

COURSE STRUCTURE & DETAILED SYLLABUS

ACE - R20

CIVIL ENGINEERING

B. TECH FOUR YEAR DEGREE COURSE STRUCTURE & SYLLABUS

(2020 Batch)

I Year II Semester



ACE

Engineering College

Ankushapur(V), Ghatkesar(M) - 501 301

(An Autonomous Institution, Affiliated to JNTUH, Hyderabad)



ACE
Engineering College
 Ankushapur(V), Ghatkesar(M), Medchal.Dist - 501 301
(Autonomous)

B.TECH. FOUR YEAR DEGREE COURSE
CIVIL ENGINEERING
COURSE STRUCTURE
 I Year II Semester

I Year				II Semester			
S.No.	Course Type	Course Code	Course Title	Periods Per Week			Credits
				L	T	P	
1	BSC	MA201BS	Mathematics – II	3	1	0	4
2	BSC	CH202BS	Engineering Chemistry	3	1	0	4
3	ESC	ME203ES	Engineering Mechanics	3	1	0	4
4	ESC	ME205ES	Engineering Workshop	1	0	3	2.5
5	HSMC	EN205HS	English	2	0	0	2
6	BSC	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	HSMC	EN207HS	English Language and Communication Skills Lab	0	0	2	1
8	MC	MC209	Python Programming	1	0	2	0
9	MC	MC210	Aptitude & Reasoning	3	0	0	0
Total				16	3	10	19

MA201BS: MATHEMATICS – II
(ADVANCED CALCULUS & ELEMENTARY COMBINATORICS)
(Common to CE, EEE, ME, ECE, CSE, IT, AI, AI&ML, DSE)

B.Tech. I Year II Semester									
Course Code	Category	Hours/Week			Credits	Maximum Marks			
		L	T	P		C	CIA	SEE	Total
MA201BS	BSC	3	1	-	4	30	70	100	
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil			Total Classes: 60				
Prerequisite: Mathematical Knowledge of 12 th / Intermediate level									
Course Objectives: To learn <ul style="list-style-type: none"> • Methods of solving the differential equations of first and higher order. • Evaluation of multiple integrals and their applications • The physical quantities involved in engineering field related to vector valued functions • The basic properties of vector valued functions and their applications to line, surface and volume integrals • Concept of Recurrence Relations and generating functions 									
Course Outcomes: After learning the contents of this paper the student must be able to <ul style="list-style-type: none"> • Identify whether the given differential equation of first order is exact or not • Solve higher differential equation and apply the concept of differential equation to real world problems • Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped • Evaluate the line, surface and volume integrals and converting them from one to another • Apply the concepts of advanced counting techniques 									
Unit: I		First Order ODE							
Exact, linear and Bernoulli's equations; Applications : Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.									
Unit: II		Ordinary Differential Equations of Higher Order							
Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type a^x , $\sin x$, $\cos x$, polynomials in x , $a^x (x)$ and $x (x)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Eulerequation.									
Unit: III		Multivariable Calculus (Integration)							
Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelopiped).									
Unit: IV		Vector calculus							

Gradient, Divergence, Curl, Line integral, conservative fields, Green's theorem, surface area of solids of revolution, surface area, surface integral, Triple integrals and Gauss Divergence theorem, Stokes' theorem (without proofs)

Unit: V **Counting (Recurrence Relations & Elementary Combinatorics)**

Basic counting, Pigeonhole principle, Permutations and Combinations, Binomial Coefficients, Application of Recurrence Relations, Solution of Recurrence Relations, Generating functions, Inclusion – Exclusion and applications

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Kenneth H. Rosen, Discrete Mathematics and Its Applications, McGrawHill.

Reference Books:

1. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. Higher Engineering Mathematics by B V Ramana, Tata McGraw-Hill
4. Discrete Mathematics for Computer Scientists and Mathematicians by Joe R. Mott, Abraham Kandel, Theodore P. Baker, Prentice-Hall of India Pvt.Ltd.

