

**Chemistry Group (Sem-I)**

**COURSE WISE DETAILED  
CURRICULUM**

## FY102 Engineering Chemistry

**Lectures** : 3 Hrs/Week

**Credit** : 3

**Evaluation Scheme**

**ISE** : 40 Marks

**ESE** : 60 Marks

<b>Course Objectives:</b> The objective of the course is to		
1) study the different water quality parameters and its applications in engineering field. 2) demonstrate the structural and functional role of biomolecules essential for cellular reactions. 3) Enlist the chemical and biological differences between DNA, RNA and their role in cellular behavior. 4) develop an interest among the students regarding applied and engineering chemistry. 5) analyze characteristics of fuels. 6) understand basic properties of metals and alloys.		
<b>Course Outcomes:</b>		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	<b>Recall</b> the terms, basic properties of water analyze water sample for pollution control.	Remember
CO2	<b>Utilize</b> the knowledge of biomolecules	Analyze
CO3	<b>Apply</b> Knowledge of engineering materials in various technical fields and in construction.	Apply
CO4	<b>Select</b> proper fuels for domestic , and industrial applications.	Apply
CO5	<b>Analyze</b> engineering problems related to corrosion and metal finishing in achieving a practical solution. apply the significance of corrosion in industries	Analyze
CO6	<b>Explain</b> chemical equilibrium using various terms ( Phase , Components & Degree of freedom	Understand

<b>Description:</b>		
This course aims to impart fundamental knowledge of engineering materials (composite, polymer Cement), and applied knowledge of water purification methods, analysis of amino acids using ninhydrin test, energy storage devices, prevention techniques of corrosion. Students will be expected to communicate knowledge to society and industry.		
<b>Prerequisites:</b>	1:	Students should have knowledge about basic chemistry related to electrochemistry and occurrence of metals,
	2:	periodic table physical and chemical properties of elements
	3:	Applications of fuel and different macromolecules

Section – I		
Unit 1	<b>Water</b>	
	Introduction, impurities in natural water, water quality parameters Hardness of water, types of hardness, units of hardness. ill effects of hard water in steam generation in boilers , scale & sludge formation. Numericals on hardness, treatment of hard water (ion exchange and reverse osmosis). Green Chemistry :Definition, Twelve principles of green chemistry, Industrial	08 Hrs
Unit 2	<b>Chemistry of living cell</b>	
	Cell & cellular constituents and their functions. Various classes of biological molecules & functions. a) <b>Amino acids :</b> Definition, Nomenclature, General structure and classification of amino acids : 1) <b>Neutral amino acids:</b> Hydrocarbon chain amino acids-Glycine, Alanine, Valine, Leucine, Isoleucine. 2) <b>Acidic amino acids and their amides:</b> Aspartic acid, Glutamic acid, Asparagine, Glutamine. 3) <b>Basic aminoacids:</b> Lysine Arginine, Histidine, b) <b>Nucleic acids:</b> Introduction, Meaning, Definition, Distinction between DNA and RNA, Components of nucleic acids viz, bases, sugars. Nucleosides and nucleotides,	05 Hrs
Unit 3	<b>Engineering materials</b>	
	<b>Macromolecules: Polymers :</b> Introduction, Addition and condensation polymers examples ; plastics --industrially important plastics( PF,UF & Epoxy resin) Conducting polymers and Biopolymers, Molecular Weight of polymers. <b>Composite materials</b> Introduction, Composition, properties and uses of fiber reinforced plastics (FRP) example glass reinforced plastic(GRP)	07 Hrs
Section – II		
Unit 4	<b>Fuels</b>	
	Introduction, Definition ,classification, properties of fuels. Characteristics of good fuels, comparison between solid, liquid and gaseous fuels, Calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numerical on Bomb and Boy's calorimeter <b>Fuel Cells:</b> Defination, classification of fuel cells, working of Solid oxide fuel cell (SOFC), limitations and applications of fuel cells.	07Hrs
Unit 5	<b>Corrosion and it's Prevention</b>	
	Introduction, Concept of electrode potential, Nernst Theory , causes, classification, Factors affecting rate of corrosion corrosion monitoring and protection from corrosion prevention methods .such as Proper design and material selection,cathodic protection, Prevention methods and protective coatings- Metallic and Non metallic coatings , such as Hot dipping (galvanizing and tinning,), electroplating ,	07Hrs

	Metal cladding ,Metal Spraying	
<b>Unit 6</b>	<b>Chemical Equilibrium</b>	
	Introduction, Heterogeneous equilibrium, mathematical statement of phase rule Terminology, , Phase diagram, One component system example Water system. Two component system example lead-silver,applications and limitations of phase rule.	<b>05Hrs</b>

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	--	--	--	--	--	--	--	--	--	--	1			
CO2	3	1	--	--	--	--	--	--	--	--	--	1			
CO3	3	--	--	--	2	--	--	--	--	--	--	1			
CO4	3	1	--	--	--	--	--	--	--	--	--	1			
CO5	--	--	--	--	--	--	--	--	--	--	--	1			
CO6	--	--	--	--	--	--	--	--	--	--	--	1			

### References:

<b>Text Books</b>	
1	Textbook of Engineering Chemistry by S.S. Dara and S.S.Umare, S. Chand and Company Lit., New Delhi
2	Textbook of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co.( Pvt.) Lit,Delhi
3	Textbook of Engineering Chemistry by Dr. Mrs. Jayshree Parikh , Tech-Max Publication Pune.
<b>Reference Books</b>	
1	Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Company Ltd., New Delhi.
2	A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad
3	ChatwalandAnand,InstrumentalMethodsofChemicalAnalysis,HimalayaPublishingHouse,New Delhi
4	A text Book of Engineering Chemistry by ShashiChawla, DhanpatRai& Co. (Pvt.) Ltd, Delhi
5	Engineering Chemistry by Renu Bapna and Renu Gupta, MacMillan Publishers (India) Ltd, Delhi.

**Web Links/ Video Lectures**

<b>Sr. No</b>	<b>Unit No.</b>	<b>Web Links/ Video Lectures</b>
1	1	<a href="https://www.researchgate.net/publication/343294128_Water_Quality_Parameters">https://www.researchgate.net/publication/343294128_Water_Quality_Parameters</a> <a href="https://nptel.ac.in/courses/122/106/122106028/">https://nptel.ac.in/courses/122/106/122106028/</a> <a href="https://nptel.ac.in/courses/105/108/105108081/">https://nptel.ac.in/courses/105/108/105108081/</a>
2	2	<a href="https://www.britannica.com/science/biomolecule">https://www.britannica.com/science/biomolecule</a> <a href="https://www.digimat.in/102.html">https://www.digimat.in/102.html</a>
3	3	<a href="https://onlinelibrary.wiley.com/journal/2365709X">https://onlinelibrary.wiley.com/journal/2365709X</a> <a href="https://nptel.ac.in/courses/113/105/113105057/">https://nptel.ac.in/courses/113/105/113105057/</a>
4	4	<a href="https://www.energy.gov/eere/fuelcells/types-fuel-cells">https://www.energy.gov/eere/fuelcells/types-fuel-cells</a> <a href="http://www.nptelvideos.in/2012/11/engineering-chemistry-1.html">http://www.nptelvideos.in/2012/11/engineering-chemistry-1.html</a>
5	5	<a href="https://www.electrochem.org/corrosion-science/">https://www.electrochem.org/corrosion-science/</a> <a href="https://nptel.ac.in/courses/113/108/113108051/">https://nptel.ac.in/courses/113/108/113108051/</a>
6	6	<a href="https://www.britannica.com/science/phase-rule">https://www.britannica.com/science/phase-rule</a> <a href="https://nptel.ac.in/courses/113/104/113104068/">https://nptel.ac.in/courses/113/104/113104068/</a> <a href="http://www.nitttrc.edu.in/nptel/courses/video/112104248/L17.html">http://www.nitttrc.edu.in/nptel/courses/video/112104248/L17.html</a>

