Chemistry Group (Sem-I)

COURSE WISE DETAILED CURRICULUM

23FY110 Engineering Chemistry

Lectures	**:**	3 Hrs/Week	**Evaluation Scheme**		
Credit	**:**	3	**IA**	**:**	10 Marks
			ISE	**:**	30 Marks
			ESE	**:**	60 Marks

Course Objectives: 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.

Course Outcomes:

COs	At the end of successful completion of the course, the student will beable to	Bloom's Taxonomy
CO1	**Use** relevant water treatment process to solve industrial problems .	Apply
CO2	**Utilize** the knowledge of biomolecule.	Apply
CO3	**Select** relevant engineering materials for applications.	Remember
CO4	**Select** proper fuels for domestic and industrial use.	Understand
CO5	**Use** corrosion preventive measures in domestic and industrial application.	Apply
CO6	**Explain** phase and chemical equilibrium.	Understand

Description:

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.

Prerequisites:	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	**Water**	
	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	**Chemistry of living cell**	
	Cell & cellular constituents and their functions. Various classes of biological molecules & functions. **a) Amino acids :** Definition, Nomenclature, General structure and classification of amino acids : 1) **Neutral amino acids**: Hydrocarbon chain amino acids-Glycine, Alanine, Valine, Leucine, Isoleucine. 2) **Acidic amino acids and their amides:** Aspartic acid, Glutamic acid, Aspargine, Glutamine. 3) **Basic aminoacids:** Lysine Arginine, Histidine, b) **Nucleic acids**: Introduction, Meaning, Definition, Distinction between DNA and RNA, Components of nucleic acids viz, bases, sugars. Nucleosides and nucleotides,	**05 Hrs**
Unit 3	**Engineering materials**	
	Macromolecules: Polymers : Introduction, Addition and condensation polymers examples ; plastics --industrially important plastics(PF,UF & Epoxy resin) Conducting polymers and Biopolymers, Molecular Weight of polymers. **Composite materials** Introduction, Composition, properties and uses of fiber reinforced plastics (FRP) example glass reinforced plastic(GRP)	**07 Hrs**
Section – II		
Unit 4	**Fuels**	
	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 **Fuel Cells:** Defination, classification of fuel cells, working of Solid oxide fuel cell (SOFC), limitations and applications of fuel cells.	**07Hrs**
Unit 5	**Corrosion and it's Prevention**	
	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	**07Hrs**

	coatings , such as Hot dipping (galvanizing and tinning,), electroplating , Metal cladding ,Metal Spraying	
Unit 6	**Chemical Equilibrium**	
	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.	**05Hrs**

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
3	Textbook of Engineering Chemistry by Dr. Mrs. Jayshree Parikh , Tech-Max Publication Pune.
Reference Books	
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

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

23FY102 Engineering Mathematics-I

Lectures	**:**	3 Hrs/Week	**Evaluation Scheme**	
Credit	**:**	3	**IA**	**:** 10 Marks
			ISE	**:** 30 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	Bloom's Taxonomy
CO1	**Find** rank of matrix and solve system of linear equations.	Remember, Apply
CO2	**Find** characteristic equation and use it to find eigen value, eigen vector, higher power and inverse (if it exists) of square matrix.	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, Understand
CO4	**Estimating** the value of a function for the given value of the independent variable	Understand
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	Understand ,Apply

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

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

Section – I		
Unit 1	**Matrices and Solution of Linear System Equations**	
	Rank of matrix: Definition, Normal form and echelon form, System of linear homogeneous equations, System of linear Non-homogeneous equations	**06 Hrs**
Unit 2	**Eigen Values and Eigen vectors**	
	Eigen Values , Properties of Eigen Values, Eigen vectors, Properties of Eigen vectors, Cayley-Hamilton's theorem (Without proof)	**06 Hrs**
Unit 3	**Complex Numbers**	
	De Moivre's Theorem (Without proof), Roots of complex numbers by using De Moivre's Theorem, Expansion of sinnθ and cosnθ in powers of sinθ and /or cosθ, Circular functions of a complex variable, Hyperbolic and Inverse Hyperbolic Functions- definitions .	**07Hrs**
Section – II		
Unit 4	**Finite Differences**	
	Forward & Backward difference operator, Shift operator, Interpolation & Extrapolation Methods , Newton's formulae (Equal intervals), Lagrange's formulae (Unequal intervals).	**06Hrs**
Unit 5	**Numerical Solution of linear simultaneous equations**	
	Gauss elimination method, Gauss-Jordan method, Jacobi's iteration method, Gauss-Seidel iteration method.	**06 Hrs**
Unit 6	**Partial Differentiation and its Application**	
	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	**08 Hrs**