Web References:

- 1) SWAYAM Online Courses <https://storage.googleapis.com/uniquecourses/online.html>
- 2) Directory of Open Access Journals <https://doaj.org/>
- 3) Springer Open Journals <https://www.springeropen.com/journals>
- 4) UG/PG MOOCs http://ugcmoocs.inflibnet.ac.in/ugcmoocs/moocs_courses.php

E-Text Books:

- 1) National Digital Library: <https://ndl.iitkgp.ac.in/>
- 2) NCERT Text Books <http://ncert.nic.in/textbook/textbook.htm>
- 3) Directory of Open Access Books <https://www.doabooks.org/>

CH202BS: ENGINEERING CHEMISTRY

B.Tech. I Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CH202BS	Basic Sciences	L	T	P	C	CI	SE	Total
		3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil			Total Classes: 60			
Prerequisite: Nil								
Course Objectives:								
<ul style="list-style-type: none"> To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them. To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry. To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways. To acquire the knowledge of preparation, properties and applications of engineering materials. 								
Course Outcomes: The basic concepts included in this course will help the student to gain:								
<ul style="list-style-type: none"> The knowledge of atomic, molecular and electronic changes, band theory related to conductivity. The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments. The knowledge of configurational and conformational analysis of molecules and reaction mechanisms. The knowledge of preparation, properties and applications of engineering materials. 								
Unit - 1	MOLECULAR STRUCTURE AND THEORIES OF BONDING							
Atomic and Molecular orbitals, Linear Combination of Atomic orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N ₂ , O ₂ and F ₂ molecules. Pi-molecular orbitals of butadiene and benzene. Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.								
Unit - 2	WATER AND ITS TREATMENT							
Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems								
Unit - 3	ELECTROCHEMISTRY AND CORROSION							
Electro Chemistry: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications.								

Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

Unit - 4**STEREOCHEMISTRY, REACTION MECHANISM AND SYNTHESIS OF DRUGMOLECULES**

Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation analysis of n-butane. Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1 , S_N2 reactions.

Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and Anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydrohalogenation of alkylhalides. Saytzeffrule. Oxidation Reactions :Oxidation of alcohols using

$KMnO_4$ and chromic acid. Reduction reactions: Reduction of carbonyl compounds using $LiAlH_4$, $NaBH_4$. Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Unit - 5**MATERIAL SCIENCE (POLYMERS, COMPOSITE MATERIALS CERAMICS AND COMPOSITE MATERIALS) & SPECTROSCOPY**

POLYMERS: Introduction, classification, Types of polymerization, Thermoplastics and thermosetting polymers, synthesis and applications of poly vinyl chloride, Bakelite, nylon 6,6
COMPOSITE MATERIALS: Composites - Constitution, classification, Particle reinforced composites, Fiber-reinforced composites, Metal-matrix composites, Carbon-carbon composites Structural composites, Advantages and applications.

CERAMICS: Different types of ceramic crystal structures, Clay products, Advanced ceramics, Ceramic ball bearings, Cements.

SPECTROSCOPY: Introduction to spectroscopy, IR spectra and its applications

Text Books:

1. A TEXT BOOK OF ENGINEERING CHEMISTRY BY DR S.S DHARA & DR.K.MUKKANTI.(S.Chand Publications)
2. A TEXT BOOK OF ENGINEERING CHEMISTRY BY DR BHARATHI KUMARI YALAMANCHALI.(VGS Techno Series)

Reference Books:

1. Physical Chemistry, by P.W. Atkins
2. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E. Schore, 5th Edition.
3. University Chemistry, by B.M. Mahan, Pearson IV Edition.

Web References:

1. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan.
2. Engineering Chemistry by P.C. Jain & M. Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.

E-Text Books:

1. [ebook] Central library IIT Indore (www.library.iiti.ac.in)
2. [ebook] Chemistry by Royal Society of Chemistry (<https://www.rsc.org/ebooks>)

ME203ES: ENGINEERING MECHANICS

B.Tech. I Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
ME203ES	ESC	L	T	P	C	CIA	SEE	Total
		3	1	0	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: 0			Total Classes: 60			
<p>Course Objectives: The objectives of this course are to</p> <ul style="list-style-type: none"> • Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium • Perform analysis of bodies lying on rough surfaces. • Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections • Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies. • Explain the concepts of work-energy method and its applications to translation, rotation and plane motion and the concept of vibrations 								
<p>Course Outcomes: At the end of the course, students will be able to</p> <ul style="list-style-type: none"> • Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces. And, solve problem of bodies subjected to friction. • Find the location of centroid and calculate moment of inertia of a given section. • Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion. • Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration. 								
Unit: I								
Introduction to Engineering Mechanics - Force Systems: Basic concepts, Particle equilibrium in 2-D & 3- D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy.								
Unit: II								
Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack; Centroid and Centre of Gravity -Centroid of Lines, Areas and Volumes from first principle, Centroid of composite sections; Centre of Gravity and its implications – Theorem of Pappus.								
Unit: III								
Area Moment of Inertia: Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Product of Inertia, Parallel Axis Theorem, Perpendicular Axis Theorem. Mass Moment of Inertia: Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.								
Unit: IV								
Review of particle dynamics – Rectilinear motion; Plane curvilinear motion (rectangular, path, And polar coordinates). 3-D curvilinear motion; Relative and								

constrained motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

Unit: V

Kinetics of Rigid Bodies -Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation

Text Books:

1. Shames and Rao (2006) , Engineering Mechanics, Pearson Education.
2. Reddy Vijay Kumar K. and J. Suresh Kumar (2010), Singer's Engineering Mechanics – Statics & Dynamics.