## FY103 Engineering Mathematics-I

**Lectures** : 3 Hrs/Week

**Credit** : 3

**Evaluation Scheme**

**ISE** : 40 Marks

**ESE** : 60 Marks

**Course Objectives:** The objective of the course is to

- 1) provide detailed of matrices which is applied for solving system of linear equations and useful in various fields of technology
- 2) learn the concept of imaginary numbers and gives awareness about algebra of complex numbers which helps in understanding of engineering subjects like electrical circuits, Electromagnetic wave theory, and complex analysis etc.
- 3) build ability to solve numerically system of linear equations, algebraic and transcendental equations.
- 4) This course enables to provide an overview of partial derivatives and its applications which is used for solving optimization problems and concepts is needed in study of wave, heat equation of various orders and also in calculation of errors in various engineering subjects.

**Course Outcomes:**

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Find rank of matrix and solve system of linear equations.	Remember, Understand
CO2	find characteristic equation and use it to find eigen value, eigen vector, higher power and inverse (if it exists) of square matrix.	Understand Apply
CO3	Use De Moivre's Theorem to find roots of complex numbers and express $\sin n\theta$ and $\cos n\theta$ in powers of $\sin\theta$ and $\cos\theta$	Apply
CO4	estimating the value of a function for the given value of the independent variable	Evaluating
CO5	Solve system of linear equations using numerical methods	Apply
CO6	Calculate partial derivative and apply it to find extreme values of function of two variable	Understanding, Evaluation

**Description:**

Engineering Mathematics-I course is offered as the basic science course. This course contains Mathematical methods and techniques that are typically used in engineering to solve complex engineering problems. This course has six units namely i) Matrices and Solution of Linear System Equations ii) Eigen Values and Eigen vectors, iii) Complex Numbers, iv) Numerical Solution of linear simultaneous equations, v) Finite Differences, vi) Partial Differentiation and its Application

<b>Prerequisites:</b>	1:	Determinant, Matrix algebra
	2:	Basic knowledge of complex numbers
	3:	Differentiation and integration formulae.
<b>Section – I</b>		
<b>Unit 1</b>	<b>Matrices and Solution of Linear System Equations</b>	
	Rank of matrix: Definition, Normal form and echelon form, System of linear homogeneous equations, System of linear Non-homogeneous equations	<b>06 Hrs</b>
<b>Unit 2</b>	<b>Eigen Values and Eigen vectors</b>	
	Eigen Values , Properties of Eigen Values, Eigen vectors, Properties of Eigen vectors, Cayley-Hamilton's theorem (Without proof)	<b>06 Hrs</b>
<b>Unit 3</b>	<b>Complex Numbers</b>	
	De Moivre's Theorem (Without proof), Roots of complex numbers by using De Moivre's Theorem, Expansion of $\sin n\theta$ and $\cos n\theta$ in powers of $\sin\theta$ and /or $\cos\theta$ , Circular functions of a complex variable, Hyperbolic and Inverse Hyperbolic Functions- definitions .	<b>07Hrs</b>
<b>Section – II</b>		
<b>Unit 4</b>	<b>Finite Differences</b>	
	Forward & Backward difference operator, Shift operator, Interpolation & Extrapolation Methods , Newton's formulae (Equal intervals), Lagrange's formulae (Unequal intervals).	<b>06Hrs</b>
<b>Unit 5</b>	<b>Numerical Solution of linear simultaneous equations</b>	
	Gauss elimination method, Gauss-Jordan method, Jacobi's iteration method, Gauss-Seidel iteration method.	<b>06 Hrs</b>
<b>Unit 6</b>	<b>Partial Differentiation and its Application</b>	
	Partial derivatives: Introduction, Total derivatives, Euler's theorem on homogeneous function of two variables, Jacobian and its Properties, Maxima and Minima of functions of two variables	<b>08 Hrs</b>

**Note-**Minimum 06 Assignments should be given covering all units

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1													
CO2	2	1													
CO3	2	1													
CO4	2	1													
CO5	2	1													
CO6	2	1													

### References:

Text Books	
1	Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.
2	A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd., New Delhi.
3	Engineering Mathematics I , G. V. Kumbhojkar, H. V. Kumbhojkar, C. Jamnadas & Co.
Reference Books	
1	A text book of Applied Mathematics, Vol.I, Vol. II, Vol. III by P. N. Wartikar& J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
2	Numerical methods by Dr. B. S. Grewal, Khanna Publishers, Delhi.
3	Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
4	Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.
5	A text book of Engineering Mathematics Volume I by Peter V. O'Neil and Santosh K.Sengar, Cengage Learning.

### Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	<a href="https://nptel.ac.in/courses/111/107/111107112/">https://nptel.ac.in/courses/111/107/111107112/</a>
2	2	<a href="https://nptel.ac.in/courses/111/105/111105121/">https://nptel.ac.in/courses/111/105/111105121/</a>
3	5	<a href="https://nptel.ac.in/courses/111/107/111107105/">https://nptel.ac.in/courses/111/107/111107105/</a>
4	5	<a href="https://nptel.ac.in/courses/111/106/111106101/">https://nptel.ac.in/courses/111/106/111106101/</a>
5	6	<a href="https://nptel.ac.in/courses/111/107/111107108/">https://nptel.ac.in/courses/111/107/111107108/</a>



## FY109. Computer Programming in C

**Lectures** : 2 Hrs/Week

**Credit** : 2

**Evaluation Scheme**

**ISE** : 40 Marks

**ESE** : 60 Marks

<b>Course Objectives:</b> The objective of the course is to		
1) understand the basics of problem solving techniques 2) provide an insight into structured programming constructs in C 3) give details of modular programming		
<b>Course Outcomes:</b>		
<b>COs</b>	<b>At the end of successful completion of the course, the student will be able to</b>	<b>Blooms Taxonomy</b>
CO1	Define the various terminologies in Programmings	Remember
CO2	Understand the concept to implement structured programming for various problem definitions	Understand
CO3	Understand devising algorithm, flowchart and implementing programs in C- languages.	Understand
CO4	Understand the problem statement and Select the most suitable constructs for writing well structured programs.	Understand
CO5	Implement real world problems of different requirements using computer Programming in C	Apply
CO6	Use modular programming concepts to solve complex problems	Apply

<b>Description:</b>		
This Course is designed to build programming skills in First year B.Tech students. The programming skills will be helpful to all branches of Engineering.		
<b>Prerequisites:</b>	1:	Basic knowledge of Computers.
	2:	Computational Mathematics.
<b>Section – I</b>		
<b>Unit 1</b>	<b>Basics of C programming</b>	
	Basics of programming: Program development steps, Algorithms / Pseudo code, flowchart, History and Importance of C, Structure of C- Program, A sample C programs, Keyword and Identifier, Basic data types and sizes, Constants, variables.	<b>04 Hrs</b>
<b>Unit 2</b>	<b>Operators and Expressions in C</b>	

