



Shree Warana Vibhag Shikshan Mandal's

**Tatyasaheb Kore Institute of
Engineering And Technology,**

Warananagar (An Autonomous Institute)

NBA Accredited Institute

Department of First Year B.Tech

F Y. B. Tech.
2023-24

First Year B. Tech.

Syllabus Structure and Curriculum under Autonomy

**Shree Warana Vibhag Shikshan Mandal's
Tatyasaheb Kore Institute of Engineering and Technology
(Autonomous), Warananagar**

Vision

To sustain a distinct identity for the institute by providing quality technical and management education, academic flexibility, innovation, and industry relevant skills with professional ethics.

Mission

- To persistently implement flexible curriculum for preparing technocrats with sound skills and professional ethics.
- To strengthen industry-institute interface for effective enhancement of internships, employability, and entrepreneurship.
- To facilitate an atmosphere that encourages faculty and students to engage in meaningful academic and research activities.
- To enhance educational opportunities for the rural and weaker sections of the society.
- To inculcate life long learning with human values and concern for the society and environment.

Quality Policy

To promote excellence in academics and training activities by inspiring students for becoming competent professionals to cater industrial and social needs.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar
(An Autonomous Institute)

NBA Accredited Institute , Accredited With 'A' Grade by NAAC

Abbreviations

Sr. No.	Acronym	Definition
1	ISE	In-Semester Examination
2	ISE-I	In-Semester Examination-I
3	ISE-II	In-Semester Examination-II
4	ESE	End Semester Examination
5	ISA	In-Semester Assessment (Term Work)
6	L	Lecture
7	T	Tutorial
8	P	Practical
9	CH	Contact Hours
10	C	Credit
11	IA	Internal Assessment

Course/ Subject Categories

Sr. No.	Acronym	Definition
1	AEC	Ability Enhancement Course
2	BSC	Basic Science Course
3	CC	Co-curricular Courses
4	ESC	Engineering Science Course
5	HSSM	Humanities Social Science and Management
6	IKS	Indian Knowledge System
7	MAC	Mandatory Audit Course
8	PCC	Programme Core Course
9	VSEC	Vocational and Skill Enhancement Course

Course/ Subject Code

2	3	F	Y	1	0	1
Course Introduced Year		Branch Code		Semester	Course Number	

Course Term work and POE Code

2	3	F	Y	1	T / P / A
Course Introduced Year		Branch Code		Semester	T- Term work P- POE A- Audit Course

SWVSM'S

**Tatyasaheb Kore Institute of Engineering and Technology,
Warananagar**
(An Autonomous Institute)

First Year B. Tech.

Structure and Curriculum

(Common to all Programmes)

To be implemented from academic year 2023-24

INSTRUCTIONS

- **There are two groups in each semester:**
 - 1) Physics Group and
 - 2) Chemistry Group
- **Allotment of groups to students**
 - 1) In Semester-I, 50% of first year B.Tech students will be admitted in Physics group and remaining 50% will be in Chemistry Group.
 - 2) In Semester-II, students admitted in Physics group in semester-I will be transferred to Chemistry Group. The students admitted in Chemistry Group in semester-I will be transferred to Physics Group.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

First Year B. Tech (Sem-I)

PHYSICS GROUP

(Common to all Programmes)

(To be implemented As per NEP 2020 from AY 2023-24)

Teaching & Examination Scheme

Course Code	Category	Course Title	Teaching & Credit Scheme					Examination & Evaluation Scheme			
			L	T	P	CH	C	Component	Marks	Min for Passing	
23FY101	BSC	Engineering Physics	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY102	BSC	Engineering Mathematics-I	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY103	ESC	Basic Electrical and Electronics Engineering	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY104	ESC	Basic Civil Engineering	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY105	CC	Cyber Security	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY106	HSSM	Communication Skills	1	--	--	1	1	IA	10	20	
								ISE	40		
23FY101T	BSC	Engineering Physics Lab	-	--	1	2	1	ISA	25	10	
23FY102T	BSC	Engineering Mathematics-I Tutorial	-	1	--	1	1	ISA	25	10	
23FY103T	ESC	Basic Electrical and Electronics Engineering Lab	-	--	1	2	1	ISA	25	10	
23FY104T	ESC	Basic Civil Engineering Lab	-	--	1	2	1	ISA	25	10	
23FY105T	CC	Cyber Security Lab	-	--	1	2	1	ISA	25	10	
23FY106T	HSSM	Communication Skills Lab	-	--	1	2	1	ISA	25	10	
23FY107T	ESC	Engineering Drawing	-	--	1	2	1	ISA	25	10	
								OE	25	10	
23FY108T	VSEC	Manufacturing technique Lab	-	-	1	2	1	ISA	50	20	
23FY109A	MAC	Mandatory Audit Course-I: Democracy, Elections and Good Governance *	-	--	--	-	--	ESE	50*	20	
Total			13	01	07	28	21	-	800	----	

****A student must fulfill requirement of IA, ISE and ISA for appearing ESE.**

* A separate examination will be conducted for the mentioned Audit Course at the end of the semester.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

First Year B. Tech (Sem-I)

CHEMISTRY GROUP

(Common to all Programmes)

(To be implemented As per NEP 2020 from AY 2023-24)

Teaching & Examination Scheme

Course Code	Category	Course Title	Teaching & Credit Scheme					Examination & Evaluation Scheme			
			L	T	P	CH	C	Component	Marks	Min for Passing	
23FY110	BSC	Engineering Chemistry	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY102	BSC	Engineering Mathematics-I	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY111	PCC	Computer Programming in C	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY112	ESC	Engineering Mechanics	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY113	ESC	Basic Mechanical Engineering	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY114	HSSM	Indian Knowledge System	1	--	--	1	1	IA	10	20	
								ISE	40		
23FY115	HSSM	Employability Enhancement Skills	1	--	-	1	1	IA	10	20	
								ISE	40		
23FY110T	BSC	Engineering Chemistry Lab	--	-	1	2	1	ISA	25	10	
23FY102T	BSC	Engineering Mathematics-I Tutorial	--	1	-	1	1	ISA	25	10	
23FY111T	PCC	Computer Programming in C Lab	--	--	1	2	1	ISA	25	10	
23FY112T	ESC	Engineering Mechanics Lab	--	--	1	2	1	ISA	25	10	
23FY113T	ESC	Basic Mechanical Engineering Lab	--	--	1	2	1	ISA	25	10	
23FY115T	HSSM	Employability Enhancement Skills Lab	-	-	1	2	1	ISA	25	10	
23FY116T	CC	Inquisitive Learning	-	-	1	2	2	ISA	25	20	
								Presentation	25		
23FY109A	MAC	Mandatory Audit Course-I: Democracy, Elections and Good Governance *	--	--	--	--	--	ESE	50	20	
Total			14	01	06	27	21	-	800	----	

****A student must fulfill requirement of IA, ISE and ISA for appearing ESE.**

* A separate examination will be conducted for the mentioned Audit Course at the end of the semester.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

First Year B. Tech (Sem-II)

PHYSICS GROUP

(Common to all Programmes)

(To be implemented As per NEP 2020 from AY 2023-24)

Teaching & Examination Scheme

Course Code	Category	Course Title	Teaching & Credit Scheme					Examination & Evaluation Scheme			
			L	T	P	CH	C	Component	Marks	Min for Passing	
23FY101	BSC	Engineering Physics	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY201	BSC	Engineering Mathematics-II	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY103	ESC	Basic Electrical and Electronics Engineering	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY104	ESC	Basic Civil Engineering	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY105	CC	Cyber Security	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY106	HSSM	Communication Skills	1	--	--	1	1	IA	10	20	
								ISE	40		
23FY101T	BSC	Engineering Physics Lab	-	--	1	2	1	ISA	25	10	
23FY201T	BSC	Engineering Mathematics-II Tutorial	-	1	--	1	1	ISA	25	10	
23FY103T	ESC	Basic Electrical and Electronics Engineering Lab	-	--	1	2	1	ISA	25	10	
23FY104T	ESC	Basic Civil Engineering Lab	-	--	1	2	1	ISA	25	10	
23FY105T	CC	Cyber Security Lab	-	--	1	2	1	ISA	25	10	
23FY106T	HSSM	Communication Skills Lab	-	--	1	2	1	ISA	25	10	
23FY107T	ESC	Engineering Drawing	-	--	1	2	1	ISA	25	10	
								OE	25	10	
23FY108T	VSEC	Manufacturing technique Lab	-	-	1	2	1	ISA	50	20	
23FY202A	MAC	Mandatory Audit Course II: Water Management *	-	--	--	-	--	ESE	50*	20	
Total			13	01	07	28	21	-	800	----	

****A student must fulfill requirement of IA, ISE and ISA for appearing ESE.**

* A separate examination will be conducted for the mentioned Audit Course at the end of the semester.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

First Year B. Tech (Sem-II)

CHEMISTRY GROUP

(Common to all Programmes)

(To be implemented As per NEP 2020 from AY 2023-24)

Teaching & Examination Scheme

CourseCode	Category	Course Title	Teaching & Credit Scheme					Examination & Evaluation Scheme			
			L	T	P	CH	C	Component	Marks	Min for Passing	
23FY110	BSC	Engineering Chemistry	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY201	BSC	Engineering Mathematics-II	3	--	--	3	3	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY111	PCC	Computer Programming in C	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY112	ESC	Engineering Mechanics	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY113	ESC	Basic Mechanical Engineering	2	--	--	2	2	IA	10	16	40
								ISE	30		
								ESE	60	24	
23FY114	HSSM	Indian Knowledge System	1	--	--	1	1	IA	10	20	
								ISE	40		
23FY115	HSSM	Employability Enhancement Skills	1	--	-	1	1	IA	10	20	
								ISE	40		
23FY110T	BSC	Engineering Chemistry Lab	--	-	1	2	1	ISA	25	10	
23FY201T	BSC	Engineering Mathematics-II Tutorial	--	1	-	1	1	ISA	25	10	
23FY111T	PCC	Computer Programming in C Lab	--	--	1	2	1	ISA	25	10	
23FY112T	ESC	Engineering Mechanics Lab	--	--	1	2	1	ISA	25	10	
23FY113T	ESC	Basic Mechanical Engineering Lab	--	--	1	2	1	ISA	25	10	
23FY115T	HSSM	Employability Enhancement Skills Lab	-	-	1	2	1	ISA	25	10	
23FY116T	CC	Inquisitive Learning	-	-	1	2	2	ISA	25	20	
								Presentation	25		
23FY202A	MAC	Mandatory Audit Course-II: Water Management *	--	--	--	--	--	ESE	50	20	
Total			14	01	06	27	21	-	800	---	

A student must fulfill requirement of IA, ISE and ISA for appearing ESE.

* A separate examination will be conducted for the mandatory Audit Course at the end of the semester
Inquisitive Learning: 25 marks for report preparation/model making and 25 marks for presentation

F.Y./B.Tech Chief Coordinator

Chairman

BOS F. Y. B. Tech

Autonomous

Warananagar

Dean Academics

Chairman

Academic Council

Physics Group (Sem-I)

**COURSE WISE DETAILED
CURRICULUM**

23FY101 Engineering Physics

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1) Provide the useful fundamental concepts of Physics to all Engineering disciplines. 2) Make the student aware of new techniques in Physics applicable to engineering practices. 3) Encourage them to understand engineering and technical development.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Summarize the knowledge of basic quantum mechanics to understand Wave particle dualism and uncertainty principle.	Understand
CO2	Demonstrate the different crystal structure and their properties by Understanding crystal physics.	Understand
CO3	Apply the theory and phenomenon of nanophysics to produce nanomaterials.	Apply
CO4	Define the basic requirements of Architectural Acoustics.	Remember
CO5	Illustrate the diffraction and polarization phenomenon of light.	Understand
CO6	Explain the concepts and applications of LASER and necessary tools for Nuclear power plant.	Understand

Description:		
Engineering Physics course is offered as the basic science course. This course contains crystal structures and their properties, Approaches and techniques of nanomaterial and nanotechnology, Basic concepts of Architectural acoustics, Different phenomenon's of light, wave –particle dualism and uncertainty principle and nuclear energy. These are useful fundamental concepts of Physics to all Engineering disciplines and to make the student aware of new techniques in Physics applicable to engineering practices.		
Prerequisites:	1:	Fundamentals of properties of wave and particle and types of the solid.
	2:	Different phenomenon of light and sound.

3: Basics of Atomic Physics and Nuclear energy

Section – I

Unit 1 **Wave Mechanics**

Introduction, Wave-particle dualism (De-Broglie's Hypothesis -light and matter), De-Broglie's wavelength in terms of Kinetic Energy, Potential Difference and Temperature, Properties of matter waves, Heisenberg's uncertainty principle for position and momentum, Compton Effect (statement, explanation and formula), Photoelectric Effect, Numerical.

