	-	-	-	-	-	-	2
2	1	-	-	-	-	3	1	-	2	-	-	1
3	-	-	-	-	-	3	2	-	2	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.TechI Semester

(7G632) FLUID MECHANICS

L T P
3 1 0

Course objective:

- To familiarize with the properties of fluids and the applications of fluid mechanics.
- To formulate and analyze the problems related to calculation of forces in fluid structure interaction.
- To understand the concept of fluid measurement, types of flows and dimensional analysis.

UNIT I

PROPERTIES OF FLUIDS AND PRESSURE MEASUREMENTS:

Dimensions and units – Physical properties of fluids – Mass density-specific weight- specific volume- specific gravity - ideal and real fluids-Newtonian and non-Newtonian fluids – Viscosity - Surface tension -Vapour pressure and their influences on fluid motion - Pressure at a point - Pascal's law - Hydrostatic law - Atmospheric, gauge and absolute pressures - Measurement of pressure - Pressure gauges – Manometers - Differential and micro manometers.

HYDROSTATIC FORCES: Hydrostatic forces on submerged plane surfaces – Total pressure and centre of pressure on plane and curved surfaces – Calculation of total pressure from pressure diagrams-Buoyancy-Meta centric height-Conditions of equilibrium of a floating and submerged bodies.

UNTI II

FLUID KINEMATICS : Description of fluid flow - Stream line – Path line and streak lines - Stream tube - Classification of flows - Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one dimensional flows – stream and velocity potential functions - Flow net and its uses.

FLUID DYNAMICS: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line – Momentum equation and its application – Momentum and kinetic Energy correction factors –Forces on pipe bend.

UNIT III

CLOSED CONDUIT FLOW: Laws of fluid friction – Darcy-Weisbach equation - Minor losses – Pipes in series – Pipes in parallel – Total energy line and hydraulic gradient line - Pipe network problems -Variation of friction factor with Reynolds's number – Moody's chart.

MEASUREMENT OF FLOW: Pitot tube - Venturimeter and orifice meter – Orifices and mouthpieces - Rectangular, triangular and trapezoidal notches – weirs.

UNIT IV

LAMINAR AND TURBULENT FLOW: Reynold's experiment - Characteristics of laminar and turbulent flows – Laminar flow through circular pipes - Flow between parallel plates – Hydrodynamically smooth and rough boundaries.

UNIT V

HYDRAULIC SIMILITUDE: Dimensional analysis - Rayleigh's method and Buckingham's pi theorem - Model studies – Geometric, kinematic and dynamic similarities - Dimensionless numbers – Model laws – Scale effects.

Text books

1. P.N. Modi and S.M. Seth, Hydraulics and Fluid Mechanics, 18th Edition, Standard Book House, Delhi, 2011.
2. R.K. Bansal, Fluid Mechanics and Hydraulic Machines, 9thEdition, Laxmi Publishers, New Delhi, 2011.

References

1. R.K. Rajput, Fluid Mechanics and Hydraulic Machinery, 4th Edition, S. Chand Publishers, New Delhi, 2010.
2. J.F. Douglas, J.M. Gaserek and J.A. Swaffirld, Fluid Mechanics, 5thEdition, Longman, 2010.
3. A.K. Mohanty, Fluid Mechanics, 2ndEdition, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.

   S.K. Som and G. Biswas, Introduction to Fluid Machines, 2ndEdition, Tata McGraw-Hill Publishers Pvt. Ltd, 2010.

Course Outcomes:

At the end of the course, the student will be able to

1. State the newton's law of viscosity and explain the mechanics of fluids at rest and in motion by observing the fluid phenomena.
2. Compute the force of buoyancy and analyze the stability of a floating body.
3. Derive euler's equation of motion and deduce bernoulli's equation.
4. Examine energy losses & pressure drop in pipe transitions and Sketch energy gradient lines. Complex flow problems using dimensional analysis and develop rules for experiments with scale models.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.	3	-	-	-	-	-	2	-	-	-	-	-
2.	3	2	-	-	-	-	2	-	-	-	-	-
3.	3	2	-	-	-	-	-	-	-	-	-	-
4.	3	3	1	-	-	-	-	-	-	-	-	-

ANNAMACHARYAINSTITUTE OF TECHNOLOGY&SCIENCES:: RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech I Semester

(7G633) STRENGTH OF MATERIALS

L T P

3 1 0

Course Objective:

- The subject provides the knowledge of simple stresses, strains, flexural stresses in members, shear stresses and deflection in beams so that the concepts can be applied to the Engineering problems.

UNIT I

SIMPLE STRESSES AND STRAINS:-Elasticity and plasticity –Types of stresses and strains – Hooke's law–stress –strain diagram for mild steel– Working stress –Factor of safety –Lateral strain, Poisson's ratio and volumetric strain –Elastic moduli and the relationship between them–Bars of varying section –composite bars– Temperature stresses.

Strain energy –Resilience –Gradual, sudden, impact and shock loadings – simple applications.

UNIT II

SHEAR FORCE AND BENDING MOMENT: Definition of beam–Types of beams– Concept of shear force and bending moment– S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these loads– Point of contra flexure –Relation between S.F, B.M and rate of loading at a section of a beam.

UNIT III

FLEXURAL STRESSES: Theory of simple bending –Assumptions – Derivation of bending equation: M/I =f/y = E/R Neutral axis–Determination of bending stresses– section modulus of rectangular and circular sections(Solid and Hollow), I, T,L & Channel sections –Design of simple beam sections.