Note-Minimum 06 Assignments should be given covering all units

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**	https://nptel.ac.in/courses/111/107/111107112/
2	**2**	https://nptel.ac.in/courses/111/105/111105121/
3	**5**	https://nptel.ac.in/courses/111/107/111107105/
4	**5**	https://nptel.ac.in/courses/111/106/111106101/
5	**6**	https://nptel.ac.in/courses/111/107/111107108/

23FY111 Computer Programming in C

Lectures	**:** 2 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**IA**	**:** 10 Marks
		ISE	**:** 30 Marks
		ESE	**:** 60 Marks

Course Objectives: 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

Course Outcomes:

COs	At the end of successful completion of the course	Bloom's Taxonomy
CO1	**Define** algorithm, flowchart and implementing programs in C-languages.	Remember
CO2	**Select** appropriate operators in programming expressions for implementing simple C- Programs.	Understand
CO3	**Explain** Decision Making and Branching statements for implementing Programs.	Understand
CO4	**Illustrate** appropriate looping statements for implementing Programs.	Understand
CO5	**Develop C** programming language for applications of 1-D and 2-D Arrays.	Apply
CO6	**Make use of** modular programming using functions in C-Language.	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.

Prerequisites:	1:	Basic knowledge of Computers.
	2:	Computational Mathematics.

Section – I

Unit 1	**Basics of C programming** 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.	**04 Hrs**

Unit 2	**Operators and Expressions in C**	
	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.	**04 Hrs**
Unit 3	**Decision Making and Branching Statements**	
	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	**04 Hrs**
Section – II		
Unit 4	**Decision Making and Looping**	
	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	**04 Hrs**
Unit 5	**Arrays**	
	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.	**04 Hrs**
Unit 6	**User Defined Function**	
	Introduction, Need for User-defined functions, A multifunction progam/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..	**04 Hrs**

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/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1.	01,02,03,04, 05 and 06	https://www.w3resource.co/ https://www.includehelp.com/c/ https://www.javatpoint.com/

23FY112 Engineering Mechanics

Lectures	**:** 2 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**IA**	**:** 10 Marks
		ISE	**:** 30 Marks
		ESE	**:** 60 Marks

Course Objectives: 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.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	**Solve** the resultant force and moment for a given system of forces.	Apply
CO2	**Determine** the support reactions for a given system of forces.	Apply
CO3	**Calculate** the support reactions for a given beams.	Apply
CO4	**Determine** the centroid of the different cross sections in civil and mechanicalengineering.	Apply
CO5	**Determine** the second moment of area of the different cross sections.	Apply
CO6	**Understand** impact properties of material.	Understand

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.

Prerequisites:	1	Learners should know secondary school mathematics
	2	Learners should know the "Mechanics" section from Physics.

Section – I

Unit 1	**Fundamentals of Statics**	
	Basic Concepts and Fundamental Laws, Force, System of Forces, Resultant, Equilibrant, Resolution and Composition of Forces, Moment and Couple,	**5**

	Varignon's Theorem, Law of Moments.	
Unit 2	**Equilibrium of Forces**	
	Basic concept of equilibrium, Equilibrium conditions, Lamis' Theorem, Free Body Diagram, Equilibrium of spheres.	**5**
Unit 3	**Equilibrium of Beams**	
	Types of Loads, Types of supports, Analysis of Simple beams, Support reactions.	**4**
Section – II		
Unit 4	**Centroid**	
	Centroid and Center of Gravity, Centroid of Standard shapes, centroid of given diagram	**5**
Unit 5	**Moment of Inertia**	
	Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.	**5**
Unit 6	**Impact and Collision of elastic bodies**	
	Impact, Types of Impact, Law of conservation of Momentum, Coefficient of Restitution, Numerical on Direct central Impact and Impact on fixed plane.	**4**

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**	https://www.youtube.com/watch?v=nGfVTNfNwnk
2	**2**	https://www.youtube.com/watch?v=nkg7VNW9UCc
3	**3**	https://www.youtube.com/watch?v=6u_rjLjv-MY
4	**4**	https://www.youtube.com/watch?v=Fudcc0JoXdo
5	**5**	https://www.youtube.com/watch?v=ljDIIMvx-eg
6	**6**	https://www.youtube.com/watch?v=aiT5mcuXf5Y