Reference Books

1. Timoshenko S.P and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 1983.
2. Engineering Mechanics by Dhubay, TMH
3. Hibbeler R.C & Ashok Gupta, "Engineering Mechanics", Pearson Education, 2010.
4. Meriam. J. L., "Engineering Mechanics", Volume-II Dynamics, John Wiley & Sons, 2008.
5. Andrew Pytel, Jaan Kiusalaas, "Engineering Mechanics", Cengage Learning, 2014.
6. Beer F.P & Johnston E.R Jr. Vector, "Mechanics for Engineers", TMH, 2004.
7. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
8. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2008.

Web References

1. <https://nptel.ac.in/courses/112/106/112106286/>
2. <https://ndl.iitkgp.ac.in/>

E-Text Books

1. https://books.google.co.in/books?id=AOY9fiIkB9AC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
2. <https://drive.google.com/file/d/1Z53SsmbaRAbhutHQAF7SeKM5vsZTEm/view>

ME205ES: ENGINEERING WORKSHOP

B.Tech. I Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
ME205ES	ESC	L	T	P	C	CIA	SEE	Total
		1	0	3		2.5	30	70
Contact Classes: 15	Tutorial Classes: 0	Practical Classes: 45			Total Classes: 60			
Prerequisite: Practical Skill								
Course Objectives:								
<ul style="list-style-type: none"> • To study of different hand operated power tools, uses and their demonstration. • To gain a good basic working knowledge required for the production of various engineering products. • To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field. • To develop a right attitude, team working, precision and safety at workplace. • It explains the construction, function, use and application of different working tools, equipment and machines. • To study commonly used carpentry joints. • To have practical exposure to various welding and joining processes. • Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances. 								
Course Outcomes: At the end of the course, the student will be able to:								
<ul style="list-style-type: none"> • Study and practice on machine tools and their operations • Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding. • Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling. • Apply basic electrical engineering knowledge for house wiring practice. 								
1. TRADES FOR EXERCISES:								
At least two exercises from each trade:								
1. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Ten on Joint)								
2. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)								
3. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)								
4. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)								
5. Welding Practice – (Arc Welding & Gas Welding)								
6. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)								
7. Black Smithy – (Round to Square, Fan Hook and S-Hook)								
2. TRADES FOR DEMONSTRATION & EXPOSURE:								
Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working								

Text Books:

1. Workshop Practice /B. L. Juneja/Cengage
2. Workshop Manual / K.Venugopal/Anuradha.

Reference Books:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/SciTech
2. Workshop Manual /Venkat Reddy/BSP

EN205HS: ENGLISH

B.Tech. I Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
EN205HS	HSMC	L	T	P	C	CIA	SEE	Total
		2	0	0	2	30	70	100
Contact Classes: 32		Tutorial Classes: -			Practical Classes: Nil		Total Classes: 32	
Prerequisite: Knowledge of functional English, basics in grammar, understanding of LSRW Skills								
<p>Course Overview:</p> <p>In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.</p> <p>In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.</p>								
<p>Course Objectives:</p> <p>The course will help to</p> <ul style="list-style-type: none"> • Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. • Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. • Develop study skills and communication skills in formal and informal situations. 								
<p>Course Outcomes:</p> <p>Students should be able to</p> <ul style="list-style-type: none"> • Use English Language effectively in spoken and written forms. • Comprehend the given texts and respond appropriately. • Communicate confidently in various contexts and different cultures. • Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills 								
UNIT: I		The Raman Effect						
<p>Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes. Grammar: Identifying Common Errors in Writing with Reference to Articles and Parts of Speech Reading: Reading and Its Importance- Techniques for Effective Reading. Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.</p>								