	Introduction, Arithmetic Operators, Relation Operator, Logical Operator. Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Some Computational Problems.	<b>04 Hrs</b>
<b>Unit 3</b>	<b>Decision Making and Branching Statements</b>	
	Decision Making and Branching : Introduction, Decision Making with IF Statement, Simple if Statement , if..else Statement, Nested if....else Statements, else...if Ladder, Switch statement, The ?: Operator, The goto statement. Example programs	<b>04 Hrs</b>
<b>Section – II</b>		
<b>Unit 4</b>	<b>Decision Making and Looping</b>	
	Introduction, while statement, do-while statement, for statement:Simple for loop,Additional feature of for loop, Nesting of for loop, jumps in loops, break and continue. Example programs	<b>04 Hrs</b>
<b>Unit 5</b>	<b>Arrays</b>	
	Introduction, Definitions of Array, Assigning and Entering value to an array, Accessing array elements/ Read data from an Array, Array Elements in Memory, 1-Dimensional, 2-Dimensional, Programs on Array operations, basic operations on matrices.	<b>04 Hrs</b>
<b>Unit 6</b>	<b>User Defined Function</b>	
	Introduction, Need for User-defined functions, A multifunction program/Moduler program, Prototype of Funtion/Function Declaration , Definition/Implementation of Functions, Return Values and their types, Function Calls,Category of function, Function Arguments:Call by Value. Example programs..	<b>04 Hrs</b>

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1			2				1	1							
CO2	2	1					1								
CO3	2	1	2	1	1	1						1			
CO4	2	2	2	2	1	1	1					1			
CO5	3	2	2	2	1	1	1					1			
CO6	1	1	2	3	1	1	1					1			

**References:**

<b>Text Books</b>	
1	C the Complete Reference by Herbert Schild (Tata McGraw Hill) 4th Edition.
2	The C Programming Language- Brian W. Kernighan, Dennis Ritchie 2nd Edition.
<b>Reference Books</b>	
1	E. Balaguruswamy, "Programming in ANSI C", Tata McGraw Hill, 5th edition, 2010.
2	Let Us C By Yashavant P. Kanetkar, 5th Edition.

**Web Links/ Video Lectures**

<b>Sr. No</b>	<b>Unit No.</b>	<b>Web Links/ Video Lectures</b>
1.	01,02,03,04, 05 and 06	<a href="https://www.w3resource.co/"><u>https://www.w3resource.co/</u></a> <a href="https://www.includehelp.com/c/"><u>https://www.includehelp.com/c/</u></a> <a href="https://www.javatpoint.com/"><u>https://www.javatpoint.com/</u></a>

## FY110 Engineering Mechanics

**Lectures** : 2 Hrs/Week

**Credit** : 2

**Evaluation Scheme**

**ISE** : 40 Marks

**ESE** : 60 Marks

<b>Course Objectives:</b> The objective of the course is to		
1) Understand and visualize the various force systems on static bodies. 2) Study the concept of equilibrium and its imaginary existence. 3) Evaluate geometric properties of plain laminae. 4) Understand impact of rigid bodies.		
<b>Course Outcomes:</b>		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Evaluate the resultant force and moment for a given system of forces.	Knowledge
CO2	Determine the support reactions for a given system of forces.	Evaluation
CO3	Calculate the support reactions for a given beams.	Analysis
CO4	Determine the centroid of the different cross sections in civil and mechanical engineering.	Analysis
CO5	Determine the second moment of area of the different cross sections.	Application
CO6	Understand impact properties of material.	Understand

<b>Description:</b>		
This course is designed to provide basic understanding about the different types of forces, moments and their effects on structural elements, which will analyze different structural systems. Students should get enough knowledge about equilibrium condition, in which entire stability depends.		
<b>Prerequisites:</b>	1	Learners should know secondary school mathematics
	2	Learners should know the “Mechanics” section from Physics.
<b>Section – I</b>		
<b>Unit 1</b>	<b>Fundamentals of Statics</b>	
	Basic Concepts and Fundamental Laws, Force, System of Forces, Resultant, Equilibrant, Resolution and Composition of Forces, Moment and Couple, Varignon’s Theorem, Law of Moments.	<b>5</b>



**References:**

Text Books	
1	Engineering Mechanics by R. S. Khurmi, S. Chand Publications.
2	Engineering Mechanics by R. K. Bansal and Sanjay Bansal
3	Engineering Mechanics by S. S. Bhavikatti, New Age International Pvt. Ltd
4	Engineering Mechanics by D.P.Sharma, Pearson Education
Reference Books	
1	Engineering Mechanics by Manoj K Harbola, Cengage Learning
2	Vector Mechanics for Engineers Vol.I and II by F. P. Beer and E. R. Johnston, Tata Mc -Graw Hill
3	Engineering Mechanics by K. I. Kumar, Tata Mc -Graw Hill Publication
4	Engineering Mechanics by Irving H. Shames, Prentice Hall of India, New Delhi.
5	Fundamentals of Engineering Mechanics by S. Rajasekaran, G. Sankarasubramanian, Vikas Publishing House.

**Web Links/ Video Lectures**

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	<a href="https://www.youtube.com/watch?v=nGfVTNfNwnk">https://www.youtube.com/watch?v=nGfVTNfNwnk</a>
2	2	<a href="https://www.youtube.com/watch?v=nkg7VNW9UCc">https://www.youtube.com/watch?v=nkg7VNW9UCc</a>
3	3	<a href="https://www.youtube.com/watch?v=6u_rjLjv-MY">https://www.youtube.com/watch?v=6u_rjLjv-MY</a>
4	4	<a href="https://www.youtube.com/watch?v=Fudcc0JoXdo">https://www.youtube.com/watch?v=Fudcc0JoXdo</a>
5	5	<a href="https://www.youtube.com/watch?v=ljDIIMvx-eg">https://www.youtube.com/watch?v=ljDIIMvx-eg</a>
6	6	<a href="https://www.youtube.com/watch?v=aiT5mcuXf5Y">https://www.youtube.com/watch?v=aiT5mcuXf5Y</a>

## FY111 BASIC MECHANICAL ENGINEERING

**Lectures** : 2 Hrs/Week

**Credit** : 2

**Evaluation Scheme**

**ISE** : 40 Marks

**ESE** : 60 Marks

<b>Course Objectives:</b> The objective of the course is to		
1) Acquire basic knowledge of mechanical engineering 2) Impart knowledge of basic concepts of thermodynamics applied to industrial application 3) Understand principle of energy conversion system and power plants 4) Understand and identify power transmission devices with their functions		
<b>Course Outcomes:</b>		
<b>COs</b>	<b>At the end of successful completion of the course, the student will be able to</b>	<b>Blooms Taxonomy</b>
CO1	demonstrate the knowledge of basic concepts and derivations in thermodynamics.	Knowledge, Application
CO2	solve problems based on applications of first law of thermodynamics and belt drives.	Knowledge, Application
CO3	summarize the working of energy converting and power transmission devices.	Knowledge, Application
CO4	explain the principles, construction and working of various power plants.	Knowledge, Application
CO5	illustrate the understanding of basic manufacturing processes.	Knowledge, Application
CO6	identify and list the mechanical engineering applications in industries.	Knowledge Understanding

<b>Description:</b>		
Basic Mechanical Engineering course is offered as the basic science course. This course describes the scope of mechanical engineering in multidisciplinary industries and important phenomenon to run the world. This course describes the applications of Mechanical Engineering in many relative fields.		
<b>Prerequisites:</b>	1:	Mathematics
	2:	Basics of Thermodynamics
	3:	Basics of energy sources
<b>Section – I</b>		
	<b>Thermodynamics</b>	