06 Hrs

Unit 2 **Crystallography**

Introduction, Basics of crystal structure -Space Lattice, Basis, crystalline solid and Unit cell (geometry and types), Seven crystal system, Properties of unit cell for SC, BCC and FCC (number of atoms per unit cell, coordination number, atomic radius and packing density), Relation between density and lattice constant, Miller indices (procedure and sketches for planes), Bragg's x-ray spectrometer, Numerical.

07 Hrs

Unit 3 **Nanoscience and Nanotechnology**

Introduction, Nanomaterials, Nanoscience and Nanotechnology, Top down and bottom up approaches, Production techniques - Ball milling and Colloidal, Types of nanomaterial, Properties of material at nanoscale (Surface to Volume ratio and Quantum confinement effect), Applications of nanomaterials, Characterizations - Scanning Tunneling Microscope and Atomic Force Microscope.

06 Hrs

Section – II

Unit 4 **Architectural Acoustics**

Introduction, Reverberation, Reverberation time, Absorption coefficient, Average absorption coefficient, Sabine's formula for reverberation time (no derivation), Factors affecting architectural acoustics and their remedy, Numerical.

06 Hrs

Unit 5 **Wave Optics**

Introduction, Theories of light, Interference of light and types, Diffraction of light and types, Construction of diffraction grating, Theory of fraunhofer diffraction by double slit, Resolving power of plane transmission grating, Polarization of light, double refraction, Huygens' theory of double refraction, Specific Rotation, Quarter wave plate and half wave plate, Laurent's half shade polarimeter, Numerical.

07 Hrs

Unit 6	LASER and Nuclear Physics	
	<p>LASER: Introduction, Absorption, spontaneous emission and stimulated emission of radiations, Population inversion, Pumping energy, Characteristics of laser beams, Ruby laser.</p> <p>Nuclear Physics: Introduction, Nuclear Fission, Energy released by 1 Kg of U235, Nuclear fission reactor, Nuclear fusion, Thermonuclear reactions (proton-proton chain and Carbon Nitrogen cycle), Numerical.</p>	07 Hrs

References:

Text Books	
1	M. N. Avadhanulu and P. G. Kshirsagar, "A Text book of Engineering Physics", S.Chand and Company, New Delhi.
2	R. K. Gaur and S. L. Gupta "Engineering Physics", Dhanpat Rai Publications, New Delhi.
Reference Books	
1	R. K. Gaur & Gupta S. L, Engineering Physics –Dhanapat Rai Publication
2	B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi
3	Subramanyam & BrijLal, A Text Book of Optics –S. Chand & Company (P.) Ltd.
4	M. N. Avadhanulu & P. G. Kshirsagar - A Text Book of Engineering Physics -S. Chand Publication.
5	B. K. Pandey and S. Chaturvedi- Engineering Physics, Cengage Learning

Web Links/ Video Lectures

Sr. No	Unit No./Topic	Web Links/ Video Lectures
1	Unit No. 1	https://nptel.ac.in/courses/115/101/115101010/
2	Unit No. 2	https://nptel.ac.in/courses/115/104/115104109/
3	Unit No. 2	https://nptel.ac.in/courses/115/105/115105099/
4	Unit No. 3	https://nptel.ac.in/courses/115/101/115101007/
5	Unit No. 5	https://nptel.ac.in/courses/115/105/115105083/
6	Unit No. 6	https://nptel.ac.in/courses/115/102/115102124/
7	Unit No. 6	https://nptel.ac.in/courses/115/104/115104043/
8	Physics	http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
9	Physics	https://en.wikipedia.org/wiki/Fundamentals_of_Physics

23FY102 Engineering Mathematics-I

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

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 $\sin n\theta$ 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 .	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/

23FY103 Basic Electrical and Electronics Engineering

Lectures : 2 Hrs/Week

Credit : 2

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
Provide the Knowledge with an introductory and broad treatment in the field of Electrical and Electronics Engineering.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Apply the KCL and KVL to determine the current and voltage of DC circuits .	Apply
CO2	Describe the basic concepts of Magnetic circuits.	Understand
CO3	Describe the concepts of Basic Electronics components.	Understand
CO4	Illustrate the Nature of single phase AC series and parallel RLC circuits by calculating impedance power factor and power consumption.	Apply
CO5	Explain the concept of 3 phase supply Generation , transmission , Utilization and its advantages.	Understand
CO6	Solve the problems related to power losses to determine the efficiency of single phase transformer.	Apply

Description:		
Basic Electrical & Electronics Engineering course is offered as the engineering science course. This course contains. Basic knowledge of Electrical & Electronics engineering and its advantages, applications. This course has six units namely i) Analysis of D.C. Circuits, ii) Magnetic circuits, iii) Fundamentals of electronics iv) Single phase AC circuits, v) Three phase AC circuits, vi). Single phase Transformer		
Prerequisites:	1:	Battery, Potential difference and current flow concept.
	2:	Few basic electrical and Electronics components identification
	3:	Difference between AC & DC circuits
Section – I		
Unit 1	Analysis of D.C. Circuits	
	Concept of EMF, Potential difference, current, Power, Energy, Resistance, Ohms law,	

	Kirchhoff's laws, Mesh & Node analysis. (Numerical treatment on Mesh & Node analysis of two loops)	05 Hrs
Unit 2	Magnetic circuits	
	Concept of MMF, reluctance, magnetic flux, Magnetic flux density, magnetic field strength, Comparison of Electric & magnetic circuit, , Analysis of Series magnetic circuits.	04 Hrs
Unit 3	Fundamentals of Electronics	
	Introduction of Diode and V-I characteristics, Rectifier configuration, Analysis of Half wave Rectifier ,Full wave Rectifier and Bridge Rectifier, Introduction of Transistor.	05 Hrs
Section – II		
Unit 4	Single phase A.C Circuits	
	Faradays laws, Lenz's Law, generation of sinusoidal voltage, Analysis of pure Resistive, Inductive, Capacitive circuits, Analysis of series R-L,R-C, R-L-C circuits. (Numerical treatment on series R-L, R-C, R-L-C circuits)	05 Hrs
Unit 5	Three phase A.C. Circuits	
	Advantages of three phase system, Generation of three phase AC supply, phase sequence, Balanced system, Relation between line & phase quantities in Balanced star and Delta connected circuits.	04 Hrs
Unit 6	Single phase Transformer	
	Construction, operating principle, types, EMF Equation, Turns Ratios, Ideal Transformer, Power losses. (Numerical treatment on EMF Equation)	05 Hrs

References:

Text Books	
1)	P.V.Prasad and S.Shivan Raju – Electrical Engineering Concepts and applications – cenagage learning.
2)	B.H.Deshmukh, Electrical Engineering Concepts and applications
3)	Robert L.Boysted and Louis Nashelsky ,Electronics devices and circuit theory – Pearson education
Reference Books	
1)	B.L.Theraja – Electrical Technology Vol.1.- S.Chand publications.
2)	Nagarath I.J. and D.P.Kothari – Basic Electrical Engineering (2001) – Tata McGraw Hill.
3)	Bharati Dwivedi and Anurasg Tripathi – Fundamentals of Electrical engineering – Willey Precise.

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/108/106/108106172/
2	2	https://nptel.ac.in/courses/108/106/108106172/
3	3	https://nptel.ac.in/courses/108/108/108108122/
4	4	https://nptel.ac.in/courses/108/105/108105053/
5	5	https://nptel.ac.in/courses/108/105/108105053/
6	6	https://nptel.ac.in/courses/108/105/108105017/

23FY104 Basic Civil Engineering

Lectures : 2 Hrs/Week

Credit : 2

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to

1. Learn the brief introduction of all aspects under civil engineering
2. Understand basic concepts of Surveying, Transportation Engineering

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Illustrate linear and angular measurements by considering principles and significance of Surveying	Knowledge
CO2	Identify nature of ground by using methods of leveling	Apply
CO3	List components of pavements, railway track and water supply scheme	Understand
CO4	Demonstrate basic knowledge of Civil Engineering and explain principles of building planning and Bye laws.	Understand, Evaluate
CO5	Explain various components and it's uses of building.	Evaluate
CO6	Study various building materials and it's uses.	Apply

Description:

This course include principles of building planning, building components and their functions, building materials, surveying and its principles, leveling transportation engineering, irrigation

Prerequisites:

- | | |
|----|-------------------------|
| 1: | Properties of materials |
| 2: | Measurements |
| 3: | Principles |

Section – I

Unit 1	Linear and Angular Measurements	
	Principles of surveying, Linear measurements- Chain Surveying, Instruments used- Metric chain, errors in chaining, Ranging(Direct only)- Instruments Used, nominal scale and R.F., chaining, offsetting &	05Hrs

	numerical, Angular Measurements- Compass survey, Meridian, bearing and its types, system of bearing, Types of compass: prismatic and surveyor compass, Calculation of included angles, correction for local attraction, Numerical.	
Unit 2	Leveling	
	Terms used in leveling, use of Dumpy level and Auto Level, Temporary adjustments. Methods of reduction of levels, types of leveling, Numerical.	04 Hrs
Unit 3	Introduction to Transportation, Environmental Engineering	
	Components of rigid and flexible pavement, components of railway track (Broad Gauge), Water Treatment Plant- Components with Flow Diagram	04 Hrs
Section – II		
Unit 4	Introduction to Civil Engineering and Building Planning	
	Introduction, branches of civil engineering , Relevance of civil engineering in the overall development of the country, Principles of planning, Introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, Ventilation, sanitation as per municipal corporation area requirement.	05Hrs
Unit 5	Components of Building	
	A) Sub-structure: Elements of sub-structures and their Functions of elements B) Super-structure: Elements of super-structures and their Functions of elements	05Hrs
Unit 6	Building Materials and Design	
	Building Materials- cement blocks- properties and specification, Cement-Types, grades, properties and uses in brief, Concrete-Plain and reinforced cement concrete and ready mix concrete and their grades, Use and properties of bricks, steel, timber, Use and properties of roofing materials etc.	03Hrs

References:

Text Books	
1	Basic Civil Engineering by G. K. Hiraskar, DhanpatRai Publication
2	Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications
3	Building Construction by S P Arora & S P Bindra, DhanpatRai Publications
Reference Books	
1	Surveying by N. Basak, Tata Mc-Graw Hill Publication
2	Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication
3	Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
4	Irrigation Engineering by B. C. Punmia, DhanpatRai Publications

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/105/103/105103093/
2	2	https://nptel.ac.in/courses/105/102/105102088/
3	3	https://nptel.ac.in/courses/105/102/105102088/
4	4	https://nptel.ac.in/courses/105/107/105107122/
5	5	https://nptel.ac.in/courses/105/107/105107122/
6	6	https://nptel.ac.in/courses/105/101/105101087/

23FY105 Cyber Security

Lectures : 02 Hrs/Week

Evaluation Scheme

Credit : 02

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1. To study different types of cyber crime and network security.		
2. To study different authentication methods, protocols and Email security.		
3. To study digital forensics, types and digital evidence acquisition.		
4. To study VAPT Audit and its purpose.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Describe cyber security , cyber crime & its types.	Understand
CO2	Explain data loss prevention , smart phone security & software security	Apply
CO3	Apply methods for authentication .	Apply
CO4	Describe email phishing, email spoofing & infection types.	Remember
CO5	Identify different techniques & tools for acquiring digital evidence.	Remember
CO6	Explain the role of VAPT in ensuring the security of information system.	Understand

Description:		
This course is geared towards generating and enhancing awareness about cyber security challenges and the concepts of cyber security.		
Prerequisites:	1:	Fundamental knowledge of Computer.
	2:	Fundamental knowledge of Mobile Application.
	3:	Awareness of internet.
Unit 1	Introduction To Cyber Security: <ul style="list-style-type: none"> • Definition of Cyber Security, Types of Cyber Security, Definition of Cyber Crime, Types of Cyber Crime, • Cyber crime's Impact on individuals, Organizations and Society • Cyber Investigation Vs Cyber Security Audit 	04 Hrs

