Annamacharya Institute of Technology and Sciences, Tirupati

Course structure for Four Year Regular B.Tech. Degree Program

(Effective for the batches admitted from 2019-20)

CIVIL ENGINEERING (CE)

II B. Tech –I Semester

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BSC	19ABS9913	Probability & Statistics, PDE and Complex Variables	3	0	0	3	30	70	100
2	HSC	19AHS9903	Communicative English II	2	0	0	2	30	70	100
3	PCC	19APC0101	Mechanics of Materials	3	0	0	3	30	70	100
4	PCC	19APC0102	Surveying	4	0	0	4	30	70	100
5	PCC	19APC0103	Fluid Mechanics	3	0	0	3	30	70	100
6	PCC	19APC0104	Building Materials and Construction	2	0	0	2	30	70	100
7	MC	19AMC9901	Biology for Engineers	2	-	-	-	30	-	30
PRACTICAL										
8	HSC	19AHS9904	Communicative English Lab II	0	0	2	1	30	70	100
9	PCC	19APC0105	Strength of Materials Lab	0	0	3	1.5	30	70	100
10	PCC	19APC0106	Surveying Lab	0	0	4	2.0	30	70	100
TOTAL							21.5	300	630	930

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year: II   **Semester: I**   **Branch of Study -   CE**

Subject Code	Subject Name	L	T	P	Credits
19APC0101	Mechanics of Materials	3	0	0	3

Course Outcomes:
1: Understand the system of forces on bodies.
2: Determine the centroid and moment of inertia for different cross-sections.
3: Understand the concepts of stress, strain, generalized Hooke's law, elastic modulii
4: Develop shear force and bending moment diagrams for different load cases.
5: Compute the slope and deflection of simple beams

UNIT - I
Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams and Equations of Equilibrium of Coplanar Systems, support reactions for simply supported beam.

UNIT - II
Centroid and Center of Gravity: Introduction – Centroids of rectangular, triangular, circular, I, L and T sections. **Area moment of Inertia**: Introduction – Definition of Moment of Inertia of rectangular, triangular, circular, I, L and T sections - Radius of gyration, perpendicular axis theorem and parallel axis theorem.

UNIT – III
Simple Stresses and Strains:
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.

UNIT – IV
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 over changing beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – point of contra flexure – Relation between S.F, B.M and rate of loading at section of a beam.

UNIT – V
Deflection of Beams: Uniform bending – slope, deflection and radius of curvature - Determination of slope and deflection for cantilever and simply supported beams under point loads and U.D.L. -Mohr's theorems – Moment area method –Conjugate beam method.

TEXT BOOKS:
1. R.K Bansal, Engineering Mechanics, Lakshmi Publications.
2. R. K. Bansal, Strength of Materials, Lakshmi Publications House Pvt. Ltd.
3. R. Subramanian, Strength of Materials, Oxford University Press.
REFERENCES:
1. S.S. Bhavakatti, Engineering Mechanics, New Age Publishers.

Subject Code	Subject Name	L	T	P	Credits
19APC0102	Surveying	4	0	0	4

Course Outcomes:
1: Understand basic principles of surveying, Prismatic compass
2: Understand basic concepts of leveling and contouring and Theodolite survey
3. Understand Computation of Areas and Volumes
4: Understand and able to set the curves on field.
5: Understand modern techniques in the survey systems.

UNIT – I:
Basics of Surveying: Definition, principles and classification of surveying - Principles of chain survey –Types of chains - Tape corrections – types of Ranging - Construction and working of prismatic compass – Types of bearing - Declination, local attraction.

UNIT – II:
Levelling - Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels- HI Method-Rise and Fall method.
Contouring- Characteristics and uses of Contours - methods of contour surveying, interpolation and sketching of Contours.
Theodolite Surveying: Measurement of horizontal and vertical angles-reiteration and repetition methods.

UNIT – III:
Computation of Areas and Volumes: Areas - Determination of areas consisting of irregular boundary and regular boundary - Volume- trapezoidal and prismoidal formula-
 Determination of volume of earth work in cutting and embankments.

UNIT – IV:
Curves: Types of curves and their necessity, elements of simple circular curve, setting out of simple horizontal circular curves-problems.
Construction surveys: Introduction-setting out of buildings-highways culverts.

UNIT – V:
Modern Field Survey Systems:
EDM and Total Station: Measurement principle of EDM - EDM instrument characteristics - Accuracy in EDM - Total station – Introduction – Advantages - Types and applications of total station - Field procedure.
Differential Global Positioning System (DGPS): Introduction - Working principle - DGPS receivers -Applications of DGPS. Surveying with LIDAR.

 Text Books:
1. Arora, K.R. I, Surveying, Vol-I, II and II, Standard Book House, 2015.
2. C. Venkatramaiah, Text Book of Surveying, Universities Press Pvt Ltd, Hyderabad. Revised Edition 2011.
3. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying (Vol – 1,2 &3), by –
Laxmi Publications (P) Ltd., New Delhi.
4. N.N. Basak, Surveying and Levelling- Tata McGraw-Hill Education, 2017.