UNIT: II	Ancient Architecture in India
<p>Vocabulary: Synonyms and Antonyms. Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement. Reading: Improving Comprehension Skills – Techniques for Good Comprehension Writing: Format of a Formal Letter-Writing Formal Letters E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.</p>	
UNIT: III	Blue Jeans
<p>Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English. Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses. Reading: Sub-skills of Reading- Skimming and Scanning Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence</p>	
UNIT: IV	What Should You Be Eating
<p>Vocabulary: Standard Abbreviations in English Grammar: Redundancies and Clichés in Oral and Written Communication. Reading: Comprehension- Intensive Reading and Extensive Reading Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing</p>	
UNIT: V	How a Chinese Billionaire Built Her Fortune
<p>Vocabulary: Technical Vocabulary and their usage Grammar: Common Errors in English Reading: Reading Comprehension-Exercises for Practice Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.</p>	
Text Book:	
1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.	
Reference Books:	
Swan, M. (2016). Practical English Usage. Oxford University Press.	
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.	
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.	
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.	
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.	
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.	
Web References:	
1. www.cambridgeenglishonline.org	
2. www.eslcafe.com	
3. bbc.co.uk/worldservice/learningenglish	
E-Text Books:	
1. The secret to perfecting your grammar - Bloomsbury International	

CH206BS: ENGINEERING CHEMISTRY LAB

B.Tech. I Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CH206BS	BSC	L	T	P	C	CIA	SEE	Total
		-	-	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45			Total Classes: 45			
Prerequisite: Nil								
<p>Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:</p> <ul style="list-style-type: none"> • Estimation of hardness and chloride content in water to check its suitability for drinking purpose. • To determine the rate constant of reactions from concentrations as a function of time. • The measurement of physical properties like adsorption and viscosity. • To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique. 								
<p>List of Experiments:</p> <ol style="list-style-type: none"> 1. Determination of total hardness of water by complexometric method using EDTA 2. Determination of chloride content of water by Argentometry 3. Estimation of an HCl by Conductometric titrations 4. Estimation of Acetic acid by Conductometric titrations 5. Estimation of HCl by Potentiometric titrations 6. Estimation of Fe²⁺ by Potentiometry using KMnO₄ 7. Synthesis of Aspirin and Paracetamol 8. Determination of acid value of coconut oil 9. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal 10. Determination of viscosity of ground nut oil by using Ostwald's viscometer. 11. Determination of partition coefficient of acetic acid between n-butanol and water. 12. Determination of surface tension of a give liquid using stalagmometer. 13. Thin layer chromatography calculation of R_f values. eg ortho and para nitrophenols. 14. Determination of rate constant of acid catalysed hydrolysis of methylacetate 								
<p>List of Equipment/Software (with Specifications or Range) Required:</p> <ol style="list-style-type: none"> 1. CONDUCTIVITYMETER 2. POTENTIOMETER. 3. WATER DISTILLATION SET 4. WATER BATH 5. TLC CHAMBER 6. UV CHAMBER 7. SHAKER BATH 								

EN207HS: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.TECH I YEAR II SEMESTER								
COURSE CODE	CATEGORY	HOURS/WEEK			CREDITS	MAXIMUM MARKS		
EN207HS	HSMC	L	T	P	C	CIA	SEE	TOTAL
		0	0	2	1	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes:32				Total Classes :32		
PREREQUISITES: Knowledge of functional English, basics in grammar, understanding of LSRW skills								
<p>Course Objectives:</p> <ul style="list-style-type: none"> To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking To improve the fluency of students in spoken English and neutralize their mother tongue influence To train students to use language appropriately for public speaking and interviews 								
<p>COURSE OUTCOME: Students will be able to attain Better understanding of nuances of English language through audio- visual experience and group activities</p> <ul style="list-style-type: none"> Neutralization of accent for intelligibility Speaking skills with clarity and confidence which in turn enhances their employability skills 								
<p>SYLLABUS English Language and Communication Skills Lab (ELCS) shall have two parts: a. Computer Assisted Language Learning (CALL) Lab b. Interactive Communication Skills (ICS) Lab</p> <p>Listening Skills <i>Objectives</i></p> <ol style="list-style-type: none"> To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions <p>Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.</p> <ul style="list-style-type: none"> Listening for general content Listening to fill up information Intensive listening Listening for specific information 								

Speaking Skills*Objectives*

1. To involve students in speaking activities in various contexts
 2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice: Just A Minute (JAM) Sessions
 - Describing objects/situations/people
 - Role play – Individual/Group activities

Module: I	Exercise-I	
CALL Lab: Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.		
ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language. Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.		
Module: II	Exercise-II	
CALL Lab: Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.		
ICS Lab: Understand: Features of Good Conversation – Non-verbal Communication. Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.		
Module: III	Exercise-III	
CALL Lab: Understand: Intonation-Errors in Pronunciation-the Interference of Mother Tongue (MTI). Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.		
ICS Lab: Understand: How to make Formal Presentations. Practice: Formal Presentations.		
Module: IV	Exercise-IV	
CALL Lab: Understand: Listening for General Details. Practice: Listening Comprehension Tests.		
ICS Lab: Understand: Public Speaking – Exposure to Structured Talks. Practice: Making a Short Speech – Extempore.		
Module: V	Exercise- V	

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.