Unit 2	Network and Internet Security <ul style="list-style-type: none"> • Mobile/Smartphone Security • Definition and concepts of Data Loss Prevention (DLP) Web/Internet Security • Software Security 	04 Hrs
Unit 3	Internet Banking And Mobile Banking <ul style="list-style-type: none"> • Authentication Methods (Passwords, PIN's, OTP's and Biometrics) • Secure Communication Protocol- SSL/TLS • Man in the Middle Attack (MITM) Mobile Device Management (MDM) • For telephonic complaint - dial 1930 • Physical Complaint - First Information Report (FIR) to Police Station • Online Complaint on www.cybercrime.gov.in/webform/helpline.aspx • In Case of Mobile stolen/lost, file complaint on www.ceir.gov.in 	05 Hrs
Unit 4	Email Security <ul style="list-style-type: none"> • Introduction to Email Security, • Definition and concepts of Email Phishing • Definition and types of Email Spoofing (Domain Spoofing and Name Spoofing) • Infection Types - Malware Email, Spam Email, Virus infected Email, • Email Attack with embedded links, • Case Studies-Trojan Horse Attack 	05 Hrs
Unit 5	Digital Forensics <ul style="list-style-type: none"> • Introduction Digital Forensics <ul style="list-style-type: none"> ➤ Overview of Digital Forensics and its role in Investigation • Types of Digital Forensics • Digital Evidence Acquisition (Case Studies) <ul style="list-style-type: none"> ➤ Techniques and tools for acquiring digital evidence ➤ Forensic imaging and data preservation methods ➤ Validation and verification of acquired evidence 	05 Hrs
Unit 6	Vulnerability Assessment and Penetration Testing (VAPT) Audit <ul style="list-style-type: none"> • Introduction to VAPT Audit <ul style="list-style-type: none"> ➤ Overview of VAPT Audit and its Purpose ➤ Role of VAPT in ensuring the security of information system • Purpose of VAPT Audit 	05 Hrs

References:

Recommended Books

1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by SumitBelapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver,Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
6. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt.Ltd.
7. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

23FY106 Communication Skills (Sem - I)

Lectures : 01 Hrs/Week

Evaluation Scheme

Credit : 1

IA : 10 Marks

ISE : 40 Marks

Course Objectives: The objective of the course is to		
<ul style="list-style-type: none"> •To acquaint students with basic English Grammar and help students in improving language skills •To familiarize students with concept, various types, barriers and filters of communication •To assist students in developing Vocabulary •To aid them in understanding corporate meetings •To 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	Bloom's Taxonomy
CO1	Understand basic concepts of grammar	Understand
CO2	Understand communicative techniques to participate in several activities	Understand
CO3	Recall appropriate vocabulary	Apply
CO4	Demonstrate interpersonal skills with precision and competence in different scenario.	Apply
CO5	Write business letters by using appropriate language tools	Apply

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

Unit 1	Rapid Review of English Grammar	
	<ul style="list-style-type: none"> • Parts of Speech • Types of Sentences, Tenses / Verbal forms 	02 Hrs
Unit 2	Introduction to Communication	
	<ul style="list-style-type: none"> • Nature, Importance and Process of Communication • Basic Types: Verbal- Non- verbal Communication • Barriers & Filters to Communication 	02 Hrs
Unit 3	Organizational Communication	
	<ul style="list-style-type: none"> • Nature of Communication.-Formal & Informal • Directions of Communication: Upward, Downward, Horizontal, Internal, External • Levels of Communication 	02 Hrs
Unit 4	Vocabulary Building	
	<ul style="list-style-type: none"> • Synonyms & Antonyms, Prefixes and Suffixes • Words often Confused: Homonym & Homophone • Idioms and Phrases 	02 Hrs
Unit 5	Corporate Meetings	
	<ul style="list-style-type: none"> • Significance and Types of Meeting • Strategies of Conducting and Attending Meeting Effectively • Record Keeping: Notice, Agenda and Minutes 	02 Hrs
Unit 6	Business Correspondence	
	<ul style="list-style-type: none"> • 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 	04 Hrs

References:

Recommended Books	
01	<i>Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition.</i>
02	<i>Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)</i>
03	<i>Basic Communication Skills for Technology by Rutherford, Andrea J. (2002).. Delhi: Pearson Education Asia</i>
04	<i>Mastering Communication by Nicky Stanton, Palgrave Master Series</i>
05	<i>Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)</i>
06	<i>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</i>
07	<i>Written Communication in English by Saran Freeman (Orient Longman)</i>
08	<i>Seely, J. The Oxford Guide to Writing and Speaking, Oxford University Press, India 3rd Edition , 2013</i>

09	<i>High School English Grammar and Composition by Wren and Martin, Blackie, 2000</i>
10	<i>Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)</i>
11	<i>Sethi, J. and Dhamija P.V. A Course in Phonetics and Spoken English Prentice-Hall of India 2nd Edition, 2006</i>
12	<i>English Language Laboratories, by Nira Konar, PHI Learning, 2014</i>
13	<i>Perspective of Communication and Communicative Competence, M.V. Rodriques, Concept Publishing Company, New Delhi-10059</i>
	www.buisnesscommunicationskills.com
	www.kcitraing.com
	www.mindtools.com

23FY101T Engineering Physics Lab

Practical : 2 hr/week
 Credit : 1

Evaluation Scheme
ISA : 25 Marks
POE : NA

Course Objectives: The objective of the course is		
<ul style="list-style-type: none"> • To furnish the conceptual understanding of the basic principles. • To make the students gain practical knowledge to relate with the Physics theory. • To encourage them to understand technical development. • To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop the skills needed to set up the equipment. 		
Course Outcomes:		
COs	At the end of the successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Explain the need for precise measurement practices for data recording.	Understand
CO2	Interpret the principle, concept, working and applications of wave optics, band gap energy as well as Crystal relevant experiments.	Apply
CO3	Apply the techniques and skills associated with modern scientific tools regarding LASER and Nuclear plants.	Apply
CO4	Develop scientific communication skills while performing the experiments and interpreting the results to communicate effectively the scientific activities	Apply

Description:		
<p>This course aims to make the students gain practical knowledge to relate with the theoretical studies and to use the principle in the right way to implement modern technology. The experiments are selected from various areas of Physics like Measurements, Wave Optics, Lasers, Solid state physics and Basic Electronics. The Engineering Physics Laboratory manual is written in a simple scientific language with aim, apparatus, theory, diagrams, formula, graphs and questions. These experiments will help the students to expertise in the analysis of various concepts in Optics, measurements, crystallography and electronics-related topics.</p>		
Prerequisites:	1:	Higher secondary level Physics
	2:	Fundamentals of wave optics, Band theory and crystal.

Practical/Experiment Topic
(Minimum 8 experiments should be completed)

Number	Practical/Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Measurements in Physics	02	Remember
2	Resistor and Capacitor Code	02	Remember
3	Measurement of Band Gap Energy	02	Understand
4	Study of seven Crystal Structure, Bravais Lattice and Properties of unit cell	02	Apply
5	Study of Symmetry Elements of Cubic Crystal	02	Apply
6	Determination of Interplaner distance using XRD pattern	02	Apply
7	Miller Indices	02	Apply
8	Divergence of LASER Beam	02	Apply
9	Resolving power of Telescope	02	Apply
10	Specific rotation by Polarimeter	02	Apply
11	Wavelength of different spectral lines of mercury using grating.	02	Analyze
12	Determination of wavelength of LASER using diffraction grating.	02	Analyze
13	The grating constant of the diffraction grating	02	Apply
14	Determination of e/m of an electron	02	Apply
15	Resolving power of diffraction grating	02	Apply

References:

TextBooks	
1	Engineering Physics Lab Manual, TKIET Warananagar
2	Madhusudhan Rao, Engineering Physics Lab Manual, Scitech Publication
3	O.P. Singh, Vipin Kumar, R.P. Singh, Engineering Physics Practical Manual, Ram Prasad Publication
ReferenceBooks	
1	Resnick Halliday, Physics Volume-I, Krane -John Wiley & Sons Pub.
2	Resnick Halliday, Physics Volume-II, Krane -John Wiley & Sons Pub.

Virtual Lab Link:

1. **Experiment name-** Diffraction Grating (**Lab Name-**[Optics virtual lab](http://vlab.amrita.edu/?sub=1&brch=281&sim=334&cnt=1))
<http://vlab.amrita.edu/?sub=1&brch=281&sim=334&cnt=1>
2. **Experiment name-** Crystal Structure (**Lab Name-**[solid state physics virtual lab](http://vlab.amrita.edu/?sub=1&brch=282&sim=370&cnt=1))
<http://vlab.amrita.edu/?sub=1&brch=282&sim=370&cnt=1>
3. **Experiment name-**[Laser beam divergence and spot size](http://vlab.amrita.edu/?sub=1&brch=189&sim=342&cnt=1) (**Lab Name-**[laser optics virtual lab](http://vlab.amrita.edu/?sub=1&brch=189&sim=342&cnt=1))
<http://vlab.amrita.edu/?sub=1&brch=189&sim=342&cnt=1>
4. **Experiment name-** Numerical Aperture of Optical Fiber (**Lab Name-**[laser optics virtual lab](http://vlab.amrita.edu/?sub=1&brch=189&sim=343&cnt=1))
<http://vlab.amrita.edu/?sub=1&brch=189&sim=343&cnt=1>
5. **Experiment name-** B-H Curve (**Lab Name-**[solid state physics virtual lab](http://vlab.amrita.edu/?sub=1&brch=282&sim=1507&cnt=1))
<http://vlab.amrita.edu/?sub=1&brch=282&sim=1507&cnt=1>
6. **Experiment name-** Photoelectric effect (**Lab Name-**[modern physics virtual lab](http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1))
<http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1>
7. **Experiment name-** Energy Band Gap of Semiconductor (**Lab Name-**Basics of Physics lab)
<https://bop-iitk.vlabs.ac.in/exp/energy-band-gap/>

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		
<ul style="list-style-type: none">• 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/Tutorial Topic	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 Jordan 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

23FY103T Basic Electrical & Electronics Engineering Lab (Sem- I & II)

Tutorial/Practical : 2 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

Course Objectives: The objective of the course is to		
Provide the students with an introductory and broad treatment of the field of Electrical and Electronics engineering.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Make electrical connection for different circuits	Understand
CO2	Apply the different laws	Apply
CO3	Analyze V-I characteristics of Bridge circuits	Analyze
CO4	Determine the efficiency of transformer	Evaluate

Description:		
Basic Electrical Engineering course is offered as the engineering science course. This course contains basic knowledge of electrical engineering and its advantages, applications. This course has six units namely i) Analysis of D.C.Circuits, ii) Magnetic circuits, iii) Single phase AC circuits, iv) Three phase AC circuits, v) Single phase Transformer and vi). Fundamentals of electronics		
Prerequisites:	1:	Battery , Potential difference and current flow concept.
	2:	Few basic electrical components identification
	3:	Difference between AC & DC circuits
	4:	Few basic electronics components identification

Experiment

Number	Practical/ Experiment/Tutorial Topic	Hrs	Bloom's Taxonomy
1	Laboratory sessions covering, general introduction to	2	Understand

	electrical engineering laboratory, experimental setups, Instruments etc. Electrical symbols		
2	Electric shocks & precautions against shocks	2	Understand
3	Study of Ohm's law	2	Apply
4	Verification of Kirchoff's Voltage law & Kirchoff's Current law	2	Apply
5	B-H Curve for magnetic material	2	Understand
6	Study of Half wave Rectifier	2	Understand
7	Study of Full wave Rectifier	2	Understand
8	Determination of Reactance's for series R-L-C circuit	2	Apply
9	Demonstration of Power factor Improvement by static capacitor	2	Apply
10	Polarity & Ratio test for Single phase Transformer	2	Apply
11	Load tests on single phase transformer	2	Apply
12	Study of Basic method of Earthing, Use of Fuse & MCB	2	Understand
13	Study of different luminaries including Mercury Vapour lamp, fluorescent tube, CFL & LED lamp	2	Understand

References:

Text Books:	
1)	P.V.Prasad and S.Shivan Raju – Electrical engineering concepts and applications – cenagage learning.
2)	B.H.Deshmukh, Electrical engineering concepts and applications
3)	Robert L.Boysted and Louis Nashelsky ,Electronics devices and circuit theory – Pearson education
Reference Books:	
1)	B.L.Theraja – Electrical Technology Vol.1.- S.Chand
2)	Nagarath I.J. and D.P.Kothari – Basic Electrical Engineering (2001) – Tata McGraw Hill.
3)	Bharati Dwivedi and Anurasg Tripathi – Fundamentals of Electrical engineering – Willey Precise.