<b>Unit 1</b>	Thermodynamic State, Process, Cycle, Thermodynamic System, Heat, work, Internal Energy, First Law of Thermodynamics, Application of First Law to steady Flow processes, Limitations of First Law (Numerical Treatment)	<b>0 5 Hrs</b>
<b>Unit 2</b>	<b>Introduction to I C Engine</b> Classification, Construction and Working of C.I. and S.I. Two stroke, Four Stroke Cycles.	<b>04 Hrs</b>
<b>Unit 3</b>	<b>Introduction to Refrigeration and Air Conditioning</b> Applications of Refrigeration & air conditioning Refrigerant types and properties, Vapour compression system, vapor absorption system, Window Air Conditioning. (Descriptive Treatment only).	<b>04 Hrs</b>
<b>Section – II</b>		
<b>Unit 4</b>	<b>Energy Sources and power plants</b> Renewable and nonrenewable, Photovoltaic cell Wind Power plant, Hydropower plant, Steam Power plant , Bio-gas, Bio-Diesel (Descriptive Treatment only).	<b>04 Hrs</b>
<b>Unit 5</b>	<b>Mechanical Power Transmission and Energy conversion devices</b> Type of Belt and belt drives (Descriptive Treatment only), chain drive, Types of gears and gear Trains, Construction, working and applications of centrifugal Pump, Construction, working.	<b>04 Hrs</b>
<b>Unit 6</b>	<b>Manufacturing Processes</b> Introduction to manufacturing processes – Casting Process, Steps involved in casting processes, and their applications, Metal removing processes (Lathe, milling & drilling operations) Metal Joining Processes – Arc welding, soldering and brazing and their applications.	<b>0 5 Hrs</b>

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	1					1		1	1		1			
CO2	3	2					1		2	1		2			
CO3	2	1					1		2	1		2			
CO4	2						1		2	1		1			
CO5	2						1		1	1		1			
CO6	2						1		1	1		2			



**References:**

Text Books	
1	Thermal Engineering by R.K. Rajput, Laxmi Publication, Delhi, ISBN-13-978-8131808047, 9 <sup>th</sup> edition.
2	Engineering Thermodynamics by R. Joel, The English Language Book Society
3	Elements of Heat Engine Vol.I,II,III by Patel and Karamchandani, Acharya Book Depot.
Reference Books	
1	Solar Energy by Dr.S.P. Sukathame, Tata Mc-Graw Hill Publication, 4 <sup>th</sup> edition.
2	Power Plant Engineering by Arora and Domkunwar, Dhanpat Rai and Sons
3	Elements of Workshop Technology, Vol.I and II by Hajara Choudhari, Media Promoters

**Web Links/ Video Lectures**

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	<a href="https://nptel.ac.in/courses/112/105/112105123/">https://nptel.ac.in/courses/112/105/112105123/</a>
2	2	<a href="https://nptel.ac.in/courses/112/103/112103262/">https://nptel.ac.in/courses/112/103/112103262/</a>
3	3	<a href="https://nptel.ac.in/courses/112/107/112107208/">https://nptel.ac.in/courses/112/107/112107208/</a>
4	4	<a href="https://nptel.ac.in/courses/121/106/121106014/">https://nptel.ac.in/courses/121/106/121106014/</a>
5	5	<a href="https://nptel.ac.in/courses/112/105/112105234/">https://nptel.ac.in/courses/112/105/112105234/</a>
6	6	<a href="https://nptel.ac.in/courses/112/107/112107219/">https://nptel.ac.in/courses/112/107/112107219/</a>

## FY104 Professional Communication

**Lectures** : 01 Hrs/Week

**Evaluation Scheme**

**Credit** : 1

**ISE** : 50 Marks

**ESE** : NA

**Course Objectives:** The objective of the course is to

- 1) acquaint students with basic English Grammar and help students in improving language skills
- 2) familiarize students with concept, various types, barriers and filters of communication
- 3) assist students in developing Vocabulary
- 4) aid them in understanding corporate meetings
- 5) train the students to compose and write the business letters effectively

**Course Outcomes:**

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	formulate grammatical sentences correctly	Understand
CO2	Classify and compare types of communication.	Understand
CO3	Use various communicative techniques to participate in several activities	Apply
CO4	Understand and use vocabulary effectively	Understand Apply
CO5	Use interpersonal skills with precision and competence in different scenario.	Apply
CO6	Display standard writing skills while composing business letters	Create

**Description:**

In the era of globalization, the most commonly used medium to express oneself is English language, especially in the industry, where almost all the service manuals, installation and commissioning manuals of the various equipment are in English and the technologist has to interpret them correctly. English is the dire need, not only for the Indian industry, but also worldwide, where the Engineering Graduates have the opportunity to take up jobs. Therefore, the basic English reading and writing skills have become almost mandatory for employment in the industry. Hence, English language has become quite a necessity for engineering students. This course is therefore designed to help the students to learn the correct grammatical structures and use the relevant vocabulary while reading and writing. Also introduce the communication theory, report writing & business correspondence to them.

<b>Prerequisites:</b>	1:	Basic Knowledge of English Grammar
	2:	Reading and Listening Comprehension
	3:	Basic knowledge of Writing Skills

<b>Unit 1</b>	<b>Rapid Review of English Grammar</b>	
	Parts of Speech Types of Sentences, Tenses / Verbal forms	<b>02 Hrs</b>
<b>Unit 2</b>	<b>Introduction to Communication</b>	
	Nature, Importance and Process of Communication Basic Types: Verbal- Non- verbal Communication Barriers & Filters to Communication	<b>02 Hrs</b>
<b>Unit 3</b>	<b>Organizational Communication</b>	
	Nature of Communication.-Formal & Informal Directions of Communication: Upward, Downward, Horizontal, Internal, External Levels of Communication	<b>02 Hrs</b>
<b>Unit 4</b>	<b>Vocabulary Building</b>	
	Synonyms & Antonyms, Prefixes and Suffixes Words often Confused: Homonym & Homophone Idioms and Phrases	<b>02 Hrs</b>
<b>Unit 5</b>	<b>Corporate Meetings</b>	
	Significance and Types of Meeting Strategies of Conducting and Attending Meeting Effectively Record Keeping: Notice, Agenda and Minutes	<b>02 Hrs</b>
<b>Unit 6</b>	<b>Business Correspondence</b>	
	Importance of Correspondence & Elements of Letter Writing Structure or Layouts (American & British) Letter Writing: Simple application letters (Applications for various occasions etc.), Letters: Inquiry, Order Placement, Complaint and its Adjustment, Invitation Letter	<b>04 Hrs</b>

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1							2								
CO2						2	2			2					
CO3							2			2					
CO4						2	2			2		2			
CO5							2								
CO6							2								

**References:**

Recommended Books	
01	Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition.
02	Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
03	Basic Communication Skills for Technology by Rutherford, Andrea J. (2002).. Delhi: Pearson Education Asia
04	Mastering Communication by Nicky Stanton, Palgrave Master Series
05	Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)
06	Sharma, R. C. and Krishna Mohan, Basic Correspondence and Report Writing: A Practical Approach to Business and Technical Communication, Tata McGraw-Hill Publishing Company Limited, India ,5th Edition, 2017
07	Written Communication in English by Saran Freeman (Orient Longman)
08	Seely, J. The Oxford Guide to Writing and Speaking, Oxford University Press, India 3rd Edition , 2013
09	High School English Grammar and Composition by Wren and Martin, Blackie, 2000
10	Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)
11	Sethi, J. and Dhamija P.V. A Course in Phonetics and Spoken English Prentice-Hall of India 2nd Edition, 2006
12	English Language Laboratories, by Nira Konar, PHI Learning, 2014
13	Perspective of Communication and Communicative Competence, M.V. Rodrigues, Concept Publishing Company, New Delhi-10059