SHEAR STRESSES: Derivation of formula– Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T., L & Chanel sections.

UNIT IV

DEFLECTION OF BEAMS 1: Bending in to a circular arc– slope, deflection and radius of curvature –Differential equation for the elastic line of a beam – Double integration and Macaulay's methods.

DEFLECTION OF BEAMS 2: Determination of slope and deflection for cantilever and simply supported beams subjected to point loads,-U.D.L. Uniformly varying load.-Mohr's theorems –Moment area method– application to simple cases including overhanging beams – deflections of popped cantilevers for simple loading cases .

UNIT V

PRINCIPAL STRESSES AND STRAINS: Introduction– Stresses on an inclined section of a bar under axial loading– compound stresses– Normal and tangential stresses on an inclined plane for biaxial stresses– Two perpendicular normal stresses accompanied by a state of simple shear– Mohr's circle of stresses– Principal stresses and strains –Analytical and graphical solutions.

THEORIES OF FAILURES: Introduction– Various Theories of failures like Maximum Principal stress theory– Maximum Principal strain theory– Maximum shear stress theory– Maximum strain energy theory –Maximum shear strain energy theory.

Text Books:

1. Mechanics of Materials – Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi publications
2. Strength of Materials by R. Subramaniyan, Oxford University Press.
3. Strength of materials by Dr. R. K.Bansal – Laxmi publications.

References:

1. Mechanics of Solids, by Ferdinand Beer and others– Tata Mc. Grawhill Publications2000.
2. Strength of Materials by Schaum's outline series –Mc.Grawhillb International Editions.
3. Strength of Materials by S. Ramakrishna and R. Narayan– Dhanpat Rai Publications.
4. Strength of materials by R. K. Rajput, S. Chand & Co, New Delhi.
5. Strength of Materials by L.S.Srinathetal., Macmillan India Ltd., Delhi.
6. Strength of Materials by BhaviKatti.

Course Outcomes:

1. The students would be able to understand the behavior of materials under different stress and strain conditions.
2. The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.
3. The student would be able to understand the simple bending theory, and also able to analyze the stress distribution in different beam sections like rectangular, circular, triangular, I, T,L and angle sections.
4. The student would be able to understand various methods to find out Deflection in beams and also able to determine slope in the beams.
5. The students would be able to understand the principal Stresses and Strains and also able to apply different theories of failures.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.	3	3	-	-	3	-	-	-	-	-	-	-
2.	3	3	2	-	3	-	-	-	-	-	-	-
3.	3	3	3	2	3	-	-	-	-	-	-	-
4.	3	3	3	1	3	-	-	-	-	-	-	-
5.	3	3	3	1	3	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech I Semester

(7G634) SURVEYING

L T P

3 1 0

Course Objectives:

- To ensure that the student develops knowledge of the basic and conventional surveying instruments, principles behind them, working of the instruments, plotting of the area from the field measurements, determination of the area and the theory behind curves.
- To ensure that the student develops knowledge in the working of advanced instruments, setting out of curves from the field measurements and basic knowledge on remote sensing.

UNIT I

LINEAR MEASUREMENTS AND CHAIN SURVEYING: Principle – Classification - Accuracy and errors - Linear measurements – Direct measurements - Instruments for chaining – Ranging out survey lines – Errors in chaining – Tape corrections - Chain triangulation -Field book - Instruments for setting right angles - Basic problems in chaining - Obstacles for chaining.

COMPASS: Compass Survey: Types of compass – Bearings - Included angles– Declination - Dip and local attraction.

UNIT II

LEVELING AND CONTOURING: Types of levels - Dumpy level and tilting level - Temporary and permanent adjustments - Height of instrument and rise and fall methods - Effect of curvature and refraction - Characteristics of contours - Direct and indirect methods of contouring and plotting of contours - Uses of contour maps.

COMPUTATION OF AREAS AND VOLUMES: Areas: Areas dividing into number of triangles - By offsets to a base line - By latitudes and departures (D.M.D. and D.P.D) – By coordinates - Areas from maps. Volumes: Volume from cross-section - Embankments and cutting for a level sections - transverse slopes.

UNIT III

THEODOLITE: Description and uses of vernier micrometer – Micro-optic theodolites – Temporary and permanent adjustments of vernier transit – Measurement of horizontal and vertical angles – Heights and distances – Traversing – Closing error and distribution – Gale's traverse table – Omitted measurements.

UNIT IV

PLANE TABLE SURVEYING: Plane Table Survey: Components – Setting – Methods – Radiation– Traversing - Intersection and Resection

TACHEOMETRIC SURVEYING: Principle of stadia method – Distance and elevation formulae for staff held vertical–Instrumental constants – Anallactic lens–Tangential method–Use of sub tense bar –Tachometric contouring.

UNIT V

CURVES: Types of curves - Linear and angular methods of setting out of simple curves – By offsets from long chord – By offsets from tangents - By successive bisection of arcs & chords – By offsets from chords produced – Two Theodolite methods, Introduction to EDM , basic concepts & total station .

Text Books:

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying - Vol. I, II and III, 15th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010.
2. S. K. Duggal, Surveying - Vol. I and II, 3rd Edition, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2010.

References:

1. R. Subramanian, Surveying and Leveling, 1stEdition, Oxford University Press, New Delhi, 2010.
2. Arthur R. Benton and Philip J. Taety, Elements of Plane Surveying, 3rd Edition, McGraw Hill, 2010.
3. Arora, K. R., Surveying - Vol. I, II and III, 10th Edition, Standard Book House, Delhi, 2011.
4. Chandra, A.M, Plane Surveying, 2nd Edition, New Age International Publishers, New Delhi, 2010.

