COURSE STRUCTURE & DETAILED SYLLABUS

MECHANICAL ENGINEERING

B. TECH FIRST YEAR SECOND SEMESTER

(Applicable for the batches admitted from 2020-2021)

ACE

Engineering College

Ankushapur(V), Ghatkesar(M), Medchal Malkajgiri (Dist.), Telangana - 501 301.

(An Autonomous Institution, Affiliated to JNTUH ,Hyderabad)

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B.TECH. FIRST YEAR SECOND SEMESTER
MECHANICAL ENGINEERING
COURSE STRUCTURE

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**

Note: *MC = Satisfactory/Unsatisfactory

CS106ES : PROGRAMMING FOR PROBLEM SOLVING LAB

B.Tech. I Year II Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS106ES	**ESC**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		0	0	3	1.5	30	70	100
Contact Classes: 0	**Tutorial Classes: 0**	**Practical Classes:45**				**Total Classes:45**		

Prerequisite: Basic Knowledge of Computer

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

For all the Programs writing Algorithm and drawing Flow chart is Mandatory.

List of Experiments:

Basic programs

1. Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
2. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.
3. Write a program to convert temperature from Fahrenheit to Celsius and vise versa.
4. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
5. Write a C program to find simple and compound interest.
6. Write a C program to find Gross salary of an Employee.

Decision Making statements

1. Write a program for fiend the max and min from the three numbers using if-else.
2. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*,/, % and use Switch Statement)
3. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
4. Write a C program to find the roots of a Quadratic equation.
5. Write a C program to find grade of a student using else if ladder.
6. C program to read weekday number and print weekday name using switch.

Loop:

1. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:

5 x 1 = 5
5 x 2 = 10
5 x 3 = 15

2. Write a C program to print the following patterns:

```
 1          *          1          1          * * * *
 1 2        * *        2 3        2 2        * * *
 1 2 3       * * *     4 5 6      3 3 3      * *
                                  4 4 4 4    *
```

a.
```
 1
 2 3
 4 5 6
7 8 9 10
```

b.
```
 1
 01
 101
 0101
 10101
```

c.
```
 1
 22
 333
 4444
 55555
```

d.
```
    *
   ***
  *****
 *******
*********
 *******
  *****
   ***
    *
```

3. Find the sum of the series

a. 1^2+2^2+3^2+4^2+……+N^2
b. 1/2 - 2/3 + 3/4 - 4/5 + 5/6 ..... n
c. 1-X^2/2!+X^4/4!- .....
d. 1-x/2 +x^2/4-x^3/6 .....

Loop with Decision making Statements:

1. Write a program that shows the binary equivalent of a given positive number between 0 to 255.
2. Write a program that finds if a given number is a prime number
3. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
4. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
5. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
6. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x^2+x^3+……+x^n. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
7. Write a C program to print all Perfect numbers between 1 to n.
8. C program to print all Armstrong numbers from 1 to N.

Function

1. Write a C program to calculate factorial of a given number using function & recursion.
2. Write a C Program for call by value & call by reference.
3. Write a C program to calculate GCD of two number using function & recursion.
4. Write a C program to calculate LCM of two number using function & recursion.
5. Write a C program to find x^n using recursion.
6. Write a C program o find minimum and maximum value from given two values using a macro.
7. Write a C program to demonstrate the storage classes.
8. Write a C program to demonstrate pre processor commands.

Arrays

1. Write a C program to find the minimum, maximum and average in an array of integers.
2. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
3. Write a C program that uses functions to perform the following:
   i. Addition of Two Matrices
   ii. Multiplication of Two Matrices
4. Write a C program to merge to arrays into a single array.
5. Write a C program to implement Stack using array.
6. Write a C program to implement Queue using array.

Sorting and Searching:

1. Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
2. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.
3. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
4. Write a C program that sorts the given array of integers using selection sort in descending order
5. Write a C program that sorts the given array of integers using insertion sort in ascending order
6. Write a C program that sorts the given array of integers using merge sort and quick sort in ascending order

Pointers & Dynamic Memory Allocation

1. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
2. Write a program for reading elements using pointer into array and display the values using array.
3. Write a program for display values reverse order from array using pointer.
4. Write a program through pointer variable to sum of n elements from array.

Strings:

1. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
2. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
3. Write a C program that uses functions to perform the following operations:
   a. To insert a sub-string in to a given main string from a given position.
   b. To delete n Characters from a given position in a given string.
4. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
5. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn‘t contain ch.

6. Write a C program to count the lines, words and characters in a given text.
7. Write a C program that sorts a given array of names

Structures

1. Define a structure for Student with Sno, Sname, marks of three subjects, avg. Write a C program to read 4 students information and display grade of the student.
2. Define a structure called books with book name, author, price, pages, and edition. Write a C program to read and display a book information using pointer.
3. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, multiplication, division, complex conjugate) and implement them in a menu driven style.

Files:

1. Write a C program to display the contents of a file to standard output device.
2. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
3. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
4. Write a C program that does the following:
   It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function) The program should then read all 10 values and print them back.
5. Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the third file).
6. Write a C program to display first n characters of a file in reverse order.