23FY104T-BasicCivilEngineering Lab

Tutorial/Practical : 2 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> To learn the brief introduction of all aspects under civil engineering To understand basic concepts of Surveying, Transportation Engineering 		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Identify and apply different distance measurement tools.	Application
CO2	Determine positions of an object by compass.	Evaluation
CO3	Find the elevations of given points.	Evaluation
CO4	Illustrate principle of planning	Understand

Description:		
This course includes principles of building planning, building components and their functions, building materials, surveying and its principles, leveling transportation engineering, irrigation		
Prerequisites:	1:	Distance measurement
	2:	Directions with respect to North
	3:	Nature of ground

Number	Practical/Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Measurement of Distances	2	Application
2	Traversing by Compass	2	Application
3	Reduction of levels by Collimation Plane Method	2	Application, Analysis
4	Finding out gradient of line by Rise & fall method	2	Application, Analysis
5	Site visit for study of various construction processes and Building planning	2	Application
6	Drawing a line plan of residential building by applying Principles of planning	2	Application
7	Drawing sheet showing various building components	2	Application

References:

Text Books	
1	BasicCivilEngineeringbyG. K. Hiraskar,DhanpatRaiPublication
2	BasicCivilEngineeringbyS. S. Bhavikatti,NewAgeInternationalPublications
3	BuildingConstructionbySP Arora&S PBindra,DhanpatRaiPublications
ReferenceBooks	
1	SurveyingbyN.Basak,TataMc-GrawHillPublication
2	SurveyingVol.I,Vol.II,Vol.IIIbyB.C.Punmia,LaxmiPublication
3	CivilEngineeringMaterials-TechnicalTeacher'sTrainingInstitute,Chandigarh
4	IrrigationEngineeringbyB. C. Punmia,DhanpatRaiPublications

23FY105 Cyber Security – PRACTICAL

Tutorial/Practical : 02 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

POE/OE : 25 Marks

Course Objectives: The objective of the course is to		
Study how to report cyber crime, phishing emails, secure net banking, VAPT Audit format.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Understand different cyber crime.	Understand
CO2	Understand phishing E mails.	Understand
CO3	Understand VAPT Audit.	Understand
CO4	Apply authentication methods.	Apply

Description:		
Course deals with understanding of different types of Cyber Security, Cyber Crime.		
Prerequisites:	1:	Fundamental knowledge of Computer.
	2:	Fundamental knowledge of Mobile Application.
	3:	Awareness of internet.

Practical

Nos	Practical/ Experiment/Tutorial Topic	Hrs	Bloom's Taxonomy
01	Checklist for reporting cyber crime at Cyber crime Police Station.	02	Knowledge
02	Checklist for reporting cyber crime online.	02	Knowledge
03	Reporting phishing emails. (Spoofing, Phishing)	02	Knowledge
04	Checklist for secure net banking.	02	Knowledge
05	Basic checklist, privacy and security settings for popular Social media platforms.	02	Knowledge
06	Configuring security settings in Mobile Wallets and UPIs	02	Knowledge
07	VAPT Audit format.	02	Knowledge
08	Setting and configuring two factor authentications in the Mobile phone.	02	Knowledge

References:

Recommended Books
1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
6. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
7. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

23FY106T Communication Skills (Sem - I) – PRACTICAL

Tutorial/Practical : 02 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

Course Objectives: The objective of the course is to		
<ul style="list-style-type: none"> •To acquaint students with basic English Grammar and help students in improving language skills •To assist students in developing Vocabulary and phonetic drill •To aid them in understanding corporate meetings •To 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	Bloom's Taxonomy
CO1	To formulate grammatical sentences correctly and apply communicative techniques effectively	Understand
CO2	Understand and use vocabulary effectively	Understand & Apply
CO3	Display standard writing skills while composing business letters and report preparation	Create

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

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs	Bloom's Taxonomy
01	Star of Life: Introducing Yourself	02	Apply
02	Vocabulary Building Exercises	02	Remember
03	Vocabulary Building Exercises	02	Remember
04	Grammar Activities – Irregular verb list	02	Understand
05	Conducting & Attending Meeting	02	Apply
06	Conducting & Attending Meeting	04	Apply
07	Practice on writing General Applications	02	Apply
08	Practice on Business Correspondence	02	Apply

References:

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

23FY107T Engineering Drawing

Tutorial/Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

OE : 25 Marks

Course Objectives: The objective of the course is to

1. Communicate information by graphical means.
2. Understand and read drawing and present the same.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Draw the neat drawings of engineering curves.	Remember
CO2	Understand the Projection of Point, straight lines, Plane.	Remember
CO3	Construct neat Sketch of orthographic Projection, isometric drawings.	Apply
CO4	Prepare the objects by developing surfaces of solids with cutting planes.	Apply

Description:

Engineering Drawing Course consists of drawings on each unit. Students solve the more problems and draw drawings so they can Visualize and construct objects.

Prerequisites:	
1:	Knowledge of Geometry at SSC Level
2:	Knowledge of free hand sketch

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Fundamentals of Engineering Drawing	2	Understand
2	Construction of Engineering Curves	4	Apply
3	Draw the Projection of planes (1st Angle Projection only)	4	Apply
4	Draw the orthographic views, (One simple orthographic & one Sectional Orthographic). Four problems on drawing sheet.	4	Apply
5	Draw the isometric view of solid Four problems of isometric view on drawing sheet	4	Create
6	Draw the development of the surfaces of the solids in given conditions of the planes Four problems on drawing sheet.	4	Apply

References:

Text Books	
1	Engineering Drawing by N. D. Bhatt, Charotar Publication House, Bombay
2	Machine Drawing by N. D. Bhatt, Charotar Publication House, Bombay.
3	Engineering Drawing and Graphics Using AutoCAD by T. Jeyapoovan, Vikas Publication.
4	A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
Reference Books	
1	Engineering Graphics with AutoCAD - D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, (PHI) Publisher 2010.
2	Machine Drawing by K. L. Narayana, New Age Publication
3	Engineering Drawing by N. B. Shaha and B. C. Rana, Pearson Education.
4	Engineering Drawing by Prof. Amar Pathak, WILEY India Publication.

23FY108T Manufacturing Techniques Lab

Tutorial/Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 50 Marks

POE : NA

Course Objectives: The objective of the course is to		
1) Develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude 2) Acquire skills in basic engineering practice 3) Develop general machining skills in the students and develop small products		
Course Outcomes:		
Cos	At the end of successful completion of the course the student will be able to	Bloom's Taxonomy
CO1	Use the techniques, skills, and modern engineering tools necessary in smithy, welding and sheet metal working and apply them practically.	Understand
CO2	Learn the techniques, skills, and modern engineering tools necessary for fitting and carpentry operations and Possess knowledge of measurement and measuring instrument.	Apply
CO3	Demonstrate proficiency in using various tools to complete small products, enhancing precision fitting & assembly skills for fabricating components.	Apply

Description:		
<p>Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops.</p>		
Prerequisites:	1:	General safety Measures should be taken
	2:	Safety rules regarding each machine or equipment should be followed
	3:	Use of Personal protective equipment.

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Safety precautions while working in workshop. Introduction to tools	02	Understand
2	Introduction to smithy operations like, bending, forming upsetting, drawing Smithy tools hammer, hot & cold chisel flatters, tongs, anvil etc, Preparation of job as per the drawing	02	Understand and Apply
3	Preparation of smithy job as per drawing	02	Apply
4	Types of welding likes Gas Welding, arc welding, Welding equipment's, welding of various metals electrode classification and coding, welding joints, and preparation of welding component.	02	Understand and Apply
5	Preparation of welding job as per drawing	02	Understand and Apply
6	Specifications of metal sheets working tools, sheet metal and operations, and prepare the job as per drawing.	02	Understand and Apply
7	Preparation of sheet metal component as per drawing.	02	Understand and Apply
8	Preparation of sheet metal component as per drawing.	02	Understand and Apply
9	Study of various tools ,files, Drills, Taps, Die & Fitting operations to complete small product in fitting shop	02	Understand and Apply
10	Operations to develop small product.	02	Understand and Apply
11	Introduction, Classifications of wood. carpentry joints. carpentry tools to develop carpentry product.	02	Understand and Apply

References:

TextBooks	
1	Elements of Workshop Technology, Vol – I by Hajara Chaudhari, Media Promoters.
ReferenceBooks	
1	Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
2	Workshop Technology, Vol – I by Chapman, The English Language Book Society
3	Workshop Technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi

Web Links/ Video Lectures are to be provided to Theory and Practical /Experiments

Practical 1. <http://nptel.ac.in/courses/>

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.

Chemistry Group (Sem-I)

**COURSE WISE DETAILED
CURRICULUM**

23FY110 Engineering Chemistry

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

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 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 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	08 Hrs
	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	
Unit 2	Chemistry of living cell	05 Hrs
	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, Asparagine, 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,	
Unit 3	Engineering materials	07 Hrs
	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)	
Section – II		
Unit 4	Fuels	07Hrs
	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.	
Unit 5	Corrosion and it’s Prevention	07Hrs
	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 , 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, 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
3	Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi
4	A text Book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & 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

Credit : 3

Evaluation Scheme

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 $\sin n\theta$ 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 .	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	<p style="text-align: center;">Basics of C programming</p> <p>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.</p>	04 Hrs
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	Operators and Expressions in C	
Unit 2	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
	Decision Making and Branching Statements	
Unit 3	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		
	Decision Making and Looping	
Unit 4	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
	Arrays	
Unit 5	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
	User Defined Function	
Unit 6	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..	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

Credit : 2

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 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 mechanical engineering.	Apply
CO5	Determine the second moment of area of the different cross sections.	Apply
CO6	Understand impact properties of material.	Understand

Description:		
<p>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.</p>		
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,	

	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_rLjv-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		
<ul style="list-style-type: none"> • 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 protecting traditional knowledge.	Understand

Description:		
<p>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</p>		
Unit 1	<p>Introduction to Traditional Knowledge</p> <ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • 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)	<i>Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012. .</i>
	References:
1)	<i>Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002</i>

2)	<i>"Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino</i>
	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

Credit : 01

Evaluation Scheme

IA : 10 Marks

ISE : 40 Marks

ESE : NA

Course Objectives: The objective of the course is to		
<ul style="list-style-type: none"> • 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 be able 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:		
<p>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.</p>		
Prerequisites:	1:	Basic knowledge about English Vocabulary
	2:	Communication in simple English
Unit 1	Recruitment and Career Skills	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • Understanding Self: Self Esteem • Personality Types and Traits • Time Management & Stress Management • Positive Attitude Building • Emotional Intelligence 	05 Hrs
Unit 3	Technical Writing Skills	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • Techniques of Public Speaking • Speeches for Various Occasions: • Welcome Speech, Introduction of a Guest, Vote of Thanks 	02 Hrs

References:

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

9)	<i>Dr. Abha Singh, "Behavioural Science" Wiley India Pvt.Ltd</i>
10)	<i>Soft Skills by K. Alex, S. Chand and Company, 2013</i>
	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		
<ul style="list-style-type: none">• 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/Tutorial Topic	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 Jordan 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

Evaluation Scheme

Credit : 1

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		
<ol style="list-style-type: none"> 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.
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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		
<ol style="list-style-type: none"> 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)	<i>Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)</i>
2)	<i>Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition</i>
3)	<i>Lesikar, R. V. and Pettit, J. ,D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10th Edition, 2006</i>
4)	<i>Managing Soft Skills for Personality Development by B.N. Ghosh, Tata McGraw Hill, 2012.</i>
5)	<i>Bikram K. Das, KalyaniSamantray, "An Introduction to Professional English and Soft Skills" Cambridge University Press New Delhi.</i>
6)	<i>Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)</i>
7)	<i>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</i>

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

Physics Group (Sem-II)

**COURSE WISE DETAILED
CURRICULUM**

23FY101 Engineering Physics

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1) Provide the useful fundamental concepts of Physics to all Engineering disciplines. 2) Make the student aware of new techniques in Physics applicable to engineering practices. 3) Encourage them to understand engineering and technical development.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Summarize the knowledge of basic quantum mechanics to understand Wave particle dualism and uncertainty principle.	Understand
CO2	Demonstrate the different crystal structure and their properties by Understanding crystal physics.	Understand
CO3	Apply the theory and phenomenon of nanophysics to produce nanomaterials.	Apply
CO4	Define the basic requirements of Architectural Acoustics.	Remember
CO5	Illustrate the diffraction and polarization phenomenon of light.	Understand
CO6	Explain the concepts and applications of LASER and necessary tools for Nuclear power plant.	Understand

Description:		
Engineering Physics course is offered as the basic science course. This course contains crystal structures and their properties, Approaches and techniques of nanomaterial and nanotechnology, Basic concepts of Architectural acoustics, Different phenomenon's of light, wave –particle dualism and uncertainty principle and nuclear energy. These are useful fundamental concepts of Physics to all Engineering disciplines and to make the student aware of new techniques in Physics applicable to engineering practices.		
Prerequisites:	1:	Fundamentals of properties of wave and particle and types of the solid.
	2:	Different phenomenon of light and sound.

3: Basics of Atomic Physics and Nuclear energy

Section – I

Unit 1 **Wave Mechanics**

Introduction, Wave-particle dualism (De-Broglie's Hypothesis -light and matter), De-Broglie's wavelength in terms of Kinetic Energy, Potential Difference and Temperature, Properties of matter waves, Heisenberg's uncertainty principle for position and momentum, Compton Effect (statement, explanation and formula), Photoelectric Effect, Numerical.

