KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
(An Autonomous Institute under Kakatiya University, Warangal)
(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)
Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506 015, Telangana, INDIA.
काकतीय प्रैद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६ ०१५
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ – ౫౦౬ ౦౧౫
Estd-1980 KITSW
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VISION OF THE INSTITUTE

To make our students technologically superior and ethically strong by providing quality education with the help of our dedicated faculty and staff and thus improve the quality of human life

MISSION OF THE INSTITUTE

To provide latest technical knowledge, analytical and practical skills, managerial competence and interactive abilities to students, so that their employability is enhanced

To provide a strong human resource base for catering to the changing needs of the Industry and Commerce

To inculcate a sense of brotherhood and national integrity

PROGRAM OUTCOMES (POs) of UG - B.Tech. Programmes	
PROGRAM OUTCOMES (POs)	**At the time of graduation**, the **B.Tech.** graduates will be able to ...
PO1: Engineering knowledge	*apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems*
PO2: Problem analysis	*identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences*
PO3: Design/development of solutions	*design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental Considerations*
PO4: Conduct investigations	*use research-based knowledge and research methods including design of experiments,*

of complex problems	*analysis and interpretation of data, and synthesis of the information to provide valid conclusions*
PO5: Modern tool usage	*create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations*
PO6: The engineer and society	*apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice*
PO7: Environment and sustainability	*understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development*
PO8: Ethics	*apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice*
PO9: Individual and team work	*function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings*
PO10: Communication	*communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions*
PO11: Project management and finance	*demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments*
PO12: Life-long learning	*recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change*

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15

(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME

BRANCH : B.Tech. – ME / CSE / CSN / IT/ CSIoT (Stream – I)

SEMESTER : FIRST

Sl.No	Course Category	Course Code	Course Name	Periods/week			Credits	Evaluation Scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH101	Engineering Mathematics - I	3	1	-	4	10	30	40	60	100
2	ESC	U18CS102	Programming for Problem Solving using C	3	-	-	3	10	30	40	60	100
3	BSC	U18PH103	Engineering Physics	3	1	-	4	10	30	40	60	100
4	HSMC	U18MH104	English for Communication	2	-	2	3	10	30	40	60	100
5	ESC	U18EE105	Basic Electrical Engineering	3	1	-	4	10	30	40	60	100
6	ESC	U18EE106	Basic Electrical Engineering Laboratory	-	-	2	1	40	-	40	60	100
7	ESC	U18CS107	Programming for Problem Solving using C Laboratory	-	-	2	1	40	-	40	60	100
8	BSC	U18PH108	Engineering Physics Laboratory	-	-	2	1	40	-	40	60	100
9	ESC	U18ME109	Workshop Practice	-	-	2	1	40	-	40	60	100
10	MC	U18EA110	EAA* : Sports/Yoga/NSS	-	-	2	-	100	-	-	-	100
11	MC	U18MH111	Universal Human Values - I (*Induction Programme*)	-	-	-	-	-	-	-	-	-
			Total:	**14**	**3**	**12**	**22**	**310**	**150**	**360**	**540**	**1000**

Note: **L** - Lectures; ***T*** **–** Tutorials; **P** – Practicals; **CIE** – Continuous Internal Evaluation; **TA** – Teachers Assessment;
MSE – Mid Semester Examination; **ESE** – End Semester Examination; **EAA** – Extra Academic Activity;
* **indicates mandatory non-credit course**

Student Contact Hours / Week : 29 (periods/week)

Total Credits (C) : 22 Credits

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15

(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME

BRANCH : B.Tech. – ME / CSE / CSN / IT/ CSIoT (Stream – I)

SEMESTER : SECOND

S. No.	Course Category	Course Code	Course Name	Periods			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH201	Engineering Mathematics - II	3	1	-	4	10	30	40	60	100
2	ESC	U18CS202	Data Structures through C	3	-	-	3	10	30	40	60	100
3	BSC	U18CH203	Engineering Chemistry	3	1	-	4	10	30	40	60	100
4	ESC	U18ME204	Engineering Drawing	2	-	4	4	10	30	40	60	100
5	ESC	U18CE205	Engineering Mechanics	3	1	-	4	10	30	40	60	100
6	ESC	U18CS207	Data Structures through C Laboratory	-	-	2	1	40	-	40	60	100
7	BSC	U18CH208	Engineering Chemistry Laboratory	-	-	2	1	40	-	40	60	100
8	MC	U18CH209	Environmental Studies*	2	-	-	-	10	30	40	60	100
9	MC	U18EA210	EAA* : Sports/Yoga/NSS	-	-	2	-	100	-	-	-	100
			Total:	**16**	**3**	**10**	**21**	**240**	**180**	**320**	**480**	**900**