Course Outcomes

1. The students would be able to do temporary and permanent adjustments.
2. The students would be able to measure distances and angles.
3. The students would be able to orient and draw the various maps.
4. The students would be able to calculate areas and volumes of the earth work.
5. The student would be able to undertake various civil engineering surveys and convert the data into usable forms.

Mapping of COs and POs:

	Program Outcomes										
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1.	3	3	-	-	3	-	-	-	-	-	-
2.	3	3	2	-	3	-	-	-	-	-	-
3.	3	3	3	2	3	-	-	-	-	-	-
4.	3	3	3	1	3	-	-	-	-	-	-
5.	3	3	3	1	3	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech. I Semester

(7G537) ELECTRICAL & MECHANICAL TECHNOLOGY

L T P

3 1 0

Course Objectives:

- To impart knowledge on basic electrical circuits.
- Able to understand and analyzing the different DC and AC machines and their applications
- To understand the welding processes and working principles of welding equipment's.
- To understand the working principles of IC engines and air compressors.
- To understand the basic principles of air conditioning and methods of refrigeration.

In end examination minimum of two questions from each **Part-A & Part-B** should be chosen for answering **FIVE** questions. All questions carry equal marks.

Use separate booklets for Part-A & Part-B

PART –A
ELECTRICAL TECHNOLOGY

UNIT I

ELECTRICAL CIRCUITS & DC MACHINES: Electric current, Potential Difference, Power, Energy, Ohm's law, Kirchoff's laws, RLC elements, Principle of Operation of DC Generator& Motor, Construction, Types-Applications.

UNIT II

AC MACHINES: Principle of operation of 1-ø Transformers, Losses, Efficiency, Regulation, Principle of operation of 3- ø Induction motor Expression for Torque, Torque- slips Characteristics, Operation of Alternators, Applications.

PART –B
MECHANICAL TECHNOLOGY

UNIT III

WELDING PROCESSES: Introduction to welding - classification of welding processes – Arc welding and gas welding – Equipment, welding fluxes and filler rods – Submerged arc welding, TIG and MIG processes.

UNIT IV

INTERNAL COMBUSTION ENGINES: Introduction, Classification and Main components of IC Engines – Working principle of petrol and diesel engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Lubrication and fuel systems of petrol and diesel engines.

AIR COMPRESSORS AND EARTH MOVING MACHINERY: Working principles of air compressors – Reciprocating air compressor: single and multi-stage compression.

UNIT V

REFRIGERATION AND AIR CONDITIONING: Terminology of refrigeration and air conditioning – Refrigerants and their desirable properties – Methods of refrigeration: Vapour compression and vapour absorption systems - Basic principles of air conditioning – Room air conditioning systems - Comfort air conditioning systems.

Text Books:

1. Electrical Technology by B.L.Thareja, S.Chand Publishers.
2. Introduction to Electrical Engineering - M.S Naidu and S. Kamakshaiah, Tata McGraw-Hill Publications Ltd., New Delhi, 2009.
3. Mechanical Technology by R.S. Khurmi.
4. Mechanical Technology by Kodandaraman C.P.
5. Construction Planning; Equipment and Methods – Peurifoy.

Course Outcomes: Student will be able to,

1. Predict the behavior of electrical circuits.
2. Understand and analyze the different types of electrical machines used for that particular applications.
3. Understand the welding processes and working principles of different welding equipments.
4. Understand the working principles of IC engines and air compressors.
5. Understand the basic principles of air conditioning and methods of refrigeration.

Mapping of COs and POs:

Course Outcomes	Program Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	3	3	-	-	2	-	-	-	2	2	-	-
2	3	3	-	-	2	-	-	-	2	2	-	-
3	3	-	-	-	-	-	3	3	3	-	-	-
4	3	-	-	-	-	-	3	3	3	-	-	-
5	3	-	-	-	-	-	3	3	3	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech I Semester

(7GC32) ENGINEERING MATHEMATICS –III
(Common to CE & ME)

L T P

3 1 0

Course objectives:

- The subject gives the knowledge about the solution of algebraic and transcendental equations and to solve differential equations by numerical methods.
- The course intends to provide an over view about interpolation, numerical differentiation and integration.
- The course explains the concept of curve fitting and partial differential equations.
- The course provides an opportunity to learn how to solve Fourier series and Fourier integral transforms in all engineering fields.

UNIT I

Solution of algebraic and Transcendental Equations-Bisection Method-Method of false Position-Newton-Raphson method.

Numerical solutions of ordinary differential Equations-Taylor's Series-Euler's methods–Runge-Kutta fourth order Method-Milne's predictor-corrector method. (Without proofs)

UNIT II

Interpolation - Introduction – Forward Differences – Backward Differences – Newton's forward and backward difference interpolation formulae – Lagrange's Interpolation formula.

Numerical Differentiation - Numerical Integration – Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT III

Curve fitting: Fitting a straight line-second degree parabola-Exponential curve –power curve by the method of least squares.

Partial differential equations: Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions-solutions of linear equation–Nonlinear equation by Charpit's method-Method of separation of variables.

UNIT IV

Fourier series: Determination of Fourier coefficients-Fourier series of even and odd functions-Fourier series in an arbitrary interval-half range Fourier sine and cosine expansions.