23FY113 BASIC MECHANICAL ENGINEERING

Lectures : 2 Hrs/Week

Credit : 2

Evaluation Scheme

TA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: 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

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	**Describe** the basic concepts of thermodynamics and solve SFEE problems.	Understand
CO2	**Demonstrate** working of IC Engine.	Understand
CO3	**Explain** working of VCRS and VARS	Understand
CO4	**Explain** the principles, construction and working of various power plants.	Understand
CO5	**Summarize** the working of energy converting and power transmission devices.	Understand
CO6	**Illustrate** the basic manufacturing processes.	Remember

Description:

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.

Prerequisites:	1:	Mathematics
	2:	Basics of Thermodynamics
	3:	Basics of energy sources

	Section – I	
	Thermodynamics	
Unit 1	Thermodynamic State, Process, Cycle, Thermodynamic System, Heat, work, Internal Energy, First Law of Thermodynamics, Application of First Law to steady Flow processes(Numerical Treatment), Limitations of First Law, PMM	**0 5 Hrs**
Unit 2	**Introduction to I C Engine**	
	Classification of IC engines, Construction and Working of S.I. and C.I. engines Two strokes and Four Stroke engines.	**04 Hrs**
Unit 3	**Introduction to Refrigeration and Air Conditioning**	
	Applications of Refrigeration & air conditioning Refrigerant types and Properties, Vapour compression system, vapour absorption system, Window Air Conditioning. (Descriptive Treatment only).	**04 Hrs**
	Section – II	
Unit 4	**Energy Sources and power plants**	
	Renewable and nonrenewable, Photovoltaic cell Wind Power plant, Hydropower plant, Steam Power plant , Bio-gas, Bio-Diesel (Descriptive Treatment only).	**04 Hrs**
Unit 5	**Mechanical Power Transmission and Energy conversion devices**	
	Type of Belt and belt drives (Descriptive Treatment only), chain drive, Types of gears and gear Trains, Construction, working and applications of centrifugal Pump	**04 Hrs**
Unit 6	**Manufacturing Processes**	
	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.	**0 5 Hrs**

References:

Text Books	
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.
Reference Books	
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

Web Links/ Video Lectures

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

23FY114 Indian Knowledge System (IKS)

Lectures : 1 Hrs/Week
Credit : 1

Evaluation Scheme
IA : 10 Marks
ISE : 40 Marks

Course Objectives: The objective of the course is to

- To make students conscious about the Traditional knowledge and its importance
- To inculcate the importance of protecting traditional knowledge and kinds of traditional knowledge
- To furnish information about the various sectors in traditional knowledge and protection of IKS
- To kindle in them the Significance of historical places in the vicinity
- To make them aware of the importance and benefits and Yoga and Meditation

Course Outcomes:

Cos	At the end of successful completion of the course the students will be able to	Bloom's Taxonomy
CO1	**Know** the concept of Traditional knowledge and its importance.	Remember
CO2	**Use** the traditional knowledge in different sectors and perform yoga and meditation for balanced life style.	Apply
CO3	**Understand** the concept of intellectual property to protect the traditional knowledge.	Understand
CO4	**Know** the need and importance of proctecting traditional knowledge.	Understand

Description:

To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system. Indian Knowledge Systems (IKS) is an innovative cell under Ministry of Education (MoE) at AICTE, New Delhi. It is established to promote interdisciplinary research on all aspects of IKS, preserve and disseminate IKS for further research and societal applications. It will actively engage for spreading the rich heritage of our country and traditional knowledge in the field of Arts and literature, Agriculture, Basic Sciences, Engineering & Technology, Architecture, Management, Economics, etc

Unit 1	**Introduction to Traditional Knowledge** • Define Traditional Knowledge (TK), • Nature and characteristics, • Scope and importance, Types of traditional knowledge, • Traditional knowledge Vs western knowledge	**03 Hrs**

Unit 2	**Traditional Knowledge in Different Sectors**	
	• Traditional knowledge in agricultural sector • Need of meditation and its benefits in behavior pruning • Need and Importance of Yoga in educational sector •	**03 Hrs**
Unit 3	**Traditional Knowledge and Intellectual Property**	
	• Systems of traditional knowledge protection, • Legal concepts for the protection of traditional knowledge, • History and development of Warana industrial and educational complex	**03 Hrs**
Unit 4	**Protection of Traditional Knowledge**	
	• The need for protecting traditional knowledge • Significance of TK Protection • Role of Government to harness TK • Significance and protection of historical places in the vicinity of TKIET, Warana	**03 Hrs**