Note: **L** - Lectures; **T** – Tutorials; **P** – Practicals; **CIE** – Continuous Internal Evaluation; **TA** – Teachers Assessment;
MSE – Mid Semester Examination; **ESE** – End Semester Examination; **EAA** – Extra Academic Activity;
* **indicates mandatory non-credit course**

Student Contact Hours / Week : 29 (periods/week)

Total Credits (C) : 21 Credits

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15

(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME

BRANCH : B.Tech. – CE / EEE / ECE / ECI/ CSAIML (Stream – II)

SEMESTER : FIRST

Sl.No	Course Category	Course Code	Course Name	Periods/week			Credits	Evaluation Scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH101	Engineering Mathematics - I	3	1	-	4	10	30	40	60	100
2	ESC	U18CS102	Programming for Problem Solving using C	3	-	-	3	10	30	40	60	100
3	BSC	U18CH103	Engineering Chemistry	3	1	-	4	10	30	40	60	100
4	ESC	U18ME104	Engineering Drawing	2	-	4	4	10	30	40	60	100
5	ESC	U18CE105	Engineering Mechanics	3	1	-	4	10	30	40	60	100
6	ESC	U18CS107	Programming for Problem Solving using C Laboratory	-	-	2	1	40	-	40	60	100
7	BSC	U18CH108	Engineering Chemistry Laboratory	-	-	2	1	40	-	40	60	100
8	MC	U18CH109	Environmental Studies*	2	-	-	-	10	30	40	60	100
9	MC	U18EA110	EAA* : Sports/Yoga/NSS	-	-	2	_	100	-	100	-	100
10	MC	U18MH111	Universal Human Values - I (*Induction Programme*)	-	-	-	-	-	-	-	-	-
			Total	**16**	**3**	**10**	**21**	**240**	**180**	**420**	**480**	**900**

Note: **L -** Lectures; **T –** Tutorials; **P** – Practicals; **CIE** – Continuous Internal Evaluation; **TA** – Teachers Assessment;
MSE – Mid Semester Examination; **ESE** – End Semester Examination; **EAA** – Extra Academic Activity;
* **indicates mandatory non-credit course**

Student Contact Hours / Week : 29 (periods/week)

Total Credits (C) : 21 Credits

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15

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SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME

BRANCH : B.Tech. – CE / EEE / ECE / ECI/ CSAIML (Stream – II)

SEMESTER : SECOND

Sl.No	Course Category	Course Code	Course Name	Periods/week			Credits	Evaluation Scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH201	Engineering Mathematics - II	3	1	-	4	10	30	40	60	100
2	ESC	U18CS202	Data Structures through C	3	-	-	3	10	30	40	60	100
3	BSC	U18PH203	Engineering Physics	3	1	-	4	10	30	40	60	100
4	HSMC	U18MH204	English for Communication	2	-	2	3	10	30	40	60	100
5	ESC	U18EE205	Basic Electrical Engineering	3	1	-	4	10	30	40	60	100
6	ESC	U18EE206	Basic Electrical Engineering Laboratory	-	-	2	1	40	-	40	60	100
7	ESC	U18CS207	Data Structures through C Laboratory	-	-	2	1	40	-	40	60	100
8	BSC	U18PH208	Engineering Physics Laboratory	-	-	2	1	40	-	40	60	100
9	ESC	U18ME209	Workshop Practice	-	-	2	1	40	-	40	60	100
10	MC	U18EA210	EAA* : Sports/Yoga/NSS	-	-	2	-	100	-	100	-	100
			Total	**14**	**3**	**12**	**22**	**310**	**150**	**460**	**540**	**1000**

Note: **L -** Lectures; **T –** Tutorials; **P** – Practicals; **CIE** – Continuous Internal Evaluation; **TA** – Teachers Assessment;
MSE – Mid Semester Examination; **ESE** – End Semester Examination; **EAA** – Extra Academic Activity;
* **indicates mandatory non-credit course**

Student Contact Hours / Week : 29 (periods/week)

Total Credits (C) : 22 Credits

U18MH101 ENGINEERING MATHEMATICS- I

Class: B.Tech. I-Semester

Branch(s): ME, CSE, IT, CSN, CSIOT CE, EEE, ECE, ECI, CSAIML

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in

LO1: basic concepts of convergence of a series, mean value theorems, expansion of a function in series

LO2: partial differentiation and it's applications to functions of two/several variables

LO3 : differential equations of first order and first degree along with certain applications

LO4: the methods of solving higher order linear differential equations and introduce few applications to engineering problems

UNIT-I (9+3)

Infinite Series: Sequences & Series, General properties of series, Series of positive terms, Comparison test, Limit comparison test, Integral test, D'Alembert's Ratio test, Cauchy's nth root test, Alternating series- absolute convergence.