UNIT V

Fourier Integrals and Fourier transforms: Fourier Integral theorem-Fourier Transforms-Fourier sine transform - Fourier Cosine Transform-Properties-Inverse Transforms -Finite Fourier sine and Cosine Transforms.

Text Books:

Higher Engineering Mathematics, B. S. Grewal, 42nd edition, Khanna Publishers, New Delhi.

References:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 8th edition, New Age International (Pvt) Limited.
2. A text book of Engineering Mathematics, B. V. Ramana, Tata McGraw Hill.
3. Mathematical Methods, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.

Course Outcomes:

Student will be able to

1. Apply the knowledge of numerical methods to solve algebraic, transcendental and ordinary differential equations.
2. Improve the ability of data analysis in numerical differentiation and integration with the help of interpolation.
3. Derive the equations of various curves by the method of least squares to assess the relation between them and to solve partial differential equations.
4. Derive Fourier series for the given periodic function in any arbitrary intervals.
5. Apply the knowledge of Fourier integrals and Fourier transforms to solve differential equations.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1.	3	-	-	-	3	-	-	-	-	-	-	2
2.	3	3	-	2	-	-	-	-	-	-	-	1
3.	3	-	-	3	2	-	-	-	-	-	-	2
4.	3	2	-	-	-	-	-	-	-	-	-	2
5.	3	2	-	-	2	-	-	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech. I Semester

(7G635) FLUID MECHANICS LAB

L T P

0 0 3

Course Objective:

- The objective of the course is to make the student to understand the fluid flow concepts and get familiarity with flow measuring devices.

LIST OF EXPERIMENTS

1. Calibration of venturimeter.
2. Calibration of orifice meter,
3. Determination of coefficient of discharge for a small orifice by a constant head method.
4. Determination of coefficient of discharge for a mouth piece by variable head method.
5. Calibration of rectangular and triangular notch.
6. Calibration of triangular & trapezoidal weir.
7. Determination of coefficient of loss of head due to minor loss.
8. Determination of head loss due to major loss.
9. Verification of Bernoulis equation.
10. Reynolds experiment.

Course Outcomes

The students would be able to

1. Had solid foundation in fluid flow principles.
2. Analyse a variety of practical fluid flow devices and utilize fluid mechanics principles in design.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	-	-	2	-	-
2	3	3	2	-	3	-	-	1	-	2	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech. I Semester

(7G636) STRENGTH OF MATERIALS LAB

L T P

0 0 3

Course Objective:

- The objective of the course is to make the student to understand the behavior of materials under different types of loading for different types structures.

LIST OF EXPERIMENTS

1. Tension & Shear test on mild steel / HYSD bar
2. Compression test on wood
3. Compression test &Tension test on coiled spring
4. Bending test on carriage spring
5. Brinell and Rockwell hardness tests
6. Charpy and Izod impact tests
7. Bending test on simply supported beam
8. Bending test on cantilever beam
9. Bending test on fixed beam
10. Bending test on continuous beam
11. Verification of Maxwell's reciprocal theorem

Course Outcomes

The students would be able to

1. Conduct tension, compression, torsion and shear tests on materials.
2. Determine hardness of metals & flexural strength of various beams.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	-	-	2	3	-
2	3	3	2	-	3	-	-	1	-	2	1	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech I Semester

(7G637) SURVEYING LAB – I

L T P
0 0 3

Course Objectives:

- To impart the practical knowledge in the field, it is essential to introduce in curriculum.
- Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

LIST OF EXERCISES:

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey
7. Fly leveling (differential leveling)
8. An exercise of L.S and C.S and plotting
9. Two exercises on contouring.
10. Study of Theodolite in detail - practice for measurement of horizontal and vertical angles.
11. Measurement of horizontal angles by method of repetition and reiteration.

Course Outcomes

The students would be able to

1. Calculate angles, distances and levels.
2. Identify data collection methods and prepare field notes.

Mapping of COs and POs:

Course Outcomes	Program Outcomes												
1	-	1	2	3	4	5	6	7	8	9	10	11	12
2	1	3	3	-	-	3	-	-	-	-	2	3	-
3	2	3	3	2	-	3	-	-	1	-	2	1	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech. II Semester

(7G641) ADVANCED STRENGTH OF MATERIALS

L	T	P
3	1	0

Course Objective:

- The main objective of this course is to deal with the concepts of stresses and strains in Thin and Thick cylinders, torsion, columns types, direct bending stresses and unsymmetrical bending.

UNIT I

THIN CYLINDERS: Thin cylindrical shells–Derivation of formula for longitudinal and circumferential stresses– hoop, longitudinal and Volumetric strains– changes in diameter, and volume of thin cylinders –Thin spherical shells.

THICK CYLINDERS: Introduction - Lame's theory for thick cylinders – Derivation of Lame's formulae– distribution of hoop and radial stresses across thickness– design of thick cylinders –compound cylinders–Necessary difference of radii for shrinkage– Thick spherical shells.

UNIT II

TORSION OF CIRCULAR SHAFTS: Theory of pure torsion– Assumptions made in the theory of pure torsion –Derivation of Torsion equations: $T/J = q/r = N\theta/L$–Torsional moment of resistance–Polar section modulus– Power transmitted by shafts –Combined bending and torsion and end thrust.

SPRINGS: Introduction– Types of springs–Deflection of close and open coiled helical springs under axial pull and axial couple – Springs in series and parallel– Carriage or leaf springs.