References:

Recommended Books:	
	Text Books:
1)	Traditional Knowledge System in India, by Amit Jha, 2009.
2)	*Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012. .*
	References:
1)	*Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002*

2)	*"Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino*
	E-resources:
1)	https://www.youtube.com/watch?v=LZP1StpYEPM
2)	http://nptel.ac.in/courses/121106003/

23FY115 Employability Enhancement Skills (Sem - II)

Lectures	**:** 01 Hrs/Week	**Evaluation Scheme**	
		IA	**:** 10 Marks
Credit	**:** 01	**ISE**	**:** 40 Marks
		ESE	**:** NA

Course Objectives: The objective of the course is to

- To make students conscious about Recruitment procedure and ethics at workplace
- To inculcate the importance of Behavioral Skills in day to day communication
- To enhance the writing skills with technical report writing practice
- To prepare students to deliver speeches of various types / occasions

Course Outcomes:

COs	At the end of successful completion of the course, the student will beable to	Bloom's Taxonomy
CO1	**Understand** the procedure of recruitment drive	Understand
CO2	**Use** interpersonal skills with precision and competence in different scenario	Apply
CO3	**Prepare** technical reports for professional purposes	Apply
CO4	**Articulate** prepared speeches to express ideas, thoughts and emotions	Apply

Description:

Employment Enhancement Skills course has correlation with the Sem- I course Communication Skills. After learning the basics of language in the first semester, this course concentrates on the personality development, interpersonal skills and expectation from an industry Hence the included models in the syllabus has the direct co-relation with employability of the students. This course would definitely boost personality and interpersonal skills of the learners.

Prerequisites:	1:	Basic knowledge about English Vocabulary
	2:	Communication in simple English

Unit 1	**Recruitment and Career Skills** • Importance of Planning and Managing Career • Job Application and Resume/CV/Bio data • Group Discussion • Mock Personal Interview • Corporate Etiquettes & Manners	**03 Hrs**

Unit 2	**Behavioral Skills**	
	• Understanding Self: Self Esteem • Personality Types and Traits • Time Management & Stress Management • Positive Attitude Building • Emotional Intelligence	**05 Hrs**
Unit 3	**Technical Writing Skills**	
	• Importance and Objectives of Technical Writing • Structure and Types of Reports (Investigation and Accident Report) • Corporate Email Writing: Dos & Don'ts	**04 Hrs**
Unit 4	**Developing Presentation Skills**	
	• Techniques of Public Speaking • Speeches for Various Occasions: • Welcome Speech, Introduction of a Guest, Vote of Thanks	**02 Hrs**

References:

Recommended Books:	
1)	*Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)*
2)	*Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition*
3)	*Lesikar, R. V. and Pettit, J. ,D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10th Edition, 2006*
4)	*Managing Soft Skills for Personality Development* by B.N. Ghosh, Tata McGraw Hill, 2012.
5)	*Bikram K. Das, KalyaniSamantray, "An Introduction to Professional English and Soft Skills" Cambridge University Press New Delhi.*
6)	*Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)*
7)	*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*
8)	*Business Correspondence & Report-writing by R.C.Sharma&KrishnaMohan,Tata McGraw-Hill Education*

9)	*Dr. Abha Singh, "Behavioural Science" Wiley India Pvt.Ltd*
10)	*Soft Skills by K. Alex, S. Chand and Company, 2013*
	www.buisnesscommunicationskills.com, www.kcitraing.com, www.mindtools.com

23FY110T- ENGINEERING CHEMISTRY 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) 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

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	**Use** relevant water treatment process to solve industrial problems .	Apply
CO2	**Utilize** the knowledge of biomolecule.	Apply
CO3	**Select** relevant engineering materials for applications.	Remember
CO4	**Select** proper fuels for domestic and industrial use.	Understand
CO5	**Use** corrosion preventive measures in domestic and industrial application.	Apply
CO6	**Explain** phase and chemical equilibrium.	Understand

Description:

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.