Differential Calculus (Functions of One Variable): Limits, Continuity, Differentiability, Rolle's theorem (Physical and algebraic interpretations), Lagrange's mean value theorem (Geometrical interpretation), Cauchy's mean value theorem. Taylor's theorem and Power series representation of functions, Maclaurin's series, Asymptotes and Tracing of Simple Curves

UNIT-II (9+3)

Differential Calculus (Functions of Several Variables): Partial differentiation, Total differentiation, Change of variables, Application to find Tangent plane and Normal to a surface, Jacobians. Taylor's theorem for function of two variables (without proof), Maximum and minimum values of functions of two variables. Langrage's method of undetermined multipliers. Differentiation under integral sign.

UNIT-III (9+3)

Differential Equations of First Order: Practical approach to differential equations. Formation and solution of differential equation. Solution of first order and first degree differential equation, variables separable form, homogeneous form, reducible to homogeneous form, First order linear equations, Equations reducible to linear equation (Bernoulli's equation), Exact differential equations, Equations reducible to exact form.

Applications of First Order Differential Equations: Simple examples of Physical applications (Orthogonal trajectories, RL series circuit problem).

UNIT-IV (9+3)

Higher Order Linear Differential Equations with Constant Coefficients: Liner differential Equations of higher order with constant coefficients, General solution, Complementary function, Particular Integral. Methods of evaluation of particular Integrals. Wronskian, Linear dependence of solutions, Method of Variation of parameters. Cauchy's homogenous linear equation. Applications: Simple examples of RLC series circuit problem.

Text Books:

[1] Grewal, B.S., Higher Engineering Mathematics, 43/e, Delhi, *Khanna Publishers* ,2014.

Reference Books:

[1] Kreyszig E, Advanced Engineering Mathematics,9th edition, Inc, U.K, John wiely *& sons,* 2013.

[2] Shanti Narayan, Differential Calculus, New Delhi, S. Chand & Co

[3] S.S. Sastry, Engineering Mathematics 3/e, Vol.II, Prentice Hall of India,2014

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *demonstrate the convergence of a series and interpret mean value theorems*

CO2: *apply partial differentiation to functions of several variables in solving various engineering problems*

CO3: *utilize appropriate methods of differential equations of first order and first degree in solving real life engineering problems*

CO4: *solve the higher order linear differential equation with constant coefficients and few problems on engineering applications*

Course Articulation Matrix (CAM): U18 MH101 ENGINEERING **MATHEMATICS- I**

CO		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	**U18MH101.1**	3	2	1	--	--	--	--	--	--	--	--	1	-	-
CO2	**U18MH101.2**	3	3	2	--	--	--	--	--	--	--	--	1	-	-
CO3	**U18MH101.3**	3	2	2	--	--	--	--	--	--	--	--	1	-	-
CO4	**U18MH101.4**	3	3	2	--	--	--	--	--	--	--	--	1	-	-
U18MH101		**3**	**2.5**	**1.75**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**1**		

U18CS102 PROGRAMMING FOR PROBLEM SOLVING USING C

Class: B.Tech. I -Semester

Branch(s): ME, CSE, CSN, IT, CSIoT CE, EEE, ECE, ECI, CSAIML

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1*: computer fundamentals and concepts of problem solving using structured programming paradigm*

LO2*: control structures and array operations*

LO3*: string functions and modular programming concepts*

LO4*: structures, unions, pointers and files in C programming*

UNIT-I (9)

Introduction to Computers: Block diagram of computer, types of computers, computer languages, problem solving and program development steps, algorithm, flowchart

Overview of C: History, basic structure of C program

Constants, Variables and Data Types: Character set, C tokens, declaration of variables, symbolic constants and macros

Operators and Expressions: Arithmetic, relational, increment, decrement, conditional, logical, bit-wise, special operators, arithmetic expressions, precedence of operators and associativity **Managing Input and Output Operations:** Reading a character, writing a character, formatted input, formatted output

UNIT-II (9)

Decision Making and Branching: Simple if, if-else, nested–if, else-if ladder, switch, conditional operator, goto statement

Decision Making and **Looping:** While, do-while, for statements, nested loops, break and continue statements