UNIT III

COLUMNS AND STRUTS: Introduction– Types of columns –Short, medium and long columns– Axially loaded compression members– Crushing load –Euler's theorem for long columns- assumptions- Derivation of Euler's critical load formulae for various end conditions–Equivalent length of a column –Slenderness ratio–Euler's critical stress –Limitations of Euler's theory– Rankine (Gordon) formula –Long columns subjected to eccentric loading –Secant formula– Empirical formulae –Straight line formula –Prof. Perry's formula.

UNIT IV

DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and B.M,- Core of a section –Determination of stresses in the case of chimneys, retaining walls and dams –conditions for stability – stresses due to direct loading and B.M. about both axis.

UNIT V

UNSYMMETRICAL BENDING: Introduction– Graphical method for locating principal axes –Moments of inertia referred to any set of rectangular axes– Stresses in beams subjected to unsymmetrical bending –Principal axes– Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis - Deflection of beams under unsymmetrical bending, concept of shear center for high channel.

TextBooks:

1. A Textbook of Strength of materials by R. K. Bansal –Laxmi Publications (P) ltd., New Delhi.
2. Strength of Materials by S.S. Bhavikatti – Vikas Publishers
3. Strength of Materials by B.C.Punmia

References:

1. Mechanics of Solids, by Ferdinand p Beer and others– Tata Mc.Grawhill Publications2000.
2. Strength of Materials by Schaum's outline series –Mc.Grawhill International Editions.
3. Strength of Materials by S.Ramakrishnaand R.Narayan– Dhanpat Rai publications.
4. Strength of materials by R.K.Rajput, S.Chand & Co, NewDelhi.
5. Strength of Materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah,NewDelhi..
6. Mechanics of Structures, by S.B.Junnarkar, Charotar PublishingHouse, Anand,Gujrat.

Course Outcomes:

1. The students would be able to understand the types of stresses and strains in Thin cylinders and Thick cylinders and also able to determine them.
2. The students would be able to understand the theory of torsion in shafts and also able to understand the springs and its types.
3. The students would be able to understand the types of columns, types of failures occur in the columns and also able to design the columns.
4. The students would be able to determine the stresses in retaining walls, dams and chimneys.
5. The students would be able to apply knowledge in unsymmetrical bending and also able to determine the stresses in beams due to unsymmetrical bending.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1.	3	3	-	-	3	-	-	-	-	-	-	2
2.	3	3	2	1	3	-	-	-	-	-	-	-
3.	3	3	3	1	3	-	-	-	-	-	-	-
4.	3	3	3	2	3	-	-	-	-	-	-	-
5.	3	3	3	1	3	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech II Semester

(7G642) BUILDING PLANNING & DRAWING

L	T	P
3	1	0

Course Objective:

- This subject provides the knowledge of building by laws, registration, planning of various types of buildings different sign convention of various Civil Engineering Materials, Doors, windows, tiles of roof, drawing of building plans etc.

PART-A

Unit I

BUILDING BYE LAWS AND REGULATIONS: Introduction – Terminology – Objectives of building byelaws – Floor area ratio (FAR) – Floor space Index (FSI) – Principles underlying building byelaws – classification of buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

Unit II

RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

PUBLIC BUILDINGS AND CPM: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

Unit III

PROJECT NETWORKING: Planning of construction projects – scheduling and monitoring Bar chart – CPM and PERT Network planning – computation of times and floats – their significance.

PART-B

Unit IV

SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys and Aluminum alloys etc., Earth, Rock, Timber and Marble. English bond& Flemish bond odd & even courses for one, one and half, two brick walls in thickness at the junction of a corner.

DOORS WINDOWS, VENTILATORS AND ROOFS: Panelled Door – glazed door –Half panelled and glazed door, glazed windows – panelled windows -Couple roof – Collar roof – Kind Post truss – Queen post truss.

Unit V

Given line diagram with specification to draw, plan, section and elevation- sloped and flat roof buildings

Text Books:

1. Building Planning & Drawing by Dr N. Kumaraswamy and A.Kameswara Rao, Charitor Publications.
2. Planning and Designing and Scheduling- Gurucharan Singh and Jagadish Singh – Standard Publishers.
3. Planning and Designing of Buildings – Y.S.Sane

Reference Books:

1. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.
2. Building by laws bye state and Central Governments and Municipal corporations.
3. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur.
4. Building drawing – M.G.Shah, C.M.Kale, S.Y.Patki

Course Outcomes

1. Student would have a basic knowledge about the planning of the residential as well as public building.
2. Student will be able to prepare of submission drawing according to the local bylaws.
3. The students would be able to know basic principal of free hand descriptive sketching to creative a realistic sketch of an object.
4. The students will able to construct a two point perspective of given two dimensional orthographic view of object.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.	3	3	-	-	3	-	-	-	-	-	-	-
2.	3	3	2	1	3	-	-	-	-	-	-	-
3.	3	3	3	1	3	-	-	-	-	-	-	-
4.	3	3	3	2	3	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech II Semester

(7GC41) ENVIRONMENTAL SCIENCE

(Common to CE, ME and CSE)

L	T	P
3	1	0

Course Objectives:

- To enable student to know about the importance of environment.
- To train the student to use different methods to conserve natural resources.
- To enable the student to learn about the concept of ecosystem and biodiversity and its conservation.
- To make student to study about different types of pollutions & understand the social issues and human population issues related to environment.

Unit I

Introduction to Environment: Definition, Multidisciplinary nature of environmental studies, Scope & Importance of environmental studies, Need for public awareness, People in environment, Institutions in environment.