Practice: Mock Interviews.

Reference Books:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I–III. CIEFL, Hyderabad. Oxford University Press.

Web References:

6. [elt.oup.com/learning resources](http://elt.oup.com/learningresources)
7. www.cambridgeenglishonline.org
8. www.eslcafe.com
9. bbc.co.uk/worldservice/learningenglish
10. www.manythings.org

E-Text Books:

2. The secret to perfecting your grammar - Bloomsbury International

MC209: PYTHON PROGRAMMING

B.Tech I Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
MC209	MC	2	0	1	0	30	70	100
		Practical Classes:15			Total Classes :45			
Contact Classes:30								
Tutorial Classes: Nil								
PREREQUISITES: A course on “Python Programming”.								
COURSE OBJECTIVE:								
At the end of the course students should be able to:								
<ol style="list-style-type: none"> 1. To learn how to use lists, tuples, and dictionaries in Python programs. 2. To learn how to write loops and decision statements in Python. 3. To learn how to read and write files in Python. 4. To learn how to use exception handling in Python applications for error handling. 								
COURSE OUTCOME:								
At the end of the course students will be able to:								
<ol style="list-style-type: none"> 1. Explain basic principles of Python programming language. 2. Create, run and manipulate Python Programs using core data structures like Lists, Tuple, Set and 3. Dictionaries. 4. Understand and summarize different File handling operations. 5. Handle exceptions in programming. 								
Unit -1								
Algorithms, building blocks of algorithms (statements, state, control flow), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms. Python Basics, Features of Python, Python Applications, Installing and running Python with Different IDEs, Comments in Python, Memory Management in Python, Garbage Collection in Python, Python I/O : Printing to the Screen, Reading Keyboard Input.								
Unit -2								
Operators in Python: Arithmetic, Relational and Comparison Operators, Python Assignment Operators, Logical Operators and Bitwise Operators, Membership Operators, Identity Operators, Operator Precedence and Associativity, Evaluating Expressions. Control Statements: A Word on Indentation, The if Statement, The if ... else Statement, The if ... elif ... else Statement, The while Loop, The for Loop, Infinite Loops, Nested Loops, Loop manipulation using pass, continue, break and else Statement.								
Unit -3								
Variables and Data Types in Python: How Python Sees Variables, Constants, Identifiers and Reserved words in Python, Naming Conventions in Python. Declaring and using Numeric data types: int, float, complex and boolean , Sequences: Using String data type, Lists and Tuples, Methods and Useful Built-in Functions, Dictionaries and Set Types								
Unit -4								
Python Programming using functions, modules and packages: Organizing python codes using functions, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default Arguments, Variable Length Arguments, Pass by Object Reference, Local and Global Variables, Scope and Lifetime of variables, Nested Functions, Recursive Functions, Powerful Lamda								

function.

Unit -5

Python File Input-Output: Opening and closing file, Various types of file modes, reading and writing to files.

Python Exception Handling: Avoiding code break using exception handling , Various keywords to handle exception, try .. except .. else ... finally, Raising Exceptions, Assertions, Python Custom

TEXT BOOKS:

1. Learning with Python3: How to Think Like a Computer Scientist, 3rd Edition – Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers
2. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist``, Shroff/O'Reilly Publishers.