06 Hrs

Unit 2 **Crystallography**

Introduction, Basics of crystal structure -Space Lattice, Basis, crystalline solid and Unit cell (geometry and types), Seven crystal system, Properties of unit cell for SC, BCC and FCC (number of atoms per unit cell, coordination number, atomic radius and packing density), Relation between density and lattice constant, Miller indices (procedure and sketches for planes), Bragg's x-ray spectrometer, Numerical.

07 Hrs

Unit 3 **Nanoscience and Nanotechnology**

Introduction, Nanomaterials, Nanoscience and Nanotechnology, Top down and bottom up approaches, Production techniques - Ball milling and Colloidal, Types of nanomaterial, Properties of material at nanoscale (Surface to Volume ratio and Quantum confinement effect), Applications of nanomaterials, Characterizations - Scanning Tunneling Microscope and Atomic Force Microscope.

06 Hrs

Section – II

Unit 4 **Architectural Acoustics**

Introduction, Reverberation, Reverberation time, Absorption coefficient, Average absorption coefficient, Sabine's formula for reverberation time (no derivation), Factors affecting architectural acoustics and their remedy, Numerical.

06 Hrs

Unit 5 **Wave Optics**

Introduction, Theories of light, Interference of light and types, Diffraction of light and types, Construction of diffraction grating, Theory of fraunhofer diffraction by double slit, Resolving power of plane transmission grating, Polarization of light, double refraction, Huygens' theory of double refraction, Specific Rotation, Quarter wave plate and half wave plate, Laurent's half shade polarimeter, Numerical.

07 Hrs

Unit 6	LASER and Nuclear Physics	
	<p>LASER: Introduction, Absorption, spontaneous emission and stimulated emission of radiations, Population inversion, Pumping energy, Characteristics of laser beams, Ruby laser.</p> <p>Nuclear Physics: Introduction, Nuclear Fission, Energy released by 1 Kg of U235, Nuclear fission reactor, Nuclear fusion, Thermonuclear reactions (proton-proton chain and Carbon Nitrogen cycle), Numerical.</p>	07 Hrs

References:

Text Books	
1	M. N. Avadhanulu and P. G. Kshirsagar, "A Text book of Engineering Physics", S.Chand and Company, New Delhi.
2	R. K. Gaur and S. L. Gupta "Engineering Physics", Dhanpat Rai Publications, New Delhi.
Reference Books	
1	R. K. Gaur & Gupta S. L, Engineering Physics –Dhanapat Rai Publication
2	B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi
3	Subramanyam & BrijLal, A Text Book of Optics –S. Chand & Company (P.) Ltd.
4	M. N. Avadhanulu & P. G. Kshirsagar - A Text Book of Engineering Physics -S. Chand Publication.
5	B. K. Pandey and S. Chaturvedi- Engineering Physics, Cengage Learning

Web Links/ Video Lectures

Sr. No	Unit No./Topic	Web Links/ Video Lectures
1	Unit No. 1	https://nptel.ac.in/courses/115/101/115101010/
2	Unit No. 2	https://nptel.ac.in/courses/115/104/115104109/
3	Unit No. 2	https://nptel.ac.in/courses/115/105/115105099/
4	Unit No. 3	https://nptel.ac.in/courses/115/101/115101007/
5	Unit No. 5	https://nptel.ac.in/courses/115/105/115105083/
6	Unit No. 6	https://nptel.ac.in/courses/115/102/115102124/
7	Unit No. 6	https://nptel.ac.in/courses/115/104/115104043/
8	Physics	http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
9	Physics	https://en.wikipedia.org/wiki/Fundamentals_of_Physics

23FY201 Engineering Mathematics-II

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1) Model a real life scenario into differential equations and solve them analytically and numerically		
2) Learn different methods of solving improper and multiple integral		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Solve ordinary differential equations of order one and degree one	Understand
CO2	Apply numerical methods to solve ordinary differential equations of first order and first degree.	Apply
CO3	Evaluate double and triple integrals.	Understand
CO4	Use double integration to find area, mass of plane lamina.	Apply
CO5	Evaluate definite integrals using Gamma and Beta functions	Apply
CO6	Estimate definite integrals using numerical methods	Apply

Description:		
Engineering Mathematics-II 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) Differential equation of first order first degree and Applications, ii) Numerical Solution of Differential Equation of order one degree One, iii) Integral Calculus, iv) Numerical Integration, v) Multiple Integrations and vi) Application of Multiple Integrals		
Prerequisites:	1:	Trigonometric identities and Logarithmic identities
	2:	Differentiation and integration formulae
	3:	Shapes of basic curves like circle, parabola, ellipse, straight line.
Section – I		
Unit 1	Differential equation of first order first degree and Applications	
	Exact Differential Equation, Reducible to Exact Differential Equation, Linear Differential Equation, Reducible to Linear,	8 Hrs

	Application to orthogonal trajectory (Cartesian and Polar)	
Unit 2	Numerical Solution of Differential Equation of order one degree One	
	Eulers Method Eulers modified Method Runge-Kutta Method of order four Taylor Series Method	7 Hrs
Unit 3	Multiple Integrations	
	Evaluation of double integral (Cartesian and Polar) Change of order of integration (Cartesian and polar) Evaluation of triple integration Change of Cartesian to spherical coordinates	8 Hrs
Section – II		
Unit 4	Application of Multiple Integrals	
	Area using double integration Mass of plane lamina using double integration Moment of inertia of plane lamina Volume using triple integration	6 Hrs
Unit 5	Integral Calculus	
	Gamma Function and properties Beta function and properties Differentiation Under Integral Sign (with constant limits only)	7 Hrs
Unit 6	Numerical Integration	
	Trapezoidal Rule Simpson's (1/3) rule Simpson's (3/8) rule Weddle's rule	6 Hrs

Note-Minimum 06 Assignments should be given covering all units

TextBooks	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, S. Chand and Company, 40th Edition.
ReferenceBooks	
1	Advanced Engineering Mathematics”, H. K. Das, S. Chand Publication, 8th Edition.
2	A Text Book of Applied Mathematics”, Vol. I and II, P. N. Wartikar and J. N. Wartikar, Vidyarathi GrihaPrakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics, Erwin Kreyszig, Wiley India Pvt. Ltd

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/111/106/111106100/
2	2	https://nptel.ac.in/courses/111/107/111107063/
3	3,4,5	https://nptel.ac.in/courses/111/105/111105122/
4	6	<u>https://youtu.be/ cgzqVmvqtQ</u>

23FY103 Basic Electrical and Electronics Engineering

Lectures : 2 Hrs/Week

Credit : 2

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
Provide the Knowledge with an introductory and broad treatment in the field of Electrical and Electronics Engineering.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Apply the KCL and KVL to determine the current and voltage of DC circuits .	Apply
CO2	Describe the basic concepts of Magnetic circuits.	Understand
CO3	Describe the concepts of Basic Electronics components.	Understand
CO4	Illustrate the Nature of single phase AC series and parallel RLC circuits by calculating impedance power factor and power consumption.	Apply
CO5	Explain the concept of 3 phase supply Generation , transmission , Utilization and its advantages.	Understand
CO6	Solve the problems related to power losses to determine the efficiency of single phase transformer.	Apply

Description:		
Basic Electrical & Electronics Engineering course is offered as the engineering science course. This course contains. Basic knowledge of Electrical & Electronics engineering and its advantages, applications. This course has six units namely i) Analysis of D.C. Circuits, ii) Magnetic circuits, iii) Fundamentals of electronics iv) Single phase AC circuits, v) Three phase AC circuits, vi). Single phase Transformer		
Prerequisites:	1:	Battery, Potential difference and current flow concept.
	2:	Few basic electrical and Electronics components identification
	3:	Difference between AC & DC circuits
Section – I		
Unit 1	Analysis of D.C. Circuits	
	Concept of EMF, Potential difference, current, Power, Energy, Resistance, Ohms law,	

	Kirchhoff's laws, Mesh & Node analysis. (Numerical treatment on Mesh & Node analysis of two loops)	05 Hrs
Unit 2	Magnetic circuits	
	Concept of MMF, reluctance, magnetic flux, Magnetic flux density, magnetic field strength, Comparison of Electric & magnetic circuit, , Analysis of Series magnetic circuits.	04 Hrs
Unit 3	Fundamentals of Electronics	
	Introduction of Diode and V-I characteristics, Rectifier configuration, Analysis of Half wave Rectifier ,Full wave Rectifier and Bridge Rectifier, Introduction of Transistor.	05 Hrs
Section – II		
Unit 4	Single phase A.C Circuits	
	Faradays laws, Lenz's Law, generation of sinusoidal voltage, Analysis of pure Resistive, Inductive, Capacitive circuits, Analysis of series R-L,R-C, R-L-C circuits. (Numerical treatment on series R-L, R-C, R-L-C circuits)	05 Hrs
Unit 5	Three phase A.C. Circuits	
	Advantages of three phase system, Generation of three phase AC supply, phase sequence, Balanced system, Relation between line & phase quantities in Balanced star and Delta connected circuits.	04 Hrs
Unit 6	Single phase Transformer	
	Construction, operating principle, types, EMF Equation, Turns Ratios, Ideal Transformer, Power losses. (Numerical treatment on EMF Equation)	05 Hrs

References:

Text Books	
1)	P.V.Prasad and S.Shivan Raju – Electrical Engineering Concepts and applications – cenagage learning.
2)	B.H.Deshmukh, Electrical Engineering Concepts and applications
3)	Robert L.Boysted and Louis Nashelsky ,Electronics devices and circuit theory – Pearson education
Reference Books	
1)	B.L.Theraja – Electrical Technology Vol.1.- S.Chand publications.
2)	Nagarath I.J. and D.P.Kothari – Basic Electrical Engineering (2001) – Tata McGraw Hill.
3)	Bharati Dwivedi and Anurasg Tripathi – Fundamentals of Electrical engineering – Willey Precise.

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/108/106/108106172/
2	2	https://nptel.ac.in/courses/108/106/108106172/
3	3	https://nptel.ac.in/courses/108/108/108108122/
4	4	https://nptel.ac.in/courses/108/105/108105053/
5	5	https://nptel.ac.in/courses/108/105/108105053/
6	6	https://nptel.ac.in/courses/108/105/108105017/

23FY104 Basic Civil Engineering

Lectures : 2 Hrs/Week

Credit : 2

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to

1. Learn the brief introduction of all aspects under civil engineering
2. Understand basic concepts of Surveying, Transportation Engineering

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Illustrate linear and angular measurements by considering principles and significance of Surveying	Knowledge
CO2	Identify nature of ground by using methods of leveling	Apply
CO3	List components of pavements, railway track and water supply scheme	Understand
CO4	Demonstrate basic knowledge of Civil Engineering and explain principles of building planning and Bye laws.	Understand, Evaluate
CO5	Explain various components and it's uses of building.	Evaluate
CO6	Study various building materials and it's uses.	Apply

Description:

This course include principles of building planning, building components and their functions, building materials, surveying and its principles, leveling transportation engineering, irrigation

Prerequisites:

- | | |
|----|-------------------------|
| 1: | Properties of materials |
| 2: | Measurements |
| 3: | Principles |

Section – I

Unit 1	Linear and Angular Measurements	
	Principles of surveying, Linear measurements- Chain Surveying, Instruments used- Metric chain, errors in chaining, Ranging(Direct only)- Instruments Used, nominal scale and R.F., chaining, offsetting &	05Hrs

	numerical, Angular Measurements- Compass survey, Meridian, bearing and its types, system of bearing, Types of compass: prismatic and surveyor compass, Calculation of included angles, correction for local attraction, Numerical.	
Unit 2	Leveling	
	Terms used in leveling, use of Dumpy level and Auto Level, Temporary adjustments. Methods of reduction of levels, types of leveling, Numerical.	04 Hrs
Unit 3	Introduction to Transportation, Environmental Engineering	
	Components of rigid and flexible pavement, components of railway track (Broad Gauge), Water Treatment Plant- Components with Flow Diagram	04 Hrs
Section – II		
Unit 4	Introduction to Civil Engineering and Building Planning	
	Introduction, branches of civil engineering , Relevance of civil engineering in the overall development of the country, Principles of planning, Introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, Ventilation, sanitation as per municipal corporation area requirement.	05Hrs
Unit 5	Components of Building	
	A) Sub-structure: Elements of sub-structures and their Functions of elements B) Super-structure: Elements of super-structures and their Functions of elements	05Hrs
Unit 6	Building Materials and Design	
	Building Materials- cement blocks- properties and specification, Cement-Types, grades, properties and uses in brief, Concrete-Plain and reinforced cement concrete and ready mix concrete and their grades, Use and properties of bricks, steel, timber, Use and properties of roofing materials etc.	03Hrs