Unit II

Renewable & Non-renewable natural resources:

Forest resources: Use, deforestation, dams & their effects on forest & tribal people, Water resources: Use, Water cycle, floods, drought, conflicts over water. Mineral resources: Use, environmental effects of extracting mineral resources.Food resources: Impacts of over grazing, traditional agriculture and modern agriculture Energy resources: Renewable and non – renewable energy resources, use of alternate energy resources Land resources: Land degradation, soil erosion, Role of an individual in the conservation of natural resources.

Unit III

Ecosystems: Producers, consumers & decomposers, Food chains, food webs & ecological pyramids, Biogeo-chemical cycles-Oxygen cycle, Carbon cycle and Nitrogen cycle. Types, characteristic features, structure and function of the following ecosystems: (a) Forest ecosystems (b) Grass land ecosystems (c) Desert ecosystems (d) Aquatic ecosystems (lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation: Definition, Values of biodiversity: consumptive value, productive value, social value, ethical value, aesthetic value & option value, Hot spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wild life, Conservation of biodiversity: In-situ & Ex-situ conservation

Unit IV

Environmental Pollution: Definition, causes, effects & control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Marine pollution, nuclear hazards.

Unit V

Social Issues and the Environment: Rain water harvesting, Environmental ethics: Issues & possible solutions, Global warming, Acid rain, Ozone layer depletion, Environment protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention & Control of Pollution) Act, Wildlife Protection & Forest Conservation Act.

Human Population and the Environment: Population explosion, Family Welfare Program, Environment & human health - Human Rights (in relation to environment) - Value Education (environmental values), HIV/AIDS, Field work-Visit to a local area to document environmental assets.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha, University Grants Commission, University press, New Delhi, 2004.
2. Perspectives in Environmental Studies, Anubha Kaushik and C.P. kaushik, Fifthedition, New Age International Publishers, 2016.

References:

1. Environmental Studies, Benny Joseph, Second edition, McGraw Hill Education (India) Private Limited, 2013.
2. Environmental Studies from Crisis to Cure, R. Rajagopalan, Oxford University Press.
3. Environmental studies: A Text Book for Undergraduates, Dr.K. Mukkanti, S. Chand and Company Ltd, 2010.
4. Ecology, Environmental Science and Conservation, J.S. Singh, S.P. Singh and S.R. Gupta, S. Chand and Company Ltd, 2014.
5. A textbook of Environmental Studies, Shashi Chawla, Tata McGraw Hill Education India, 2012.

Course Outcomes:

1. The student will understand the importance of environment.
2. The student develops critical thinking to conserve natural resources.
3. The student will understand the concept of ecosystem &biodiversity
4. The student knows different types of pollutions, sources, effects and measures.
5. The student will apply the knowledge to solve the social issues and human population issues related to environment.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	-	-	-	1	3	-	-	-	-	3
2	1	1	-	-	-	3	3	-	-	-	-	3
3	1	1	-	-	-	-	3	-	-	-	-	3
4	2	2	-	-	-	3	3	-	-	-	-	3
5	3	3	-	-	-	3	3	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech II Semester

(7G643) HYDRAULICS AND HYDRAULIC MACHINERY

L T P
3 1 0

Course Objective:

- The main objective of this course is to deal with the concepts of fluid flow patterns and learn to use boundary layer theory, flow through open channels and impact of jet on plane and curved vanes, applications &principles of hydraulic machines.

Unit I

BOUNDARY LAYER THEORY: Boundary layer concepts – Thickness of boundary layer - Characteristics of boundary layer along a thin flat plate - Vonkarmen momentum integral equation - Laminar and turbulent boundary layers (no derivation) - Laminar sub-layer separation of boundary layer - Control of boundary layer- Flow around submerged objects – Drag and lift - Magnus effect.

Unit II

OPEN CHANNEL FLOW - I: Types of flows – Types of channels – Velocity distribution – Chezy's, Manning's and Bazin's formulae for uniform flow – Most Economical sections - Critical flow – Specific Energy - Critical depth – Computation of critical depth – Critical, sub-critical and super critical flows – Velocity measuring instruments.

OPEN CHANNEL FLOW - II: Non uniform flow - Dynamic equation for gradually varied flow - Mild, critical, steep, horizontal and adverse slopes - Surface profiles - Direct step method – Rapidly varied flow - Hydraulic jump and its applications - Energy dissipation.

Unit III

IMPACT OF JETS: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - Series of vanes - Jet striking centrally and at tip - Velocity triangles at inlet and outlet – Expressions for work done and efficiency - Applications to radial flow turbines.

Unit IV

HYDRAULIC TURBINES – I: Layout of a typical hydropower installation – Heads and efficiencies -classification of turbines -Pelton wheel - Francis turbine - Kaplan turbine - Working, working proportions - Velocity diagrams - Work done and efficiency – Hydraulic design – Runaway speed - Draft tube theory, function and efficiency.

HYDRAULIC TURBINES – II: Governing of turbines - Surge tanks - Unit quantities and specific speed–Performance characteristics-Geometric similarity - Cavitation, causes and effects.

Unit V

CENTRIFUGAL PUMPS: Pump installation details – Classification -Heads – Losses and efficiencies - Limitation of suction lift – Work done - Minimum starting speed - Specific speed - Multistage pumps -Pumps in parallel - Performance of pumps - Characteristic curves -Net positive suction head – Priming devices.

HYDROPOWER ENGINEERING: Classification of hydropower plants – Load factor - Utilization factor - Capacity factor – Estimation of hydropower potential.