**Web Links/ Video Lectures**

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	<a href="https://ismailabdi.files.wordpress.com/2018/02/basic-english-grammar.pdf">https://ismailabdi.files.wordpress.com/2018/02/basic-english-grammar.pdf</a> <a href="https://2qdocg2za8g336a8w21fo83z-wpengine.netdna-ssl.com/wp-content/uploads/2014/06/Free-English-Grammar-Book-Level-1.pdf">https://2qdocg2za8g336a8w21fo83z-wpengine.netdna-ssl.com/wp-content/uploads/2014/06/Free-English-Grammar-Book-Level-1.pdf</a>
2	2	<a href="https://www.toppr.com/guides/business_studies/directing/communication/">https://www.toppr.com/guides/business_studies/directing/communication/</a>
3	3	<a href="https://www.manage.gov.in/studymaterial/ec.pdf">https://www.manage.gov.in/studymaterial/ec.pdf</a> <a href="http://aditi.du.ac.in/uploads/econtent/communication_flows1.pdf">http://aditi.du.ac.in/uploads/econtent/communication_flows1.pdf</a>
4	4	<a href="https://www.teachingenglish.org.uk/article/vocabulary-activities">https://www.teachingenglish.org.uk/article/vocabulary-activities</a>
5	5	<a href="https://www.managementstudyguide.com/meeting-etiquette.html">https://www.managementstudyguide.com/meeting-etiquette.html</a>
6	6	<a href="https://bcastudyguide.wordpress.com/unit-4-business-letters-reports/">https://bcastudyguide.wordpress.com/unit-4-business-letters-reports/</a>

## FY102 T- ENGINEERING CHEMISTRY Lab

**Tutorial/Practical** : 2 hr/week

**Credit** : 1

**Evaluation Scheme**

**ISA** : 25 Marks

**POE** : NA

<b>Course Objectives:</b> The objective of the course is to		
1) study the different water quality parameters and its determination. 2) detect amino acids – Ninhydrin, xanthoproteic, sodium nitro preside , Pauly’s diazo test 3) understand the structural and functional role of biomolecules essential for cellular reactions. 4) study polymerization reactions and Preparation of urea-formaldehyde resin 5) develop an interest among the students regarding applied and engineering chemistry. 6) analyze characteristics of fuels and Determination of moisture, volatile and ash content in coal sample		
<b>Course Outcomes:</b>		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	<b>Recall</b> the terms, water quality parameters for pollution control.	Remember
CO2	<b>Utilize</b> the knowledge of cell boilogy	Analyze
CO3	<b>Apply</b> Knowledge of advanced materials in various engineering fields.	Apply
CO4	<b>Select</b> proper fuels for domestic , and industrial applications	Apply
CO5	<b>Analyze.</b> apply the significance of corrosion in industries	Analyze
CO6	<b>Explain</b> separation of components by paper chromatography	Understand

<b>Description:</b>		
This course aims to impart analysis of water, fundamental knowledge of engineering materials (composite, polymer Cement), and applied knowledge of biomolecules, analysis of fuel, energy storage devices, prevention techniques of corrosion. Students will be expected to communicate knowledge to society and industry.		
<b>Prerequisites:</b>	1:	Students should have knowledge about water quality parameters , and occurrence of metals,
	2:	periodic table physical and chemical properties of elements
	3:	Applications of fuel ,different macromolecules and its importance.

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Determination of acidity of water	2	Knowledge
2	Determination of total alkalinity of water sample.	2	Knowledge
3	Determination of chloride content of water by Mohr's method.	2	Application
4	Determination of temporary and permanent hardness of water sample by EDTA method.	2	Analysis
5	Determination of moisture, volatile and ash content in a given coal sample by proximate analysis	2	Knowledge
6	Preparation of urea-formaldehyde resin	2	Analysis
7	Preparation of phenol-formaldehyde resin	2	Analysis
8	Determination of percentage of copper in brass by iodometry.	2	Evaluate
9	Estimation of zinc in brass solution	2	Analysis
10	Determination of rate of corrosion of aluminium by weight loss method in acidic and basic medium	2	Application
11	Detection of amino acids – Ninhydrin, xanthoproteic, sodium nitro preside , Pauly's diazo test	2	Analysis
12	Demonstration of paper chromatography	2	Analysis

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	---	---	---	---	---	---	---	---	---	---	1			
CO2	3	1	---	---	---	---	---	---	---	---	---	1			
CO3	3	---	---	---	2	---	---	---	---	---	---	1			
CO4	3	1	---	---	---	---	---	---	---	---	---	1			
CO5	---	---	---	---	---	--	--	--	--	--	--	2			
CO6	--	1	---	---	---	--	---	--	--	--	--	1			

## References:

Text Books	
1	Textbook of Engineering Chemistry by S.S. Dara and S.S.Umare, S. Chand and Company Lit., New Delhi
2	Textbook of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co.( Pvt.) Lit, Delhi
Reference Books	
1	Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company Ltd., New Delhi
2	A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad

## Lab Link:

- 1) **Experiment name-** Determination of Viscosity (**Lab Name-** Viscosity virtual lab)  
<http://vlab.amrita.edu/?sub=2&brch=190&sim=339&cnt=1>
- 2) **Experiment name-** Water Analysis-Physical Parameter (**Lab Name-** Inorganic Chemistry virtual lab ) <http://vlab.amrita.edu/?sub=2&brch=193&sim=575&cnt=1>
- 3) **Experiment name-** Water Analysis-Chemical Parameter(**Lab Name-** Inorganic Chemistry virtual lab) <http://vlab.amrita.edu/?sub=2&brch=193&sim=1548&cnt=1>
- 4) **Experiment name-** Acid Base Titration (**Lab Name-** Inorganic Chemistry virtual lab)  
<http://vlab.amrita.edu/?sub=2&brch=193&sim=352&cnt=1>
- 5) **Experiment name-** Soil Analysis (**Lab Name-** Inorganic Chemistry virtual lab)  
<http://vlab.amrita.edu/?sub=2&brch=193&sim=1549&cnt=1>
- 6) **Experiment name-** Alloy Analysis (Brass) (**Lab Name** – Inorganic Chemistry virtual lab)  
<http://vlab.amrita.edu/?sub=2&brch=193&sim=1255&cnt=1>
- 7) **Experiment name** – Spectrophotometry (Physical Chemistry virtual lab)  
<http://vlab.amrita.edu/?sub=2&brch=190&sim=338&cnt=1>

## FY103T- ENGINEERING MATHEMATICS – I Tutorial

**Tutorial/Practical** : 1 hr/week

**Credit** : 1

**Evaluation Scheme**

**ISA** : 25 Marks

**POE** : NA

**Course Objectives:** The objective of the course is to

- 1) Find rank of matrix and use it to solve system of linear equations
- 2) Find and solve characteristic equations and use it properly to find inverses and higher powers of square matrices.
- 3) Use De Moivre's theorem
- 4) Numerical techniques to interpolate values and solve equations.