References:

Text Books	
1	Basic Civil Engineering by G. K. Hiraskar, DhanpatRai Publication
2	Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications
3	Building Construction by S P Arora & S P Bindra, DhanpatRai Publications
Reference Books	
1	Surveying by N. Basak, Tata Mc-Graw Hill Publication
2	Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication
3	Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
4	Irrigation Engineering by B. C. Punmia, DhanpatRai Publications

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/105/103/105103093/
2	2	https://nptel.ac.in/courses/105/102/105102088/
3	3	https://nptel.ac.in/courses/105/102/105102088/
4	4	https://nptel.ac.in/courses/105/107/105107122/
5	5	https://nptel.ac.in/courses/105/107/105107122/
6	6	https://nptel.ac.in/courses/105/101/105101087/

23FY105 Cyber Security

Lectures : 02 Hrs/Week

Evaluation Scheme

Credit : 02

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1. To study different types of cyber crime and network security.		
2. To study different authentication methods, protocols and Email security.		
3. To study digital forensics, types and digital evidence acquisition.		
4. To study VAPT Audit and its purpose.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Describe cyber security , cyber crime & its types.	Understand
CO2	Explain data loss prevention , smart phone security & software security	Apply
CO3	Apply methods for authentication .	Apply
CO4	Describe email phishing, email spoofing & infection types.	Remember
CO5	Identify different techniques & tools for acquiring digital evidence.	Remember
CO6	Explain the role of VAPT in ensuring the security of information system.	Understand

Description:		
This course is geared towards generating and enhancing awareness about cyber security challenges and the concepts of cyber security.		
Prerequisites:	1:	Fundamental knowledge of Computer.
	2:	Fundamental knowledge of Mobile Application.
	3:	Awareness of internet.
Unit 1	Introduction To Cyber Security: <ul style="list-style-type: none"> • Definition of Cyber Security, Types of Cyber Security, Definition of Cyber Crime, Types of Cyber Crime, • Cyber crime's Impact on individuals, Organizations and Society • Cyber Investigation Vs Cyber Security Audit 	04 Hrs

Unit 2	Network and Internet Security <ul style="list-style-type: none"> • Mobile/Smartphone Security • Definition and concepts of Data Loss Prevention (DLP) Web/Internet Security • Software Security 	04 Hrs
Unit 3	Internet Banking And Mobile Banking <ul style="list-style-type: none"> • Authentication Methods (Passwords, PIN's, OTP's and Biometrics) • Secure Communication Protocol- SSL/TLS • Man in the Middle Attack (MITM) Mobile Device Management (MDM) • For telephonic complaint - dial 1930 • Physical Complaint - First Information Report (FIR) to Police Station • Online Complaint on www.cybercrime.gov.in/webform/helpline.aspx • In Case of Mobile stolen/lost, file complaint on www.ceir.gov.in 	05 Hrs
Unit 4	Email Security <ul style="list-style-type: none"> • Introduction to Email Security, • Definition and concepts of Email Phishing • Definition and types of Email Spoofing (Domain Spoofing and Name Spoofing) • Infection Types - Malware Email, Spam Email, Virus infected Email, • Email Attack with embedded links, • Case Studies-Trojan Horse Attack 	05 Hrs
Unit 5	Digital Forensics <ul style="list-style-type: none"> • Introduction Digital Forensics <ul style="list-style-type: none"> ➤ Overview of Digital Forensics and its role in Investigation • Types of Digital Forensics • Digital Evidence Acquisition (Case Studies) <ul style="list-style-type: none"> ➤ Techniques and tools for acquiring digital evidence ➤ Forensic imaging and data preservation methods ➤ Validation and verification of acquired evidence 	05 Hrs
Unit 6	Vulnerability Assessment and Penetration Testing (VAPT) Audit <ul style="list-style-type: none"> • Introduction to VAPT Audit <ul style="list-style-type: none"> ➤ Overview of VAPT Audit and its Purpose ➤ Role of VAPT in ensuring the security of information system • Purpose of VAPT Audit 	05 Hrs

References:

Recommended Books

1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by SumitBelapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver,Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
6. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt.Ltd.
7. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

23FY106 Communication Skills (Sem - I)

Lectures : 01 Hrs/Week

Evaluation Scheme

Credit : 1

IA : 10 Marks

ISE : 40 Marks

Course Objectives: The objective of the course is to		
<ul style="list-style-type: none"> •To acquaint students with basic English Grammar and help students in improving language skills •To familiarize students with concept, various types, barriers and filters of communication •To assist students in developing Vocabulary •To aid them in understanding corporate meetings •To 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	Bloom's Taxonomy
CO1	Understand basic concepts of grammar	Understand
CO2	Understand communicative techniques to participate in several activities	Understand
CO3	Recall appropriate vocabulary	Apply
CO4	Demonstrate interpersonal skills with precision and competence in different scenario.	Apply
CO5	Write business letters by using appropriate language tools	Apply

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

Unit 1	Rapid Review of English Grammar	
	<ul style="list-style-type: none"> • Parts of Speech • Types of Sentences, Tenses / Verbal forms 	02 Hrs
Unit 2	Introduction to Communication	
	<ul style="list-style-type: none"> • Nature, Importance and Process of Communication • Basic Types: Verbal- Non- verbal Communication • Barriers & Filters to Communication 	02 Hrs
Unit 3	Organizational Communication	
	<ul style="list-style-type: none"> • Nature of Communication.-Formal & Informal • Directions of Communication: Upward, Downward, Horizontal, Internal, External • Levels of Communication 	02 Hrs
Unit 4	Vocabulary Building	
	<ul style="list-style-type: none"> • Synonyms & Antonyms, Prefixes and Suffixes • Words often Confused: Homonym & Homophone • Idioms and Phrases 	02 Hrs
Unit 5	Corporate Meetings	
	<ul style="list-style-type: none"> • Significance and Types of Meeting • Strategies of Conducting and Attending Meeting Effectively • Record Keeping: Notice, Agenda and Minutes 	02 Hrs
Unit 6	Business Correspondence	
	<ul style="list-style-type: none"> • 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 	04 Hrs

References:

Recommended Books	
01	<i>Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition.</i>
02	<i>Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)</i>
03	<i>Basic Communication Skills for Technology by Rutherford, Andrea J. (2002).. Delhi: Pearson Education Asia</i>
04	<i>Mastering Communication by Nicky Stanton, Palgrave Master Series</i>
05	<i>Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)</i>
06	<i>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</i>
07	<i>Written Communication in English by Saran Freeman (Orient Longman)</i>
08	<i>Seely, J. The Oxford Guide to Writing and Speaking, Oxford University Press, India 3rd Edition , 2013</i>

09	<i>High School English Grammar and Composition by Wren and Martin, Blackie, 2000</i>
10	<i>Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)</i>
11	<i>Sethi, J. and Dhamija P.V. A Course in Phonetics and Spoken English Prentice-Hall of India 2nd Edition, 2006</i>
12	<i>English Language Laboratories, by Nira Konar, PHI Learning, 2014</i>
13	<i>Perspective of Communication and Communicative Competence, M.V. Rodriques, Concept Publishing Company, New Delhi-10059</i>
	www.buisnesscommunicationskills.com
	www.kcitraing.com
	www.mindtools.com

23FY101T Engineering Physics

Practical : 2 hr/week
 Credit : 1

Evaluation Scheme
ISA : 25 Marks
POE : NA

Course Objectives: The objective of the course is		
<ul style="list-style-type: none"> • To furnish the conceptual understanding of the basic principles. • To make the students gain practical knowledge to relate with the Physics theory. • To encourage them to understand technical development. • To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop the skills needed to set up the equipment. 		
Course Outcomes:		
COs	At the end of the successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Explain the need for precise measurement practices for data recording.	Understand
CO2	Interpret the principle, concept, working and applications of wave optics, band gap energy as well as Crystal relevant experiments.	Apply
CO3	Apply the techniques and skills associated with modern scientific tools regarding LASER and Nuclear plants.	Apply
CO4	Develop scientific communication skills while performing the experiments and interpreting the results to communicate effectively the scientific activities	Apply

Description:		
<p>This course aims to make the students gain practical knowledge to relate with the theoretical studies and to use the principle in the right way to implement modern technology. The experiments are selected from various areas of Physics like Measurements, Wave Optics, Lasers, Solid state physics and Basic Electronics. The Engineering Physics Laboratory manual is written in a simple scientific language with aim, apparatus, theory, diagrams, formula, graphs and questions. These experiments will help the students to expertise in the analysis of various concepts in Optics, measurements, crystallography and electronics-related topics.</p>		
Prerequisites:	1:	Higher secondary level Physics
	2:	Fundamentals of wave optics, Band theory and crystal.

Practical/Experiment Topic
(Minimum 8 experiments should be completed)

Number	Practical/Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Measurements in Physics	02	Remember
2	Resistor and Capacitor Code	02	Remember
3	Measurement of Band Gap Energy	02	Understand
4	Study of seven Crystal Structure, Bravais Lattice and Properties of unit cell	02	Apply
5	Study of Symmetry Elements of Cubic Crystal	02	Apply
6	Determination of Interplaner distance using XRD pattern	02	Apply
7	Miller Indices	02	Apply
8	Divergence of LASER Beam	02	Apply
9	Resolving power of Telescope	02	Apply
10	Specific rotation by Polarimeter	02	Apply
11	Wavelength of different spectral lines of mercury using grating.	02	Analyze
12	Determination of wavelength of LASER using diffraction grating.	02	Analyze
13	The grating constant of the diffraction grating	02	Apply
14	Determination of e/m of an electron	02	Apply
15	Resolving power of diffraction grating	02	Apply

References:

TextBooks	
1	Engineering Physics Lab Manual, TKIET Warananagar
2	Madhusudhan Rao, Engineering Physics Lab Manual, Scitech Publication
3	O.P. Singh, Vipin Kumar, R.P. Singh, Engineering Physics Practical Manual, Ram Prasad Publication
ReferenceBooks	
1	Resnick Halliday, Physics Volume-I, Krane -John Wiley & Sons Pub.
2	Resnick Halliday, Physics Volume-II, Krane -John Wiley & Sons Pub.

Virtual Lab Link:

1. **Experiment name-** Diffraction Grating (Lab Name-[Optics virtual lab](#))
<http://vlab.amrita.edu/?sub=1&brch=281&sim=334&cnt=1>
2. **Experiment name-** Crystal Structure (Lab Name-[solid state physics virtual lab](#))
<http://vlab.amrita.edu/?sub=1&brch=282&sim=370&cnt=1>
3. **Experiment name-**[Laser beam divergence and spot size](#) (Lab Name-[laser optics virtual lab](#))
<http://vlab.amrita.edu/?sub=1&brch=189&sim=342&cnt=1>
4. **Experiment name-** Numerical Aperture of Optical Fiber (Lab Name-[laser optics virtual lab](#))
<http://vlab.amrita.edu/?sub=1&brch=189&sim=343&cnt=1>
5. **Experiment name-** B-H Curve (Lab Name-[solid state physics virtual lab](#))
<http://vlab.amrita.edu/?sub=1&brch=282&sim=1507&cnt=1>
6. **Experiment name-** Photoelectric effect (Lab Name-[modern physics virtual lab](#))
<http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1>
7. **Experiment name-** Energy Band Gap of Semiconductor (Lab Name-Basics of Physics lab)
<https://bop-iitk.vlabs.ac.in/exp/energy-band-gap/>

23FY201T-ENGINEERING MATHEMATICS – II TUTORIAL

Tutorial/Practical : 1 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to		
. Model a real life scenario into differential equations and solve them analytically and numerically		
. Learn different methods of solving improper and multiple integral.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Solve linear and nonlinear ordinary differential equations of order one and find orthogonal trajectory.	Knowledge, Application
CO2	Find numerical solutions of ordinary differential equations of first order and first degree.	Knowledge
CO3	Compute double and triple integrals.	Knowledge
CO4	Find area , mass of plane lamina using double integral.	Application
CO5	Evaluate definite integrals using Gamma and Beta functions.	Evaluation
CO6	Solve definite integral numerically.	Knowledge

Description:		
Engineering Mathematics-II 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) Differential equation of first order first degree and Applications, ii) Numerical Solution of Differential Equation of order one degree One, iii) Integral Calculus, iv) Numerical Integration, v) Multiple Integrations and vi) Application of Multiple Integrals		
Prerequisites:	1:	Trigonometric identities and Logarithmic identities
	2:	Differentiation and integration formulae
	3:	Shapes of basic curves like circle, parabola, ellipse, straight line.