Text Books:

1. P.N. Modi and S.M. Seth, Hydraulics and Fluid Mechanics, 18th Edition, Standard Book House, Delhi, 2011.
2. K, Subramanya, Flow in Open Channels, 3rd Edition, Tata McGraw-Hill Publishers, New Delhi, 2010.
3. D.S. Kumar, Fluid Mechanics and Fluid Power Engineering, 7th Edition, Kataria and Sons, Delhi, 2009.
4. R.K. Bansal, Fluid Mechanics and Hydraulic Machines, 9th Edition, Laxmi Publishers, NewDelhi, 2011.

References:

1. Ranga Raju, Flow Through Open Channels, 7th Edition, Tata McGraw-Hill Publications, New Delhi, 2009.
2. R.K. Rajput, Fluid Mechanics and Hydraulic Machinery, 4th Edition, S. Chand Publishers, New Delhi, 2010.
3. V.T .Chow, Open Channel Flow, McGraw-Hill Publishers, New Delhi, 1996.
4. Banga and Sharma, Hydraulic Machines, 7th Edition, Khanna Publishers, New Delhi, 2007.
5. M.M. Dandekar and K.N. Sharma, Water Power Engineering, 1st Edition, Vikas Publishing House, New Delhi, 2009.

Course Outcomes

1. The students should be able to understand and apply the basic concept of boundary layer and its types in solving the practical problems and also compute the drag and lift coefficients.
2. The students should be able to understand Uniform flows and Non Uniform flows in Open channels, design most economical sections like rectangular, circular sections etc., and also measure velocity through instruments in open channel.
3. To analyze the forces exerted by a jet of fluid on vanes of different shapes, either stationary or moving.
4. Study and understand the construction features and working principles of various types of hydraulic turbines.
5. Students are able to know the installation, working principles and characteristics of centrifugal pumps.
6. Students are able to know about hydroelectric power plant and estimation of hydro power potential.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	-	-	-	1	3	-	-	-	-	3
2	1	1	-	-	-	3	3	-	-	-	-	3
3	1	1	-	-	-	-	3	-	-	-	-	3
4	2	2	-	-	-	3	3	-	-	-	-	3
5	3	3	-	-	-	3	3	-	-	-	-	3
6	-	-	-	-	-	-	-	-	2	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech. II Semester

(7GC42) PROBABILITY AND STATISTICS

(Common to CE and ME)

L	T	P
3	1	0

Course Objectives:

- The courses shall enable the students quantify the measure of uncertainty
- The course explains the concepts of probability distributions.
- The course elaborates on sampling distribution and estimation.
- The course provides the students with statistical techniques in testing the hypothesis.

Unit I

Probability: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem.

Random variables – Discrete and continuous – Distribution functions - mean and variance.

Unit II

Binomial distribution –Poison distribution- Uniform distribution - Normal distribution. Fitting of Binomial distribution –Poison distribution.

Unit III

Sampling distribution: Population and sample - Sampling distributions of means (σ known and unknown).

Estimation: Point estimation – interval estimation - one mean &one proportions for small samples –two means two proportions for large sample.

Unit IV

Test of Hypothesis – Large samples: hypothesis concerning one and two means. Test of proportions (one and two).

Small samples: t- test.

Unit V

$\chi 2$–Tests: goodness of fit, rxc contingency tables, F-test for two variances.

Text Books:

1. Fundamentals of Mathematical Statistics, S C Gupta and V K Kapoor, Sultan schand& sons.
2. A text book of Probability & Statistics, B. V. Ramana, Tata McGraw Hill.

References:

1. Environmental Studies, Benny Joseph, Second edition, McGraw Hill Education (India) Private Limited, 2013.
2. Environmental Studies from Crisis to Cure, R. Rajagopalan, Oxford University Press, 2015.
3. Environmental studies: A Text Book for Undergraduates, Dr.K. Mukkanti, S. Chand and Company Ltd, 2010.
4. Ecology, Environmental Science and Conservation, J.S. Singh, S.P. Singh and S.R. Gupta, S. Chand and Company Ltd, 2014.
5. A textbook of Environmental Studies, Shashi Chawla, Tata McGraw Hill Education India, 2012.

Course Outcomes:

1. The student will understand the importance of environment.
2. The student develops critical thinking to conserve natural resources.
3. The student will understand the concept of ecosystem and biodiversity and its conservation.
4. The student knows about different types of pollutions, their sources, effects and control measures.
5. The student will apply the knowledge to solve the social issues and human population issues related to environment.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	-	-	-	1	3	-	-	-	-	3
2	1	1	-	-	-	3	3	-	-	-	-	3
3	1	1	-	-	-	-	3	-	-	-	-	3
4	2	2	-	-	-	3	3	-	-	-	-	3
5	3	3	-	-	-	3	3	-	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech II Semester

(7G644) STRUCTURAL ANALYSIS – I

L	T	P
3	1	0

Course Objectives:

- To make the students to understand types of structures and analysis methods and also to draw ILD's for different beams.

Unit I

FIXED BEAMS – Introduction to statically indeterminate beams with U.D.L, central point load and eccentric point load. Number of point loads and uniformly varying loads shear force and bending moment diagrams-Deflection of fixed beams effect of sinking of support.

Unit II

CONTINUOUS BEAMS: Introduction-Clapeyron's theorem of three moments-Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

Unit III

SLOPE-DEFLECTION METHOD: Introduction, Derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

MOMENT DISTRIBUTION METHOD: Introduction, application to continuous beams with and without sinking of supports.