List of Equipment/Software (with Specifications or Range) Required:

A Computer System with Ubuntu operating system and GCC Compiler

References

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
4. Hall of India
5. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
7. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

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 12th / Intermediate level

Course Objectives: To learn

- 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

- 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 ^{ax}, sin x, cos x, polynomials in x, ^{ax} (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, 9thEdition,Pearson, Reprint,2002.
3. Higher Engineering Mathematics by B V Ramana, TataMcGraw-Hill
4. Discrete Mathematics for Computer Scientists and Mathematicians by Joe R. Mott, AbrahamKandel, Theodore P. Baker, Prentice-Hall of India Pvt.Ltd.

Web References:

1. SWAYAM Online Courseshttps://storage.googleapis.com/uniquecourses/online.html
2. Directory of Open Access Journalshttps://doaj.org/
3. Springer Open Journalshttps://www.springeropen.com/journals
4. UG/PG MOOCshttp://ugcmoocs.inflibnet.ac.in/ugcmoocs/moocs_courses.php

E-Text Books:

1. National Digital Library:https://ndl.iitkgp.ac.in/
2. NCERT Text Bookshttp://ncert.nic.in/textbook/textbook.htm
3. Directory of Open Access Bookshttps://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**	**CIA**	**SEE**	**Total**
		3	1	-	4	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: Nil**				**Total Classes: 60**		

Prerequisite: Nil

Course Objectives:

- 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:

- 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 – I: 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_2molecules. Π- 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 – II: 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 – III: 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 – IV: 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 – V: 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. (V G S Techno Series)

Reference Books:

1. Physical Chemistry, by P.W.Atkins
2. Organic Chemistry: StructureandFunctionbyK.P.C. VolhardtandN.E.Schore, 5thEdition.
3. University Chemistry, by B.M. Mahan, Pearson IVEdition.

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., NewDelhi.

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)

R20 B.Tech ME I Year

ME203ES: ENGINEERING MECHANICS

B.Tech. I Year II Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ME203ES	**ESC**	3	1	0	4	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: 0**				**Total Classes: 60**		

Course Objectives: The objectives of this course are to

- 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

Course Outcomes: At the end of the course, students will be able to

- 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,PearsonEducation.
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, JaanKiusalaas, "Engineering Mechanics", Cengage Learning,2014.
6. BeerF.P & Johnston E.RJr.Vector,"MechanicsforEngineers",TMH,2004.
7. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications,2011.
8. BasudebBhattacharyya,"EngineeringMechanics",OxfordUniversityPress,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**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
ME205ES	**ESC**	1	0	3	2.5	30	70	100
Contact Classes: 15	**Tutorial Classes: 0**	**Practical Classes: 45**				**Total Classes: 60**		

Prerequisite: Practical Skill

Course Objectives:

- 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:

- Study and practice on machine tools and their operations
- Practiceonmanufacturingofcomponentsusingworkshoptradesincludingpluming, 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		
		L	T	P	C	CIA	SEE	Total
EN205HS	HSMC	2	0	0	2	30	70	100
Contact Classes: 30	Tutorial Classes: -	Practical Classes: Nil				Total Classes: 30		

Prerequisite: Knowledge of functional English, basics in grammar, understanding of LSRW skills

Course Overview:

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.

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.

Course Objectives:

The course will help to

- 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.

Course Outcomes:

Students should be able to

- 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

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.

UNIT - II: Ancient Architecture in India

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.

UNIT – III: Blue Jeans

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

UNIT - IV: What Should You Be Eating

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

UNIT – V: How a Chinese Billionaire Built Her Fortune

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.

Text Book:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge UniversityPress.

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 UniversityPress.

Web References:

1. www.cambridgeenglishonline.org
2. www.eslcafe.com
3. www.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**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
CH206BS	**BSC**	-	-	3	1.5	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		

Prerequisite: Nil

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- 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 an 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.

List of Experiments:

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 Rf values. eg ortho and para nitrophenols.
14. Determination of rate constant of acid catalysed hydrolysis of methylacetate

List of Equipment/Software (with Specifications or Range) Required:

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:30**				**Total Classes :30**		

PREREQUISITES: Knowledge of functional English, basics in grammar, understanding of LSRW skills

Course Objectives:

- 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

COURSE OUTCOME:

Students will be able to attain

Better understanding of nuances of English language through audio- visual experience and group activities

- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills

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

Listening Skills

Objectives

1. 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

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

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.

• 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:

1. www.elt.oup.com/learning resources
2. www.cambridgeenglishonline.org
3. www.eslcafe.com
4. www.bbc.co.uk/worldservice/learningenglish
5. 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**	**Total**
MC209	**MC**	**2**	**0**	**1**	**0**	**30**	**70**	**100**
Contact Classes:30	**Tutorial Classes: Nil**	**Practical Classes:15**				**Total Classes :45**		

PREREQUISITES: A course on "Python Programming".

COURSE OBJECTIVE:

At the end of the course students should be able to:

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:

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 – I

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 – II

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 – III

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 – IV

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 – V

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		
		L	T	P	C	CIA	SEE	Total
MC210	MC	3	-	-	0	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

Prerequisite: Nil

Course Objectives:

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 - Arithmetic ability, Numerical ability and General reasoning. Students will be trained to work systematically with speed and accuracy while problem solving. The major areas covered in this course include

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

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 – I: 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 – II: 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- III: 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 – IV: MODERNAPTITUDE

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 – V: 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.