Tutorials

Number	Practical/Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Exact and reducible exact differential equation	2	Knowledge
2	Linear, reducible to linear diff equation and Applications	2	Knowledge, Application
3	Evaluation of double and triple integration	2	Knowledge
4	Change of order of integration	2	Knowledge
5	Area by double integral, Mass of Lamina	2	Knowledge, Application
6	Gamma function and Differentiation under integral sign	2	Knowledge
7	Beta functions and properties	2	Knowledge
8	Euler and Eulers modified method	2	Knowledge
9	Taylor series and Runge Kutta of order four	2	Knowledge
10	Trapezoidal and Simpson (1/3) rule Simpsons (3/8)th and Weddles rule	2	Knowledge

References:

TextBooks	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, S. Chand and Company, 40th Edition.
ReferenceBooks	
1	Advanced Engineering Mathematics", H. K. Das, S. Chand Publication, 8th Edition.
2	A Text Book of Applied Mathematics", Vol. I and II, P. N. Wartikar and J. N. Wartikar, Vidyarthi GrihaPrakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics, Erwin Kreyszig, Wiley India Pvt. Ltd

23FY103T Basic Electrical & Electronics Engineering Lab (Sem- I & II)

Tutorial/Practical : 2 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

Course Objectives: The objective of the course is to		
Provide the students with an introductory and broad treatment of the field of Electrical and Electronics engineering.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Make electrical connection for different circuits	Understand
CO2	Apply the different laws	Apply
CO3	Analyze V-I characteristics of Bridge circuits	Analyze
CO4	Determine the efficiency of transformer	Evaluate

Description:		
Basic Electrical Engineering course is offered as the engineering science course. This course contains basic knowledge of electrical engineering and its advantages, applications. This course has six units namely i) Analysis of D.C.Circuits, ii) Magnetic circuits, iii) Single phase AC circuits, iv) Three phase AC circuits, v) Single phase Transformer and vi). Fundamentals of electronics		
Prerequisites:	1:	Battery , Potential difference and current flow concept.
	2:	Few basic electrical components identification
	3:	Difference between AC & DC circuits
	4:	Few basic electronics components identification

Experiment

Number	Practical/ Experiment/Tutorial Topic	Hrs	Bloom's Taxonomy
1	Laboratory sessions covering, general introduction to	2	Understand

	electrical engineering laboratory, experimental setups, Instruments etc. Electrical symbols		
2	Electric shocks & precautions against shocks	2	Understand
3	Study of Ohm's law	2	Apply
4	Verification of Kirchhoff's Voltage law & Kirchhoff's Current law	2	Apply
5	B-H Curve for magnetic material	2	Understand
6	Study of Half wave Rectifier	2	Understand
7	Study of Full wave Rectifier	2	Understand
8	Determination of Reactance's for series R-L-C circuit	2	Apply
9	Demonstration of Power factor Improvement by static capacitor	2	Apply
10	Polarity & Ratio test for Single phase Transformer	2	Apply
11	Load tests on single phase transformer	2	Apply
12	Study of Basic method of Earthing, Use of Fuse & MCB	2	Understand
13	Study of different luminaries including Mercury Vapour lamp, fluorescent tube, CFL & LED lamp	2	Understand

References:

Text Books:	
1)	P.V.Prasad and S.Shivan Raju – Electrical engineering concepts and applications – cenagage learning.
2)	B.H.Deshmukh, Electrical engineering concepts and applications
3)	Robert L.Boysted and Louis Nashelsky ,Electronics devices and circuit theory – Pearson education
Reference Books:	
1)	B.L.Theraja – Electrical Technology Vol.1.- S.Chand
2)	Nagarath I.J. and D.P.Kothari – Basic Electrical Engineering (2001) – Tata McGraw Hill.
3)	Bharati Dwivedi and Anurasg Tripathi – Fundamentals of Electrical engineering – Willey Precise.

23FY104T-BasicCivilEngineering Lab

Tutorial/Practical : 2 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1. To learn the brief introduction of all aspects under civil engineering 2. To understand basic concepts of Surveying, Transportation Engineering 		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Identify and apply different distance measurement tools.	Application
CO2	Determine positions of an object by compass.	Evaluation
CO3	Find the elevations of given points.	Evaluation
CO4	Illustrate principle of planning	Understand

Description:		
This course includes principles of building planning, building components and their functions, building materials, surveying and its principles, leveling transportation engineering, irrigation		
Prerequisites:	1:	Distance measurement
	2:	Directions with respect to North
	3:	Nature of ground

Number	Practical/Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Measurement of Distances	2	Application
2	Traversing by Compass	2	Application
3	Reduction of levels by Collimation Plane Method	2	Application, Analysis
4	Finding out gradient of line by Rise & fall method	2	Application, Analysis
5	Site visit for study of various construction processes and Building planning	2	Application
6	Drawing a line plan of residential building by applying Principles of planning	2	Application
7	Drawing sheet showing various building components	2	Application

References:

Text Books	
1	BasicCivilEngineeringbyG. K. Hiraskar,DhanpatRaiPublication
2	BasicCivilEngineeringbyS. S. Bhavikatti,NewAgeInternationalPublications
3	BuildingConstructionbySP Arora&S PBindra,DhanpatRaiPublications
ReferenceBooks	
1	SurveyingbyN.Basak,TataMc-GrawHillPublication
2	SurveyingVol.I,Vol.II,Vol.IIIbyB.C.Punmia,LaxmiPublication
3	CivilEngineeringMaterials-TechnicalTeacher'sTrainingInstitute,Chandigarh
4	IrrigationEngineeringbyB. C. Punmia,DhanpatRaiPublications

23FY105 Cyber Security – PRACTICAL

Tutorial/Practical : 02 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

POE/OE : 25 Marks

Course Objectives: The objective of the course is to		
Study how to report cyber crime, phishing emails, secure net banking, VAPT Audit format.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Understand different cyber crime.	Understand
CO2	Understand phishing E mails.	Understand
CO3	Understand VAPT Audit.	Understand
CO4	Apply authentication methods.	Apply

Description:		
Course deals with understanding of different types of Cyber Security, Cyber Crime.		
Prerequisites:	1:	Fundamental knowledge of Computer.
	2:	Fundamental knowledge of Mobile Application.
	3:	Awareness of internet.

Practical

Nos	Practical/ Experiment/Tutorial Topic	Hrs	Bloom's Taxonomy
01	Checklist for reporting cyber crime at Cyber crime Police Station.	02	Knowledge
02	Checklist for reporting cyber crime online.	02	Knowledge
03	Reporting phishing emails. (Spoofing, Phishing)	02	Knowledge
04	Checklist for secure net banking.	02	Knowledge
05	Basic checklist, privacy and security settings for popular Social media platforms.	02	Knowledge
06	Configuring security settings in Mobile Wallets and UPIs	02	Knowledge
07	VAPT Audit format.	02	Knowledge
08	Setting and configuring two factor authentications in the Mobile phone.	02	Knowledge

References:

Recommended Books
1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
6. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
7. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

23FY106T Communication Skills (Sem - I) – PRACTICAL

Tutorial/Practical : 02 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

Course Objectives: The objective of the course is to		
<ul style="list-style-type: none"> •To acquaint students with basic English Grammar and help students in improving language skills •To assist students in developing Vocabulary and phonetic drill •To aid them in understanding corporate meetings •To 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	Bloom's Taxonomy
CO1	To formulate grammatical sentences correctly and apply communicative techniques effectively	Understand
CO2	Understand and use vocabulary effectively	Understand & Apply
CO3	Display standard writing skills while composing business letters and report preparation	Create

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

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs	Bloom's Taxonomy
01	Star of Life: Introducing Yourself	02	Apply
02	Vocabulary Building Exercises	02	Remember
03	Vocabulary Building Exercises	02	Remember
04	Grammar Activities – Irregular verb list	02	Understand
05	Conducting & Attending Meeting	02	Apply
06	Conducting & Attending Meeting	04	Apply
07	Practice on writing General Applications	02	Apply
08	Practice on Business Correspondence	02	Apply

References:

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

23FY107T Engineering Drawing

Tutorial/Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

OE : 25 Marks

Course Objectives: The objective of the course is to

1. Communicate information by graphical means.
2. Understand and read drawing and present the same.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Draw the neat drawings of engineering curves.	Remember
CO2	Understand the Projection of Point, straight lines, Plane.	Remember
CO3	Construct neat Sketch of orthographic Projection, isometric drawings.	Apply
CO4	Prepare the objects by developing surfaces of solids with cutting planes.	Apply

Description:

Engineering Drawing Course consists of drawings on each unit. Students solve the more problems and draw drawings so they can Visualize and construct objects.

Prerequisites:	
1:	Knowledge of Geometry at SSC Level
2:	Knowledge of free hand sketch

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Fundamentals of Engineering Drawing	2	Understand
2	Construction of Engineering Curves	4	Apply
3	Draw the Projection of planes (1st Angle Projection only)	4	Apply
4	Draw the orthographic views, (One simple orthographic & one Sectional Orthographic). Four problems on drawing sheet.	4	Apply
5	Draw the isometric view of solid Four problems of isometric view on drawing sheet	4	Create
6	Draw the development of the surfaces of the solids in given conditions of the planes Four problems on drawing sheet.	4	Apply

References:

Text Books	
1	Engineering Drawing by N. D. Bhatt, Charotar Publication House, Bombay
2	Machine Drawing by N. D. Bhatt, Charotar Publication House, Bombay.
3	Engineering Drawing and Graphics Using AutoCAD by T. Jeyapooan, Vikas Publication.
4	A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
Reference Books	
1	Engineering Graphics with AutoCAD - D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, (PHI) Publisher 2010.
2	Machine Drawing by K. L. Narayana, New Age Publication
3	Engineering Drawing by N. B. Shaha and B. C. Rana, Pearson Education.
4	Engineering Drawing by Prof. Amar Pathak, WIELY India Publication.

23FY108T Manufacturing Techniques Lab

Tutorial/Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 50 Marks

POE : NA

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1) Develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude 2) Acquire skills in basic engineering practice 3) Develop general machining skills in the students and develop small products 		
Course Outcomes:		
Cos	At the end of successful completion of the course the student will be able to	Bloom's Taxonomy
CO1	Use the techniques, skills, and modern engineering tools necessary in smithy, welding and sheet metal working and apply them practically.	Understand
CO2	Learn the techniques, skills, and modern engineering tools necessary for fitting and carpentry operations and Possess knowledge of measurement and measuring instrument.	Apply
CO3	Demonstrate proficiency in using various tools to complete small products , enhancing precision fitting & assembly skills for fabricating components.	Apply

Description:		
<p>Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops.</p>		
Prerequisites:	1:	General safety Measures should be taken
	2:	Safety rules regarding each machine or equipment should be followed
	3:	Use of Personal protective equipment.

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Safety precautions while working in workshop. Introduction to tools	02	Understand
2	Introduction to smithy operations like, bending, forming upsetting, drawing Smithy tools hammer, hot & cold chisel flatters, tongs, anvil etc, Preparation of job as per the drawing	02	Understand and Apply
3	Preparation of smithy job as per drawing	02	Apply
4	Types of welding likes Gas Welding, arc welding, Welding equipment's, welding of various metals electrode classification and coding, welding joints, and preparation of welding component.	02	Understand and Apply
5	Preparation of welding job as per drawing	02	Understand and Apply
6	Specifications of metal sheets working tools, sheet metal and operations, and prepare the job as per drawing.	02	Understand and Apply
7	Preparation of sheet metal component as per drawing.	02	Understand and Apply
8	Preparation of sheet metal component as per drawing.	02	Understand and Apply
9	Study of various tools ,files, Drills, Taps, Die & Fitting operations to complete small product in fitting shop	02	Understand and Apply
10	Operations to develop small product.	02	Understand and Apply
11	Introduction, Classifications of wood. carpentry joints. carpentry tools to develop carpentry product.	02	Understand and Apply

References:

TextBooks	
1	Elements of Workshop Technology, Vol – I by Hajara Chaudhari, Media Promoters.
ReferenceBooks	
1	Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
2	Workshop Technology, Vol – I by Chapman, The English Language Book Society
3	Workshop Technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi

Web Links/ Video Lectures are to be provided to Theory and Practical /Experiments

Practical 1. <http://nptel.ac.in/courses/>

23FY202A Water Management

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1) Develop understanding of water resources. 2) Study global water cycle and factors that affect this cycle. 3) Analyze the process for water resources and management. 4) Study the research and development areas necessary for efficient utilization and management of water resources. 		
Course Outcomes:		
Cos	At the end of successful completion of the course the student will be able to	Bloom's Taxonomy
CO1	Describe the global water cycle and its various process along with climate change and its effect on water system.	Understand
CO2	Explain water resource planning and management for sustainable development..	Apply
CO3	Illustrate the development in use of water for agricultural application.	Analyze
CO4	Identify process for urban water supply to overcome the urban challenges.	Understand

Description:		
<p>Water is a vital resource for all life on the planet. Only three percent of the water resources on Earth are fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. One fifth of the remaining one percent is in remote, inaccessible areas. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. Pure water supply and disinfected water treatment are prerequisites for the well-being of communities all over the world. One of the biggest concerns for our water-based resources in the future is the sustainability of the current and even future water resource allocation. This course will provide students a unique opportunity to study water management activities like planning, developing, distributing and optimum use of water resources. This course covers the topics that management of water treatment of drinking water, industrial water, sewage or Wastewater ,management of water resources, management of flood protection.</p>		
Prerequisites:	1: Nil	
Unit1	Understanding 'water'-Climate change and the global water cycle, understanding global hydrology	

Unit2	Water resources planning and management-Water law and the search for sustainability: a comparative analysis, Risk and uncertainty in water resources planning and management	
Unit3	Agricultural water use-The role of research and development for agriculture water use Urban.	
Unit4	Water supply and management-The urban water challenge, Water sensitive urban design	

ReferenceBooks	
1	R.QuentinGraft,KarenHussey,QuentinGraft,KarenHussey,Publisher,"WaterResources PlanningandManagement", CambridgeUniversityPress, ISBN:9780511974304, 9780521762588.
2	P.C.Basil,"WaterManagement inIndia",ISBN:8180690970,2004.
3	C.A.Brebbia,"WaterResourcesManagement",ISBN:978-1-84564-960-9,978-1-84564-961-6.