**Course Outcomes:**

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Find rank of matrix and solve system of linear equation.	Remember
CO2	Calculate inverse and higher powers of matrix and eigen values, eigen vector	Apply
CO3	Apply basic mathematical operations (arithmetic, powers, roots) with complex numbers	Apply
CO4	Interpolate values and solve equations using numerical techniques.	Knowledge, Apply

**Description:**

Engineering Mathematics-I tutorial is dedicated to solve more problems in each unit. In this section, more problems will be practiced so that students can use mathematical methods and numerical techniques to solve engineering problems.

**Prerequisites:**

- 1: Determinant, Matrix algebra
- 2: Basic knowledge of complex numbers
- 3: Differentiation and integration formulae.



### Tutorials

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Rank by Normal form & Echelon form	1	Knowledge
2	Solution of system of linear equation	1	Apply
3	Eigen values & Eigen Vectors	1	Understanding
4	Cayley Hamilton's Theorem	1	Apply
5	De Moivre's Theorem & Roots of complex number	1	Apply
6	Newton's & Lagrange's Interpolation	1	Apply
7	Gauss elimination method & Gauss Jordan method	1	Apply
8	Jacobi Iteration & Gauss Seidel Iteration Method	1	Application
9	Partial Derivative, Euler's Theorem	1	Knowledge
10	Jacobian, Maxima & minima	1	Application

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
CO2	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
CO3	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
CO4	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--

### References:

Text Books	
1	A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd., New Delhi.
2	Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.
Reference Books	
1	A text book of Applied Mathematics, Vol.I, Vol. II, Vol. III by P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
2	Numerical methods by Dr. B. S. Grewal, Khanna Publishers, Delhi.
4	Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.

## FY110T - ENGINEERING MECHANICS Lab

**Tutorial/Practical** : 2 hr/week

**Credit** : 1

**Evaluation Scheme**

**ISA** : 25 Marks

**POE** : NA

**Course Objectives:** The objective of the course is to

- 1) Understand the vector mechanics.
- 2) Visualize concept of equilibrium and its imaginary existence.
- 3) Apply equilibrium conditions for various cases.
- 4) Find support reactions of beams

**Course Outcomes:**

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Determine the resultant of concurrent coplanar force system graphically.	Evaluate
CO2	Analyze the force the given force system.	Analyze
CO3	Verify the law of moment of given force system.	Verify
CO4	Determine the support reactions of the given beam.	Application

**Description:**

This course is designed to provide basic understanding about the different types of forces, moments and their effects on structural elements, which will analyze different structural systems. Students should get enough knowledge about equilibrium condition, in which entire stability depends.

<b>Prerequisites:</b>	1	Learners should know secondary school mathematics
	2	Learners should know the “Mechanics” section from Physics.

### Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Law of polygon of forces	2	Evaluation
2	Jib crane	2	Analysis
3	Bell crank lever	2	Verification
4	Support Reactions of Beam	2	Application,
5	To find Resultant by Graphical Method	2	Knowledge
6	To find Support Reactions by Graphical Method	2	Knowledge
7	Assignment on finding Resultant	2	Evaluation
8	Assignment on Equilibrium of Sphere	2	Evaluation
9	Assignment on Finding support reactions of beam	2	Evaluation
10	Assignment on finding Centroid of given shape	2	Evaluation
11	Assignment on finding Moment of Inertia of given shape	2	Evaluation
12	Assignment on impact of elastic bodies	2	Evaluation

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1														
CO2		1													
CO3		1													
CO4	1														

### References:

Text Books	
1	Engineering Mechanics by R. S. Khurmi, S. Chand Publications.
2	Engineering Mechanics by R. K. Bansal and Sanjay Bansal
3	Engineering Mechanics by S. S. Bhavikatti, New Age International Pvt. Ltd

4	Engineering Mechanics by D.P.Sharma, Pearson Education
<b>Reference Books</b>	
1	Engineering Mechanics by Manoj K Harbola, Cengage Learning
2	Vector Mechanics for Engineers Vol.I and II by F. P. Beer and E. R. Johnston, Tata Mc -Graw Hill
3	Engineering Mechanics by K. I. Kumar, Tata Mc -Graw Hill Publication
4	Engineering Mechanics by Irving H. Shames, Prentice Hall of India, New Delhi.
5	Fundamentals of Engineering Mechanics by S. Rajasekaran, G. Sankarasubramanian, Vikas Publishing House.

## FY111T- BASIC MECHANICAL ENGINEERING Lab

**Tutorial/Practical** : 2 hr/week

**Credit** : 1

**Evaluation Scheme**

**ISA** : 25 Marks

**POE** : NA

**Course Objectives:** The objective of the course is to

1. Understand working of IC engine with the help of demo models.
2. Understand working of refrigeration and air conditioning system with equipment set-ups and models.
3. Understand the functions of power transmitting devices with the demo models.
4. Understand the working and operations of Lathe Milling and Drilling machines in machine shop

**Course Outcomes:**

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	To impart knowledge and demonstration of the working of Various types of IC engines	Knowledge, Application
CO2	To demonstrate the working of refrigeration and air conditioning system with models.	Knowledge, Application
CO3	To demonstrate the working and functions of energy converting and power transmission devices with the help of models.	Knowledge, Application
CO4	To demonstrate the working and operations of Lathe Milling and Drilling machines in machine shop	Knowledge, Application

**Description:**

As this subject has huge scope in various industries, so in labs the concept, construction, working and demonstration of various machines, equipment and devices is observed and understood with the help of various models.

<b>Prerequisites:</b>	1:	Theory knowledge of types and components of IC engine.
	2:	Theory knowledge of types and components of refrigeration and air conditioning system.
	3:	Theory knowledge of types of energy sources

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Demonstration of I.C. engine	2	Knowledge
2	Demonstration of Two stroke and four stroke engine	2	Knowledge
3	Demonstration of vapour compression refrigeration system and window air conditioner.	2	Knowledge, Application
4	Demonstration of Solar water heating system.	2	Knowledge, Analysis
5	Demonstration of Wind or Biogas or Hydroelectric Power Plant	2	Knowledge
6	Demonstration of types of Gears and gear trains	2	Analysis
7	Demonstration of pumps and compressor.	2	Analysis
8	Demonstration of metal joining processes	2	Knowledge, Evaluation
9	Demonstration of metal removal processes	2	Knowledge, Analysis
10	Demonstration of Steam Power Plant	2	Knowledge, Application

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1				2							3			
CO2	1				2							3			
CO3	1				2							3			
CO4	1				2							3			

### References:

<b>Text Books</b>	
1	Thermal Engineering by R.K. Rajput, Laxmi Publication, Delhi,ISBN-13-978-8131808047, 9 th edition.
2	Engineering Thermodynamics by R.Joel, The English Language Book Society
3	Elements of Heat Engine Vol.I,II,III by Patel and Karamchandani, Acharya Book Depot.
<b>Reference Books</b>	
1	Solar Energy by Dr.S.P. Sukathame,Tata Mc-Graw Hill Publication,4th edition.
2	Power Plant Engineering by Arora and Domkunwar, Dhanpat Rai and Sons
3	Elements of Workshop Technology, Vol.I and II by Hajara Choudhari, Media Promoters