References :
1. Manoj K., Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011.
2. Madhu N., Sathikumar, R. and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3. Chandra A.M., Higher Surveying, Third Edition, New Age International (P) Limited, 2002.
4. Anji Reddy M., Remote sensing and Geographical information system, B.S. Publications, 2001.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year: II   **Semester: I**   **Branch of Study: CE**

Subject Code	Subject Name	L	T	P	Credits
19APC0103	Fluid Mechanics	3	0	0	3

Course Outcomes:

1: Understand basic characteristics and behavior of fluids

2: Understand concepts of fluid statics, different equipment and their applications stability of floating bodies

3: Understand fundamentals of fluid kinematics and Differentiate types

of fluid flows

4: Understand and apply experiments with different equipments under fluid flow

5: Estimate Energy losses in pipelines and Determine flow characteristics Through closed conduits.

UNIT – I:

Basic concepts and definitions: Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Newton law of viscosity, Kinematic and dynamic viscosity; variation of viscosity with temperature,; vapor pressure, surface tension, capillarity, Bulk modulus of elasticity, compressibility, boiling point.

UNIT – II:

Fluid statics: Fluid Pressure: Pressure at a point, Pascal's law, and pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT – III:

Fluid kinematics: Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three -dimensional continuity equations in Cartesian coordinates.

UNIT – IV:

Fluid Dynamics: Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter; Momentum principle; Forces exerted by fluid flow on pipe bend; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

UNIT -V:

Analysis of Pipe Flow: Energy losses in pipelines; Friction factor for pipe flow, Darcy –
Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line;
Concept of equivalent length- Pipes in series and parallel
Text Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P)
Ltd., New Delhi.

2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill.

REFERENCES:

1. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt
Ltd, Hyderabad. 3rd Edition 2009.

2. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House

3. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery,
Oxford University Press, 2010.

4. K. Subramanya, Open Channel flow, Tata Mc.Grawhill Publishers

Year: II   **Semester: I**   **Branch of Study: CE**

Subject Code	Subject Name	L	T	P	Credits
19APC0104	Building Materials & Construction	2	0	0	2

Course Outcomes:

1. To understand the basics conventional construction materials, properties and their uses
2. To know the modern building materials, properties and their uses
3. To understand the different metals and metal alloys used in construction
4. To understand the construction techniques such as masonry, plastering and formwork
5. To know the various building components and building finishes used in construction

UNIT – I

Basic Building Materials: Properties and characteristics of Basic building materials – **Stone**: characteristics of good building stone-specific uses of stones- **Bricks**: characteristics of good quality bricks manufacturing of bricks- **Wood**: - structure –properties – seasoning –**Cement:** Raw materials used, Process of Manufacturing, Chemical composition, Types of cement.

UNIT – II

Modern Building Materials Gypsum: properties of gypsum, building products made of gypsum and their uses, GFRG.

Plastics: classification-properties- use of plastic in construction- advantages of plastics – polypropylene fibers and its applications.

UNIT – III

 Metal and metal alloys: Products made of ferrous and nonferrous metals, Aluminum alloys, Types and Uses, Anticorrosive treatment- steel fibers and its applications.

UNIT – IV

Mortars, Masonry and Form Work Types: Cement Mortars- Brick masonry – types – bonds; Stone masonry – types; Cavity wall & hollow block construction. Plastering- Pointing
Form work: Types, Requirements– Scaffolding

UNIT – V

Building Components: lintels- stair cases – types of floors, types of roofs – flat, curved, trussed; foundations – types; Damp Proof Course materials, types of paints and its applications.

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 Materials by M.L.Gambhir, TMH Pubilishers.
4. A Textbook on Building Construction by S.K.Sharma, S.Chand Pubilishers.

REFERENCES:
1. Building construction by W.B.Mckay, Vol.I, II, III & IV Pearson Publications, 2013 edition.
2. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi.
3. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi
4. Building materials by S.C.Rangawala, Charotar Pubilishing House, Anand- INDIA.

Year: II   **Semester: I**   **Branch of Study: CE**

Subject Code	Subject Name	L	T	P	Credits
19AMC9901	Biology for Engineers	2	0	0	0

Course Outcomes:

1. Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
2. Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
3. Brief about human physiology.
4. Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
5. Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.

Unit I: Introduction to Basic Biology

Evolution: Different patterns of evolution, Darwin's theory of evolution, Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes. Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Brief introduction to five kingdoms of classification, Tissue Engineering.

Unit II: Introduction to Biomolecules

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Unit III: Human Physiology

Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle, Central Nerves System and Excretory system.

Unit IV: Introduction to Molecular Biology and recombinant DNA Technology

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. DNA technology. Introduction to gene cloning.

Unit V: Application of Biology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, Properties and Classification of virus, Immune response to virus, Definitions-Pandemic, Epidemic and outbreak, pandemic alert system ranges, Prevention of pandemic disease and pandemic preparation.