Chemistry Group (Sem-II)

**COURSE WISE DETAILED
CURRICULUM**

23FY110 Engineering Chemistry

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

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 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 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	08 Hrs
	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	
Unit 2	Chemistry of living cell	05 Hrs
	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, Asparagine, 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,	
Unit 3	Engineering materials	07 Hrs
	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)	
Section – II		
Unit 4	Fuels	07Hrs
	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.	
Unit 5	Corrosion and it’s Prevention	07Hrs
	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 , 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	Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi
4	A text Book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & 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

23FY201 Engineering Mathematics-II

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1) Model a real life scenario into differential equations and solve them analytically and numerically		
2) Learn different methods of solving improper and multiple integral		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Solve ordinary differential equations of order one and degree one	Understand
CO2	Apply numerical methods to solve ordinary differential equations of first order and first degree.	Apply
CO3	Evaluate double and triple integrals.	Understand
CO4	Use double integration to find area, mass of plane lamina.	Apply
CO5	Evaluate definite integrals using Gamma and Beta functions	Apply
CO6	Estimate definite integrals using numerical methods	Apply

Description:		
Engineering Mathematics-II 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) Differential equation of first order first degree and Applications, ii) Numerical Solution of Differential Equation of order one degree One, iii) Integral Calculus, iv) Numerical Integration, v) Multiple Integrations and vi) Application of Multiple Integrals		
Prerequisites:	1:	Trigonometric identities and Logarithmic identities
	2:	Differentiation and integration formulae
	3:	Shapes of basic curves like circle, parabola, ellipse, straight line.
Section – I		
Unit 1	Differential equation of first order first degree and Applications	
	Exact Differential Equation, Reducible to Exact Differential Equation, Linear Differential Equation, Reducible to Linear,	8 Hrs

	Application to orthogonal trajectory (Cartesian and Polar)	
Unit 2	Numerical Solution of Differential Equation of order one degree One	
	Eulers Method Eulers modified Method Runge-Kutta Method of order four Taylor Series Method	7 Hrs
Unit 3	Multiple Integrations	
	Evaluation of double integral (Cartesian and Polar) Change of order of integration (Cartesian and polar) Evaluation of triple integration Change of Cartesian to spherical coordinates	8 Hrs
Section – II		
Unit 4	Application of Multiple Integrals	
	Area using double integration Mass of plane lamina using double integration Moment of inertia of plane lamina Volume using triple integration	6 Hrs
Unit 5	Integral Calculus	
	Gamma Function and properties Beta function and properties Differentiation Under Integral Sign (with constant limits only)	7 Hrs
Unit 6	Numerical Integration	
	Trapezoidal Rule Simpson's (1/3) rule Simpson's (3/8) rule Weddle's rule	6 Hrs

Note-Minimum 06 Assignments should be given covering all units

TextBooks	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, S. Chand and Company, 40th Edition.
ReferenceBooks	
1	Advanced Engineering Mathematics”, H. K. Das, S. Chand Publication, 8th Edition.
2	A Text Book of Applied Mathematics”, Vol. I and II, P. N. Wartikar and J. N. Wartikar, Vidyarathi GrihaPrakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics, Erwin Kreyszig, Wiley India Pvt. Ltd

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/111/106/111106100/
2	2	https://nptel.ac.in/courses/111/107/111107063/
3	3,4,5	https://nptel.ac.in/courses/111/105/111105122/
4	6	https://youtu.be/ cgzqVmvqtQ

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
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	Operators and Expressions in C	
Unit 2	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
	Decision Making and Branching Statements	
Unit 3	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		
	Decision Making and Looping	
Unit 4	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
	Arrays	
Unit 5	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
	User Defined Function	
Unit 6	Introduction, Need for User-defined functions, A multifunction program/Modular program, Prototype of Function/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

Credit : 2

Evaluation Scheme

IA : 10 Marks

ISE : 30 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 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 mechanical engineering.	Apply
CO5	Determine the second moment of area of the different cross sections.	Apply
CO6	Understand impact properties of material.	Understand

Description:		
<p>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.</p>		
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,	

	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_rLjv-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
	Introduction to I C Engine	
Unit 2	Classification of IC engines, Construction and Working of S.I. and C.I. engines Two strokes and Four Stroke engines.	04 Hrs
	Introduction to Refrigeration and Air Conditioning	
Unit 3	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

	Energy Sources and power plants	
Unit 4	Renewable and nonrenewable, Photovoltaic cell Wind Power plant, Hydropower plant, Steam Power plant , Bio-gas, Bio-Diesel (Descriptive Treatment only).	04 Hrs
	Mechanical Power Transmission and Energy conversion devices	
Unit 5	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
	Manufacturing Processes	
Unit 6	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		
<ul style="list-style-type: none"> • 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 protecting traditional knowledge.	Understand

Description:		
<p>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</p>		
Unit 1	<p>Introduction to Traditional Knowledge</p> <ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • 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)	<i>Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012. .</i>
	References:
1)	<i>Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002</i>

2)	<i>"Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino</i>
	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

Credit : 01

Evaluation Scheme

IA : 10 Marks

ISE : 40 Marks

ESE : NA

Course Objectives: The objective of the course is to		
<ul style="list-style-type: none"> • 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 be able 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:		
<p>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.</p>		
Prerequisites:	1:	Basic knowledge about English Vocabulary
	2:	Communication in simple English
Unit 1	Recruitment and Career Skills	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • Understanding Self: Self Esteem • Personality Types and Traits • Time Management & Stress Management • Positive Attitude Building • Emotional Intelligence 	05 Hrs
Unit 3	Technical Writing Skills	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • Techniques of Public Speaking • Speeches for Various Occasions: • Welcome Speech, Introduction of a Guest, Vote of Thanks 	02 Hrs

References:

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

9)	<i>Dr. Abha Singh, "Behavioural Science" Wiley India Pvt.Ltd</i>
10)	<i>Soft Skills by K. Alex, S. Chand and Company, 2013</i>
	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>

23FY201T-ENGINEERING MATHEMATICS – II TUTORIAL

Tutorial/Practical : 1 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to		
. Model a real life scenario into differential equations and solve them analytically and numerically		
. Learn different methods of solving improper and multiple integral.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Bloom's Taxonomy
CO1	Solve linear and nonlinear ordinary differential equations of order one and find orthogonal trajectory.	Knowledge, Application
CO2	Find numerical solutions of ordinary differential equations of first order and first degree.	Knowledge
CO3	Compute double and triple integrals.	Knowledge
CO4	Find area, mass of plane lamina using double integral.	Application
CO5	Evaluate definite integrals using Gamma and Beta functions.	Evaluation
CO6	Solve definite integral numerically.	Knowledge

Description:		
Engineering Mathematics-II 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) Differential equation of first order first degree and Applications, ii) Numerical Solution of Differential Equation of order one degree One, iii) Integral Calculus, iv) Numerical Integration, v) Multiple Integrations and vi) Application of Multiple Integrals		
Prerequisites:	1:	Trigonometric identities and Logarithmic identities
	2:	Differentiation and integration formulae
	3:	Shapes of basic curves like circle, parabola, ellipse, straight line.

Tutorials

Number	Practical/Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
1	Exact and reducible exact differential equation	2	Knowledge
2	Linear, reducible to linear diff equation and Applications	2	Knowledge, Application
3	Evaluation of double and triple integration	2	Knowledge
4	Change of order of integration	2	Knowledge
5	Area by double integral, Mass of Lamina	2	Knowledge, Application
6	Gamma function and Differentiation under integral sign	2	Knowledge
7	Beta functions and properties	2	Knowledge
8	Euler and Eulers modified method	2	Knowledge
9	Taylor series and Runge Kutta of order four	2	Knowledge
10	Trapezoidal and Simpson (1/3) rule Simpsons (3/8)th and Weddles rule	2	Knowledge

References:

TextBooks	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, S. Chand and Company, 40th Edition.
ReferenceBooks	
1	Advanced Engineering Mathematics", H. K. Das, S. Chand Publication, 8th Edition.
2	A Text Book of Applied Mathematics", Vol. I and II, P. N. Wartikar and J. N. Wartikar, Vidyarthi GrihaPrakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics, Erwin Kreyszig, Wiley India Pvt. Ltd

23FY111T Computer Programming in C Lab

Tutorial/Practical : 2 hr/week

Evaluation Scheme

Credit : 1

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		
<ol style="list-style-type: none"> 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.
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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		
<ol style="list-style-type: none"> 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:		
<p>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.</p>		
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)	<i>Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)</i>
2)	<i>Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1st Edition</i>
3)	<i>Lesikar, R. V. and Pettit, J. ,D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10th Edition, 2006</i>
4)	<i>Managing Soft Skills for Personality Development by B.N. Ghosh, Tata McGraw Hill, 2012.</i>
5)	<i>Bikram K. Das, KalyaniSamantray, "An Introduction to Professional English and Soft Skills" Cambridge University Press New Delhi.</i>
6)	<i>Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)</i>
7)	<i>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</i>

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

23FY202A Water Management

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1) Develop understanding of water resources. 2) Study global water cycle and factors that affect this cycle. 3) Analyze the process for water resources and management. 4) Study the research and development areas necessary for efficient utilization and management of water resources. 		
Course Outcomes:		
Cos	At the end of successful completion of the course the student will be able to	Bloom's Taxonomy
CO1	Describe the global water cycle and its various process along with climate change and its effect on water system.	Understand
CO2	Explain water resource planning and management for sustainable development..	Apply
CO3	Illustrate the development in use of water for agricultural application.	Analyze
CO4	Identify process for urban water supply to overcome the urban challenges.	Understand

Description:		
<p>Water is a vital resource for all life on the planet. Only three percent of the water resources on Earth are fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. One fifth of the remaining one percent is in remote, inaccessible areas. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. Pure water supply and disinfected water treatment are prerequisites for the well-being of communities all over the world. One of the biggest concerns for our water-based resources in the future is the sustainability of the current and even future water resource allocation. This course will provide students a unique opportunity to study water management activities like planning, developing, distributing and optimum use of water resources. This course covers the topics that management of water treatment of drinking water, industrial water, sewage or Wastewater ,management of water resources, management of flood protection.</p>		
Prerequisites:	1:	Nil
Unit1	Understanding 'water'-Climate change and the global water cycle, understanding global hydrology	

Unit2	Water resources planning and management-Water law and the search for sustainability: a comparative analysis, Risk and uncertainty in water resources planning and management	
Unit3	Agricultural water use-The role of research and development for agriculture water use Urban.	
Unit4	Water supply and management-The urban water challenge, Water sensitive urban design	

ReferenceBooks	
1	R. QuentinGraft,KarenHussey, QuentinGraft,KarenHussey,Publisher, "WaterResources PlanningandManagement", CambridgeUniversityPress, ISBN:9780511974304, 9780521762588.
2	P.C.Basil, "WaterManagement inIndia", ISBN:8180690970,2004.
3	C.A.Brebbia, "WaterResourcesManagement", ISBN:978-1-84564-960-9,978-1-84564-961-6.

A student must fulfill requirement of IA, ISE and ISA for appearing ESE.

* A separate examination will be conducted for the mentioned Audit Course at the end of the semester
 Inquisitive Learning: 25 marks for report preparation/model making and 25 marks for presentation

F.Y. B. Tech Chief Coordinator

Chairman
 BOS F. Y. B. Tech



Dean Academics

Chairman
 Academic Council