### FY104P Professional Communication Lab

**Tutorial/Practical** : 02 hr/week

**Credit** : 1

**Evaluation Scheme**

**ISA** : 25 Marks

**POE** : 25 Marks

<b>Course Objectives:</b> The objective of the course is to		
1) acquaint students with basic English Grammar and help students in improving language skills 2) assist students in developing Vocabulary and phonetic drill 3) aid them in understanding corporate meetings 4) train the students to compose and write the business letters effectively		
<b>Course Outcomes:</b>		
<b>COs</b>	<b>At the end of successful completion of the course, the student will be able to</b>	<b>Blooms Taxonomy</b>
CO1	formulate grammatical sentences and communicate effectively	Create
CO2	Understand and use vocabulary effectively	Understand Apply
CO3	Compose business letters and prepare report	Create
CO4	Demonstrate pronunciation and communicate	Understand

<b>Description:</b>		
This course is designed to help the students to practice the correct grammatical structures and use the relevant vocabulary while reading and writing. Also give them practical experience of corporate meetings, Phonetics, Intonation and articulation Drill. Similarly provide them with basic structure and lay out of report writing & business correspondence.		
<b>Prerequisites:</b>	1:	Basic Knowledge of English Grammar
	2:	Reading and Listening Comprehension
	3:	Basic knowledge of Writing Skills



### Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs	Cognitive levels of attainment as per Bloom's
01	Star of Life: Introducing Yourself	02	Applying
02	Vocabulary Building Exercises	02	Remembering
03	Lab Module on Phonetics Drill	02	Understanding
04	Lab Session on Intonation & Pronunciation drill	02	Understanding
05	Grammar Activities – Irregular verb list	02	Understanding
06	Conducting & Attending Meeting	04	Applying
07	Practice on writing General Applications	02	Applying
08	Practice on Business Correspondence	02	Applying

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1							2	1	1	1					
CO2							2	1	1	2					
CO3							2	1	1	1					
CO4							2	1	1	1					

### References:

Recommended Books	
01	Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition.
02	Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
03	Basic Communication Skills for Technology by Rutherford, Andrea J. (2002).. Delhi: Pearson Education Asia
04	Mastering Communication by Nicky Stanton, Palgrave Master Series
05	Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)

06	Sharma, R. C. and Krishna Mohan, Basic Correspondence and Report Writing: A Practical Approach to Business and Technical Communication, Tata McGraw-Hill Publishing Company Limited, India ,5th Edition, 2017
07	Written Communication in English by Saran Freeman (Orient Longman)
08	Seely, J. The Oxford Guide to Writing and Speaking, Oxford University Press, India 3rd Edition , 2013
09	High School English Grammar and Composition by Wren and Martin, Blackie, 2000
10	Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)
11	Sethi, J. and Dhamija P.V. A Course in Phonetics and Spoken English Prentice-Hall of India 2nd Edition, 2006
12	English Language Laboratories, by Nira Konar, PHI Learning, 2014
13	Perspective of Communication and Communicative Competence, M.V. Rodriques, Concept Publishing Company, New Delhi-10059

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	<a href="https://ismailabdi.files.wordpress.com/2018/02/basic-english-grammar.pdf">https://ismailabdi.files.wordpress.com/2018/02/basic-english-grammar.pdf</a> <a href="https://2qdocg2za8g336a8w21fo83z-wpengine.netdna-ssl.com/wp-content/uploads/2014/06/Free-English-Grammar-Book-Level-1.pdf">https://2qdocg2za8g336a8w21fo83z-wpengine.netdna-ssl.com/wp-content/uploads/2014/06/Free-English-Grammar-Book-Level-1.pdf</a>
2	2	<a href="https://www.toppr.com/guides/business studies/directing/communication/">https://www.toppr.com/guides/business studies/directing/communication/</a>
3	3	<a href="https://www.manage.gov.in/studymaterial/ec.pdf">https://www.manage.gov.in/studymaterial/ec.pdf</a> <a href="http://aditi.du.ac.in/uploads/econtent/communication_flows1.pdf">http://aditi.du.ac.in/uploads/econtent/communication_flows1.pdf</a>
4	4	<a href="https://www.teachingenglish.org.uk/article/vocabulary-activities">https://www.teachingenglish.org.uk/article/vocabulary-activities</a>
5	5	<a href="https://www.managementstudyguide.com/meeting-etiquette.html">https://www.managementstudyguide.com/meeting-etiquette.html</a>
6	6	<a href="https://bcastudyguide.wordpress.com/unit-4-business-letters-reports/">https://bcastudyguide.wordpress.com/unit-4-business-letters-reports/</a>

## FY109P Computer Programming in C Lab

**Tutorial/Practical** : 2 hr/week

**Credit** : 1

**Evaluation Scheme**

**ISA** : 25 Marks

**POE** : 25

**Course Objectives:** The objective of the course is to

- 1) understand the basics of problem solving techniques in programming perspective
- 2) provide an insight into structured programming constructs in C
- 3) give details of modular programming

**Course Outcomes:**

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Define and implement the various terminologies in Programming,	Apply
CO2	Understand the concept to implement structured programming for various problem definitions	Understand
CO3	Understand devising algorithm, flowchart and implementing programs in C-languages.	Understand
CO4	Understand the problem statement and Select the most suitable programming structure for writing well structured programs.	Understand
CO5	Implement real world problems of different requirements using computer Programming in C	Apply
CO6	Use modular programming concepts to solve complex problems	Apply

**Description:**

This Course is designed to build programming skills in First year B.Tech students. The programming skills will be helpful to all branches of Engineering. The student will learn basic programming concepts from declaring a variable, conditional statements, looping to the concepts of arrays.

<b>Prerequisites:</b>	1:	Basic knowledge of Computers.
	2:	Computational Mathematics.

### Tutorials

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Write a Program to Demonstrate how to read and display the value in all Basic data type variables. Example:	2	Remember

	WAP to display the details of the Student Like: 1. Roll_No of Student 2. Division of Student 3. Height and Weight of Student.		
2	Write a C Program to demonstrate the working of Arithmetic operations using arithmetic operators in C.	2	Remember
3	Write a C Program to do the following using relational operators and branching statement: a. Read two integers and check they are equal or not. b. Print the greatest of Two numbers.	2	Understand
4	Write a Program to enter student marks through keyboard and find grade using the conditional operator. grades are 1. Honor- 90 above 2. Distinction-80 to 89 3. Grade A+ - 70 to 79 4. Grade A - 60 to 69 5. Grade B - 50 to 59 6. Pass Grade - 40 to 49 7. Fail - Below 40	2	Understand
5	Write a C Program to demonstrate Switch Statement and Constant Variable by finding the area of Circle, Rectangle, Square and Triangle considers each as a different case.	2	Understand
6	Write a C Program to demonstrate looping statements. a. Find the Factorial by given a number. b. Count total number of digits for a given integer number. c. Find the Sum of Digits in a given number. d. Reverse the given integer number and display the same on the output screen.	2	Apply
7	Write a C program to read N numbers in an integer array and print it in reverse order.	2	Apply
8	Write a C program to read N numbers in an array and display the sum of array elements.	2	Apply
9	Write a program to read two matrices and store the addition of two matrices in the third matrix.	2	Apply
10	Write a C Program to swap two numbers using call by value.	2	Apply

### Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1			2				1	1							
CO2	3	1					1								
CO3	2	1	3	1	1	1						1			
CO4	2	2	3	2	1	1	1					1			
CO5	3	2	3	2	1	1	1					1			
CO6	1	1	3	2	1	1	1					1			

### References:

Text Books	
1	C the Complete Reference by Herbert Schild (Tata McGraw Hill) 4th Edition.
2	The C Programming Language- Brian W. Kernighan, Dennis Ritchie 2nd Edition.
Reference Books	
1	E. Balaguruswamy, "Programming in ANSI C", Tata McGraw Hill, 5th edition, 2010.
2	Let Us C By Yashavant P. Kanetkar, 5th Edition.