Text books:

1. P.K.Gupta, Cell and Molecular Biology, 5th Edition, Rastogi Publications
2. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017

Reference Books:

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A Global Approach", Pearson Education Ltd, 2018.
2. T Johnson, Biology for Engineers, CRC press, 2011
3. J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2nd ed.. Panima Publications. PP 434.
4. David Hames, Instant Notes in Biochemistry –2016
5. Phil Tunner, A. Mctennan, A. Bates & M. White, Instant Notes – Molecular Biology – 2014.
6. Richard Dawkins, River Out of Eden: A Darwinian View of Life

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 2	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 3	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 4	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 5	PO 1: Apply the knowledge of basic science	1.2	1.2.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

(AUTONOMOUS)

AK 19 Regulations

B. Tech II- Year   **Semester** : IV   **Branch: Common to all**

Subject Code 19AHS9904	Subject Name **Communicative English II Lab**	L 0	T 0	P 2	Credit:1

Course Outcomes

1. Prioritize information from reading texts after selecting relevant and useful points.
2. Make formal structured presentations on academic topics using PPT slides with relevant graphical elements.
3. Participate in Group discussions using appropriate conventions and language strategies.
4. Paraphrase short academic text using suitable strategies and conventions.
5. Collaborate with a partner to make presentations and Project

Syllabus

Unit 1

Oral Presentation: Reading for presenting – strategies to select, compile and synthesize information for presentation; reading to recognize academic style. Listening for presentation strategies and answering questions- Formal presentations using PPT slides without graphic elements

Unit 2

Power point Presentation/Poster Presentation: Understand formal and informal styles; recognize the difference between facts and opinions. Following an argument/ logical flow of thought; answering questions, formal presentations using PPT slides with graphic elements.

Unit 3

Group discussion on general topics; agreeing and disagreeing, using claims and examples/ evidences for presenting views, opinions and position. Identifying claims, evidences, views, opinions and stance/ position. Identifying views and opinions expressed by different speakers while listening to discussions.

Unit4

Reading for inferential comprehension. Group discussion; reaching consensus in group work(academic context). Understanding inferences; processing of information using specific context clues from the text.

Unit 5

Formal team presentations on academic/ general topics using PPT slides-identifying sections in project reports; understanding the purpose of each section; significance of references.

References:

1. Effective Technical Communication, Rizvi,Tata McGraw-Hill Education2007
2. A Practical Course in Effective English Speaking skills, J.K.Gangal, PHI Learning Pvt Ltd, 2012
3. A Course in Communication Skills, P.Kiranmai Dutt,Geetha Rajeevan,C.L.N.Prakash, 2008.
4. Technical Communication, Meenakshi Raman, Oxford University Press
5. Professional Communication Skills, Er.A.K.Jain, Pravin S.R.Bhatia, Dr.A.M.Sheikh, S.Chand & Company Ltd, 2001.

List of COs	PO No. and keyword	Competency Indicator:	Performance Indicator
CO1.	PO10 Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.1	10.1.1 10.1.2
CO2.	PO10 Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.3	10.3.1 10.3.2 .
CO3.	PO9 Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	9.2.	9.2.1 9.2.2 9.2.3
CO4.	PO10 Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	10.3	10.3.1 10.3.2
CO5.	PO10 Able to comprehend and write effective reports and design documentation.	10.3	10.3.1 10.3.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year -II   **Semester** -I   **Branch of Study – CE**

Subject Code	Subject Name	L	T	P	Credits
19APC0105	Strength of Materials Lab	0	0	3	1.5

Course outcomes:
1: Determine the properties of material
2: Determine the compressive strength of wood or concrete
3: Examine the Polygon law of Co-planar forces and principle of moments
4: Solve the Reactions at the supports.
5: Determine the bending and deflection of beam
LABORATORY EXPERIMENTS:
1. Support reactions test on simply supported beam
2. Bell Crank Lever test
3. Tension test .
4. Bending test on (Steel/Wood) Cantilever beam.
5. Bending test on simply supported beam.
6. Torsion test.
7. Hardness test.
8. Compression test on Open coiled springs
9. Compression test on Closely coiled springs
10. Compression test on wood/ concrete
11. Izod / Charpy Impact test on metals
12. Shear test on metals
13. Continuous beam – deflection test.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year: II   **Semester: I**   **Branch of Study: CE**

Subject Code	Subject Name	L	T	P	Credits
19APC0106	Surveying Lab	0	0	4	2

Course Outcomes:

1: Understand basic principles of plane table surveying and fly leveling.

2: Understand basic concepts of theodolite survey and trigonometric leveling

3: Understand basic concepts of total station

4:Uunderstand the components of simple curve and able to set the curve on field.

5: Understand modern techniques in the survey systems.

LIST OF FIELD WORKS:

1. Chain Survey: Finding the area of a given boundary
2. Plane table survey: Finding the area of a given boundary
3. Compass Survey: Determining the Horizontal Angles and Area
4. Fly levelling: Height of the instrument method and rise and fall method.
5. Measurement of Horizontal and vertical angle by theodolite
6. Total Station: Determination of Remote height and distance.
7. Total Station: Determination of area.
8. Total Station: Preparation of contour maps for small area
9. Stake out using total station
10. Setting out of building using total station and curve setting