Prerequisites:	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.	Bloom's Taxonomy
1	Determination of acidity of water	2	Apply
2	Determination of total alkalinity of water sample.	2	Apply
3	Determination of chloride content of water by Mohr's method.	2	Apply
4	Determination of temporary and permanent hardness of water sample by EDTA method.	2	Apply
5	Determination of moisture, volatile and ash content in a given coal sample by proximate analysis	2	Understand
6	Preparation of urea-formaldehyde resin	2	Understand
7	Preparation of phenol-formaldehyde resin	2	Understand
8	Determination of percentage of copper in brass by iodometry.	2	Understand
9	Estimation of zinc in brass solution	2	Understand
10	Determination of rate of corrosion of aluminium by weight loss method in acidic and basic medium	2	Apply
11	Detection of amino acids – Ninhydrin, xanthoproteic, sodium nitro preside , Pauly's diazo test	2	Understand
12	Demonstration of paper chromatography	2	Understand

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, 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

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

23FY102T. Engineering Mathematics I

Teaching Scheme:
Tutorials: 1/week
Credit: 1

Evaluation Scheme:
ISA: 25 Marks

Course Objectives: The objective of the course is to

- To provide detailed of matrices which is applied for solving system of linear equations and useful in various fields of technology
- This course enables the students to 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.
- To build ability to solve numerically system of linear equations, algebraic and transcendental equations. To provide an overview of the experimental aspect of applied mathematics.
- 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	Bloom's Taxonomy
CO1	**Find** rank of matrix and solve system of linear equation.	Knowledge, Application
CO2	**Find** eigen values and eigen vectors and verifies cayley Hamilton's theorem	Understand, Evaluation
CO3	**Apply** De Moivre's Theorem to find roots of complex numbers, expand powers of $\sin n\theta$ and $\cos n\theta$	Understand, Apply
CO4	**Compute** forward and backward difference, Apply Newton's & Lagrange's interpolation Formulae.	Remember, Application
CO5	**Solve** system of liner equations numerically	Understand, Apply
CO6	**Find** partial derivative and apply it to find maxima & Minima of function of two variable	Understand, Application

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

Tutorials:

Number	**Practical/Experiment/TutorialTopic**	**Hrs.**	**Bloom's Taxonomy**
1	Rank by Normal form & Echelon form	**1**	Knowledge
2	Solution of system of linear equation	1	Knowledge, Application
3	Eigen values & Eigen Vectors	1	Understanding
4	Cayley Hamilton's Theorem	1	Knowledge
5	De Moivre's Theorem	1	Application
6	Roots of complex number	1	Application
7	Newton's Interpolation	1	Application
8	Lagrange's Interpolation Formula	1	Knowledge ,Application
9	Gauss elimination method & Gauss Jordon method	1	Knowledge , Application
10	Jacobi Iteration & Gauss Seidel Iteration Method	1	Knowledge , Application
11	Partial Derivative, Euler's Theorem		Knowledge
12	Jacobian, Maxima & minima		Application

23FY111T Computer Programming in C Lab

Tutorial/Practical : 2 hr/week
Credit : 1

Evaluation Scheme
ISA : 25 Marks

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	Bloom's Taxonomy
CO1	**Define** algorithm , flowchart and implementing programs in C language.	Remember
CO2	**Select** appropriate operators in programming expressions for implementing simple C programs.	Understand
CO3	**Explain** decision making and branching statements for implementing programs.	Understand
CO4	**Illustrate** appropriate looping statements for implementing programs.	Understand
CO5	**Develop C** programming language for applications of 1-D and 2-D arrays.	Apply
CO6	**Make use of** modular programming using functions in C language	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.

Prerequisites:	1:	Basic knowledge of Computers.
	2:	Computational Mathematics.

Tutorials

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
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

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/**

23FY112T - 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	Bloom's 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.

Prerequisites:	1	Learners should know secondary school mathematics
	2	Learners should know the "Mechanics" section from Physics.

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
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

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.

23FY113T - 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	Bloom's Taxonomy
CO1	**Describe** the working of IC engine	Understand
CO2	**Classify** Renewable and non-renewable energy sources	Understand
CO3	**Explain** different mechanisms for power transmission systems	Understand
CO4	**Understand** various basic operations of Lathe, Milling and Drilling machines	Understand

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.