### Web Links Practicals

1. <http://cse02-iiith.vlabs.ac.in/>
2. <https://codeforwin.org/category/c-programming>
3. <https://www.w3resource.co/>

## FY112T Inquisitive learning

**Teaching Scheme:****Practical's:** 2 hrs per week**Credits:** 1**Evaluation Scheme:****ISA:** 50 Marks

<b>Course Objectives:</b> The objective of the course is to		
1. Inculcate independent learning by problem solving with social context. 2. Get opportunity to work in a group, so as to develop team skills and learn Professionalism. 3. Participate in research and development activities to provide sustainable solutions.		
<b>Course Outcomes:</b>		
<b>Cos</b>	<b>At the end of successful completion of the course the student will be able to</b>	<b>Blooms Taxonomy</b>
CO1	Inquisitive learning will increase their capacity and learning through shared cognition.	Understanding
CO2	develop engineering research ability & project management skill	Applying
CO3	Sensitive towards ethical, societal & environmental issue along with professional work	Analyzing

**Group Structure:**

Working in supervisor/mentor – monitored groups. The students Should plan, manage and complete a task/project/activity which addresses the stated problem.

- There should be team/group of 5 -6 students
- A supervisor/mentor teacher assigned to individual groups

**Selection of Project/Problem:**

The problem-based project oriented model for learning is recommended. The model begins with the identifying of a problem, often growing out of a question or “wondering”. This formulated problem then stands as the starting point for learning. Students design and analyze the problem within an articulated interdisciplinary or subject frame. A problem can be theoretical, practical, social, technical, symbolic, cultural and/or scientific and grows out of students’ wondering within different disciplines and professional environments. A chosen problem has to be exemplary. The problem may involve an

interdisciplinary approach in both the analysis and solving phases .By exemplarity, a problem needs to refer back to a particular practical, scientific, social and/or technical Department of First Year B.Tech domain. The problem should stand as one specific example or manifestation of more general learning outcomes related to knowledge and/or modes of inquiry. There are no commonly shared criteria for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the content and structure of the activity.

- A few hands-on activities that may or may not be multidisciplinary
- Use of technology in meaningful ways to help them investigate, collaborate, analyze, synthesize and present their learning.
- Activities may include-Solving real life problem, investigation /study and Writing reports of in depth study, field work.

### **Assessment:**

The institution/head/mentor is committed to assessing and evaluating both student performance and program effectiveness. Progress of Inquisitive learning is monitored regularly on weekly basis. Weekly review of the work is necessary. During process of monitoring and continuous assessment AND evaluation the individual and team performance is to be measured. Inquisitive learning is monitored and continuous assessment is done by supervisor/mentor and authorities. Students must maintain an institutional culture of authentic collaboration, self-motivation, peer-learning and personal responsibility. The institution/department should support students in this regard through guidance/orientation programs and the provision of appropriate resources and services. Supervisor/mentor and Students must actively participate in assessment and evaluation processes.

- Group may demonstrate their knowledge and skills by developing a public product and/or report and/or presentation.
- Individual assessment for each student (Understanding individual capacity, role and involvement in the project)
- Group assessment (roles defined, distribution of work, intra-team communication and togetherness)
- Documentation and presentation

### **Evaluation and Continuous Assessment:**

It is recommended that the all activities are to be record and regularly, regular assessment of work to be done and proper documents are to be maintained at college end by both students as well as mentor (you may call it Inquisitive learning work book).Continuous Assessment Sheet (CAS) is to be maintained by all mentors/department and institutes. Recommended parameters for assessment, evaluation and weightage:

- Idea Inception (10%)
- Outcomes of Inquisitive learning / Problem Solving Skills/ Solution provided/ Final product (Individual assessment and team assessment) (20%)
- Documentation (Gathering requirements, design & modeling, implementation/execution, use of technology and final report, other documents) (20%)
- Demonstration (Presentation, User Interface, Usability etc) (50%)

Inquisitive learning workbook will serve the purpose and facilitate the job of students, mentor and project coordinator. This workbook will reflect accountability, punctuality, technical writing ability and work flow of the work undertaken.

### **Recommended Guidelines and Phases:**

It is learning through activity. Following are the recommended guidelines that will work as an initiator and facilitator in process of completion of Inquisitive learning.

1. Get groups of students registered preferably 4-6 students per group.
2. Assign mentor to each group.
3. Provide guidelines for title identification (Problem can be some real life situation that needs technology solutions. This situation can be identified by meeting people around, visiting various industries, society, and institutes. The solution can be prototype, model, convertible solutions, survey and analysis, simulation, and similar).
4. Let students submit the problem identified in prescribed format (Title, Problem statement, details of a problem undertaken, and what is need of solution to the problem)
5. Mentor can approve the problem statements based on feasibility and learning outcomes expected for first year engineering students
6. Mentor is to monitor progress of the task during phases of project work. Broadly phases may include- requirements gathering, preparing a solution, technology design for the solution. (Optional phases- implementation and testing)
7. Fortnightly monitoring and continuous assessment record is to be maintained by mentor.
8. Get the report submitted at the end of semester.



<b>Evaluation and Assessment Sheet (To be filled in my mentor)</b>			
<b>Sr. No.</b>	<b>Details</b>	<b>Maximum Marks</b>	<b>Marks Obtained</b>
1.	Problem Identification (Idea Inception)	<b>05</b>	
2.	Problem Analysis (Requirement Gathering)	<b>05</b>	
3.	Proposed Solution (Model/Design/ Process / prototype)	<b>05</b>	
4.	Report	<b>10</b>	
5.	Presentation	<b>25</b>	
<b>Total Marks</b>		<b>50</b>	
<b>Date:</b>			
<b>Name &amp; Sign of Mentor</b>			

**Co & PO Mapping:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
CO2	2	1	1	1	1	-	-	-	-	-	1	1	-	-	-
CO3	-	2	-	-	-	2	1	1	1	-	-	-	-	-	-

## FY113A Democracy, Election & Good Governance

**Course Objectives:** The objective of the course is to

The rationale of the study is to make the pupils aware of the importance of democracy. What constitute democracy, what is its importance from the point of view of the role of individual and what exactly can a individual get if he performs his role well in the society. This module also aims to make the individual understand the different aspects of democracy and its implications in the overall development of the state. The syllabus is introduced from the point of view that all students upon entering into the college, enroll themselves as voters and encourage and enthuse other members of the society to participate not only in election process but also electoral and political process in general.

<b>Unit 1</b>	<b>Democracy in India</b>
	Dimensions of Democracy: Social, Economic and Political, Decentralization: Grassroots Level Democracy – Challenges before, Challenges before Democracy: women and marginalized sections of the society
<b>Unit 2</b>	<b>Election to Local Self Government Bodies</b>
	73rd and 74th Constitutional Amendment Acts: Institutions at the local level and Role of State Election commission, Local Body Elections: Urban & Rural, Duties of an Individual towards electoral process
<b>Unit 3</b>	<b>Good Governance</b>
	Meaning and concept, Government and Governance, Good Governance initiatives in India.

**Study Material:**

<http://tkietwarana.ac.in/dpthumanities/details.aspx?title=Democracy,%20Election%20and%20Good%20Governance>