Unit IV

INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section single point load, U.D.L longer than the span, U.D.L shorter than the span.

MOVING LOADS: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single Concentrated load U.D.L longer than the span, U.D.L shorter than the span, two point loads with fixed distance between them and several point loads.

Unit V

INDETERMINATE STRUCTURAL ANALYSIS: Indeterminate Structural Analysis –Determination of static and kinematic indeterminacies–Solution of trusses with up to two degrees of internal and external indeterminacies– Castigliano's theorem.

Text Books:

1. Analysis of Structures-VolI& Vol IIbyV.N.Vazirani& M.M.Ratwani, Khanna Publications, New Delhi.
2. Structural Analysis by V.D.PrasadGalgotiapublications,2nd Editions.
3. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
4. ComprehensiveStructuralAnalysis-Vol.I&2by Dr. R. Vaidyanathan & Dr.P.Perumal- Laxmi publications pvt.Ltd., New Delhi
5. Basic structural Analysis by C.S.Reddy, Tata Mcgrawhill, New Delhi

References:

1. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, Anand, Gujrat
2. Theory of Structures by Gupta, Pandit& Gupta; Tat Mc.Graw– Hill Publishing Co. Ltd., New Delhi.
3. Theory of Structures by R.S. Khurmi, S. Chand Publishers
4. Strength of Materials and Mechanics of Structures- by B.C.Punmia, Khanna Publications, NewDelhi.
5. Introduction to structural analysis by B.D. Nautiyal, New age international publishers, NewDelhi.

Course Outcomes

1. The students would be able to determine the fixed end moments in Fixed beams and also able to draw the shear force and bending moment diagrams.
2. The students would be able to determine the fixed end moments in Continuous beams and also able to draw the shear force and bending moment diagrams.
3. The student would be able to apply knowledge on various methods of analyzing indeterminate structures.
4. The students would be able to perform ILD analysis of determinate beams and trusses and also able to apply knowledge on Moving loads..
5. The student would be able to apply knowledge strain energy theory and also able differ the determinate and indeterminate structures.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	-	-	-	-	-
2	3	3	2	-	3	-	-	-	-	-	-	3
3	3	3	2	2	3	-	-	-	-	-	-	-
4	3	3	2	2	3	-	-	-	-	-	-	-
5	3	3	2	1	3	-	-	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B.Tech II Semester

(7G645) AUTO CAD LAB

L T P

0 0 3

Course Objective:

The objective of the course is to make the students must be able to visualize and graphically reproduce complex layouts to succeed in subsequent drafting and design courses.

LIST OF EXPERIMENTS

1. Introduction to Auto CAD
2. Practice exercise on Auto Cad software.
3. Development of plan/drawing by Block editing & drafting settings.
4. Drawing plan of a building in auto cad
   a) Plan of a building in auto cad.
   b) Plan of a multi storied building in auto cad.
5. Drawing Section and elevation of a single storied building in auto cad.
6. Drawing Section & elevation of a multistoried building
7. Detailing of building components like doors, windows, roof trusses.
8. Introduction to 3-D modeling.
9. Practice exercise on 3-D modeling of a building.
10. Practice exercise on 3-d modeling of types of stair cases.

Course Outcomes

The students would be able to

1. Understand conventional signs and symbols.
2. Draw the plans and sectional elevations of buildings.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	2	-	3	-	2	-
2	3	3	2	-	3	-	1	-	3	-	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech II Semester

(7G646) HYDRAULICS AND HYDRAULIC MACHINERY LAB

L T P
0 0 3

Course Objective:

- The objective of the course is to make the students understand the fluid flow concepts and get familiarity with flow measuring devices.

List of experiments:

1. Impact of jet on vanes.
2. Study of hydraulic jump.
3. Efficiency test on single-stage Centrifugal pump.
4. Efficiency test on Multi-stage Centrifugal pump
5. Efficiency test on Reciprocating pump.
6. Performance test on Pelton wheel turbine.
7. Performance test on Francis turbine.
8. Performance test on kaplan turbine.
9. Specific speed of Pelton wheel turbine

Course Outcomes

The students would be able to

1. Calculate the performance analysis in turbines & pumps.
2. Select the proper pump to optimize the pumping efficiency.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	-	1	-	2	-	3
2	3	3	2	-	3	-	-	1	-	2	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET

(AN AUTONOMOUS INSTITUTION)

II B. Tech II Semester

(7G647) SURVEYING LAB – II

L T P
0 0 3

Course Objectives:

- To impart the practical knowledge in the field, it is essential to introduce in curriculum.
- Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

LIST OF EXPERIMENTS:

1. Trigonometric Leveling - Heights and distance problem.
2. Heights and distance using Principles of tacheometric surveying.
3. Curve setting.
4. Setting out works for buildings & pipe lines.
5. Gradient of road using Theodalite.
6. Determination of area using total station.
7. Traversing using total station.
8. Contouring using total station.
9. Determination of remote height using total station.
10. Stake-out using total station.
11. Difference in height between two inaccessible points using total station.

Course Outcomes

The students would be able to

1. Basic understanding of total station equipment.
2. Understand the working principles of surveying instruments.
3. Interpret survey data and compute areas and volumes.

Mapping of COs and POs:

	Program Outcomes											
Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	-	-	3	-	2	-	3	-	2	-
2	3	3	2	-	3	-	-	-	-	-	-	3
3	3	3	2	2	3	2	-	-	2	-	2	-