REFERENCE BOOKS:

1. Introduction to Python for Computational Science and Engineering (A beginner's guide), Hans Fangohr.
2. Exploring Python, Timothy A. Budd, Mc Graw Hill Education
3. John V Guttag, —Introduction to Computation and Programming Using Python``, Revised and expanded Edition, MIT Press
4. PYTHON PROGRAMMING, Ashok Kamthane and Amit Ashok kamthane

E TEXT BOOKS:

1. https://www.davekuhlman.org/python_book_01.pdf
2. <https://www.pdfdrive.com/python-programming-for-the-absolute-beginner-d34494394.html>
3. <http://index-of.es/Python/Exploring%20Python.pdf>

MC210: APTITUDE AND REASONING

B.Tech. I Year II Semester								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MC210	MC	L	T	P	C	CIA	SEE	Total
		3	-	-	0	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
Prerequisite: Nil								
Course Objectives:								
<p>This is a foundation course and aims at enhancing employability skills in students. Students will be introduced to higher order thinking skills and problem solving on the following areas</p> <ul style="list-style-type: none"> - Arithmetic ability, Numerical ability and General reasoning. Students will be trained to work systematically with speed and accuracy while problem solving. <p>The major areas covered in this course include</p> <ol style="list-style-type: none"> 1. Arithmetic Ability 2. Numerical Ability 3. Quantitative Aptitude 4. Verbal Reasoning 5. Logical reasoning 6. Visual Reasoning 								
Course Outcomes: Upon the completion of the course, students are expected to								
<ol style="list-style-type: none"> 1. Solve questions on the above mentioned areas using short cuts and smart methods 2. Understand the fundamentals concepts of Aptitude skills 3. Perform calculations with Speed & Accuracy 4. To improve Logical thinking. 5. To improve Application Knowledge 								
Unit-1	ARITHMETIC ABILITY FOUNDATION							
ARITHMETIC ABILITY FOUNDATION: Square root, Cube roots, Speed Maths using Vedic Maths, Surds & Indices, Logarithms								
Number Systems - Types of numbers, Divisibility tests, LCM and HCF, Unit digit, Number of zeroes, Factorial, No. of factors, Remainder concepts, Successive Divisors								
Unit-2	COMMERCIAL ARITHMETIC & ARITHMETIC ABILITY ADVANCED							
COMMERCIAL ARITHMETIC: Percentages, Profit and Loss, Discount, Simple Interest & Compound Interest								
ARITHMETIC ABILITY ADVANCED: Time, Speed & Distance- Basics, Average Speed, Problems on Trains, Relative Speed, Boats & Streams, Races & Games, Circular Motion								
Time and work, Work & Wages, Chain Rule, Pipes and Cisterns								
Unit-3	BIODIVERSITY AND BIOTIC RESOURCES							
ALGEBRA: Linear Equations, Quadratic Equations and In-equations, Averages, Ratio, Proportion & Variations, Ages, Partnership								
LOGICAL REASONING: Statements & Conclusions, Statements & Course of Actions, Statements & Assumptions, Cause & Effect, Coded Inequalities, Syllogism, Input Output								
Unit-4	MODERN APTITUDE							
MODERN APTITUDE - I: Permutations & Combinations, Circular Permutation, Probability, Area and Volumes.								
MODERN APTITUDE - II: Data Sufficiency, Data Interpretation – Line graph, Pie Charts, Bar Graph								
Unit-5	VERBAL REASONING & VISUAL REASONING							

VERBAL REASONING: Blood relations, Directions, Coding & Decoding, Number Ranking, Venn Diagrams, Alphanumeric Symbol Test, Mathematical operations.
Series, Analogy, Classification, Analytical Reasoning - Information Ordering – Arrangements
VISUAL REASONING: Series, Analogy, Classification, Mirror & Water Images, Spotting out the Embedded figure, Pattern Incompletion, Paper Folding & Cutting, Analytical Figures, Cubes & Dice

Text Books:

1. Quantitative Aptitude for Competitive Examinations – Dr. R.S Aggarwal, S. Chand Publisher, English Medium, Revised & Enlarged Edition.
2. A Modern Approach to Verbal Reasoning (Fully Solved) – Dr R.S Aggarwal, S. Chand Publisher, English Medium.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

Reference Books:

1. How to Prepare for Quantitative Aptitude for the CAT – Arun Sharma, Publisher: Mcgraw Hill TP, 8th Edition, English Medium.
2. A Modern Approach to Verbal & Non-Verbal Reasoning – Dr. R.S Aggarwal, S. Chand Publisher, English Medium, Revised Edition.
3. Quantitative Aptitude for All Competitive Examinations – Abhijit Guha, Publisher: Mcgraw Hill, 3rd Edition, English Medium.
4. Quantitative Aptitude - For Competitive Examinations – Rao U. M. Karanam, Publisher: Scitech Publications (India) Pvt. Ltd, ISBN: 9788183714631, English Medium.
5. Course in Mental Ability and Quantitative Aptitude - For Competitive Examinations – Edgar Thorpe, Publisher: Tata McGraw - Hill Education, 2nd Edition, English Medium.