Prerequisites:	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.	Bloom's Taxonomy
1	Solving SFEE numericals	4	Understand
2	Demonstration of I.C. engine	4	Understand
3	Demonstration of vapour compression refrigeration system and window air conditioner.	4	Understand
4	Demonstration of various power plants such as Windmill / Biogas / Hydroelectric Power Plant etc.	4	Understand
5	Demonstration of belt drive, chain drive, gear trains and centrifugal pump	4	Understand
6	Demonstration of casting, metal removal and metal joining processes	4	Remember

References:

Text Books	
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.
Reference Books	
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

23 FY 115T Employability Enhancement Skills (Sem - II) – PRACTICAL

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

Credit : 1 **ISA** : 25 Marks

Course Objectives: The objective of the course is to
• Strengthening Recruitment Skills- Group Discussion & Personal Interview • Inculcate the Behavioral Skills in day to day communication and corporate environment • Preparing students for writing technical reports and delivering speeches on different occasions

Course Outcomes:		
COs	**At the end of successful completion of the course, the student will be able to**	**Bloom's Taxonomy**
CO1	**Understand** the procedure of recruitment drive	Understand
CO2	**Prepare** technical reports for variety of purposes	Evaluate
CO3	**Deliver** prepared speeches to express ideas, thoughts and emotions	Apply
CO4	**Use** interpersonal skills with precision and competence in different scenario.	Apply

Description:		
This course is designed to differentiate between formal and informal communication and language, strategies for communicating in the workplace, using negotiation and diplomacy, and how to be a good promoter of using communication and soft skills complementing to hard skills while getting to be recruited and applying workplace etiquettes.		
Prerequisites:	1:	Basic knowledge about English Vocabulary
	2:	Communication in simple English

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs	Bloom's Taxonomy
01	SWOC- Analysis	02	Understand
02	Group Discussion	04	Understand & Analyze
03	Debate	02	Understand & Analyze
04	Mock Interview	04	Understand & Analyze
05	Speeches for Various Occasions	02	Apply
06	Email Writing	02	Analyze
07	Practice on Technical Writing	04	Analyze
08	Extempore or Pep talk	02	Apply

References:

Recommended Books:	
1)	*Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)*
2)	*Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition*
3)	*Lesikar, R. V. and Pettit, J. ,D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10th Edition, 2006*
4)	*Managing Soft Skills for Personality Development* by B.N. Ghosh, Tata McGraw Hill, 2012.
5)	*Bikram K. Das, KalyaniSamantray, "An Introduction to Professional English and Soft Skills" Cambridge University Press New Delhi.*
6)	*Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)*
7)	*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*

8)	*Business Correspondence & Report-writing by R.C.Sharma&KrishnaMohan,Tata McGraw-Hill Education*
9)	*Dr. Abha Singh, "Behavioural Science" Wiley India Pvt.Ltd*
10)	*Soft Skills by K. Alex, S. Chand and Company, 2013*
	www.buisnesscommunicationskills.com, www.kcitraing.com, www.mindtools.com

23FY116T Inquisitive learning

Teaching Scheme:
Practical's: 2 hrs per week
Credits: 1

Evaluation Scheme:
ISA: 25 Marks
Presentation: 25 Marks
Total Marks: 50 Marks

Course Objectives: 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.

Course Outcomes:

Cos	At the end of successful completion of the course the student will be able to	Bloom's Taxonomy
CO1	**Identify** real life problems through rigorous literature survey from societal need point of view.	Understand
CO2	**Analyze** the identified problems through technological perspective.	Apply
CO3	**Proposed** suitable solution to contribute society using fundamental knowledge of engineering through modern tools.	Creating
CO4	**Use** of technology to demonstrate proposed work in oral & written form.	Evaluate
CO5	**Develop** ability to work as an individual and as a team member and inculcate attitude of this for lifelong learning.	Apply

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.

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

23FY109A Democracy, Elections & Good Governance

Course Outcomes (CO's with Unit Numbers)

COs	At the end of successful completion of the course , the student will be able to	Bloom's Taxonomy	Unit No.
CO1	**Express** the different aspects of democracy and its implications in the overall development of the state.	Understand	**01**
CO2	**Explain** 73rd and 74th Constitutional Amendment Acts and Local Body Elections.	Understand	**02**
CO3	**Describe** the importance and role of the Good Governance.	Understand	**03**

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.

Unit 1	**Democracy in India**
	Dimensions of Democracy: Social, Economic and Political, Decentralization: Grassroots Level Democracy – Challenges before, Challenges before Democracy: women and marginalized sections of the society
Unit 2	**Election to Local Self Government Bodies**
	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
Unit 3	**Good Governance**
	Meaning and concept, Government and Governance, Good Governance initiatives in India.