Arrays: One dimensional array, declaration of one dimensional arrays, initialization of one dimensional arrays, two dimensional arrays, initializing two dimensional arrays, linear search

UNIT-III (9)

Character Arrays and Strings: Reading strings, writing strings, string handling functions, table of strings

User Defined Functions: Need of user defined functions, definition of function, return values and their types, function calls, function declaration, category of function, no arguments and no return values, arguments but no return values, arguments with return values, no arguments but returns a value, recursion, storage classes

UNIT-IV (9)

Structures and Unions: Declaring structure variables, accessing structure members, array of structures, structures within structures, unions

Pointers: Understanding **pointers**, declaring and initializing pointer variables, pointer expressions, pointers and arrays, pointers and character strings, array of pointers, pointers as function arguments, pointers and structures

File Management in C: Defining and opening a file, input and output operations on sequential text files

Text Books:

1. E.Balagurusamy, Programming in ANSIC**,** 6th ed, New Delhi: Tata McGraw Hill, 2012

Reference Books:

1. Kerninghan and Ritchie, The C Programming Language, 2nd ed, New Delhi: Prentice Hall of India, 1988
2. A.K.Sharma, Computer Fundamentals and programming in C, Hyderabad: Universities Press, 2018.
3. Peter Norton, Introduction to Computers, 6th ed. New Delhi: Tata McGraw-Hill, 2008
4. Herbert Schildt, Complete Reference with C, 4th ed. New Delhi: Tata McGraw Hill, 2000
5. Yaswanth Khanetkar, Let Us C, 13th ed. Bangalore: BPB Publications, 2012

Course Learning Outcomes (COs):

After completion of the course, the students will be able to,

CO1*: demonstrate knowledge on fundamental of C programming language and design an algorithm & flow chart for a given application*

CO2*: apply logical skills for problem solving using control structures and arrays*

CO3*: develop string programs and modular programming withfunctions*

CO4*: implement structures, unions, pointers and files in Cprogramming*

Course Articulation Matrix (CAM): U18CS102 PROGRAMMING FOR PROBLEM SOLVING USING C																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18CS102.1	1	1	-	-	-	-	-	-	-	1	-	1	2	1	1
CO2	U18CS102.2	1	2	2	1	-	-	-	-	-	1	-	1	2	2	2
CO3	U18CS102.3	1	2	2	1	-	-	-	-	1	1	-	1	2	2	2
CO4	U18CS102.4	1	2	2	2	1	-	-	-	1	1	-	1	2	2	2
U18CS102		1	1.75	2	1	1	-	-	-	1	1	-	1	2	1.75	1.75

U18PH103/ U18PH203 - ENGINEERING PHYSICS

Class: B.Tech. I– Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on...

LO1: different types of oscillations with illustrations by mechanical and electrical examples, high frequency sound waves and their applications in various fields

LO2: concepts of interference, diffraction and polarization of light waves and their applications

LO3: concepts and working principles of lasers, fiber optics and their applications in various fields

LO4: basic concepts of quantum mechanics, modern materials and their applications

UNIT-I (9+3)

Oscillations: Physical examples of simple harmonic motion: Torsional pendulum, Physical pendulum; Spring-mass systems; Loaded beams; two body oscillations; Qualitative treatment of free, damped and forced oscillations- resonance; Series and parallel resonant circuits, Q-factor.

Ultrasonics: Properties of ultrasonics; Production of ultrasonic waves: Magnetostriction method and Piezo-electric method; Detection of ultrasonic waves; Acoustic grating- Determination of wavelength of ultrasonics; Applications of ultrasonic waves- Pulse echo NDT technique (reflection mode).

UNIT-II (9+3)

Interference: Superposition principle; coherence; phase change on reflection; Interference of reflected light from uniform thin films; anti reflection coating; Newton's rings in reflected light- applications: determination of wavelength of a monochromatic light and refractive index of a liquid; Michelson's Interferometer- applications: determination of wavelength of a monochromatic light, thickness and refractive index of a thin transparent sheet;

Diffraction: Distinction between Fresnel and Fraunhofer class of diffraction; Fraunhofer diffraction at a single slit (phasor method) and a circular aperture- Rayleigh's criterion for resolution; Diffraction grating (qualitative)- Dispersive power and resolving power of a diffraction grating; determination of wavelength of a monochromatic light using diffraction grating.

Polarisation: Polarised light; double refraction; geometry of calcite crystal; Nicol prism; Huygen's explanation (positive and negative crystals); quarter and half wave plates; Production and detection of plane, circularly and elliptically polarized light; Applications- Optical activity, LCDs.

UNIT-III (9+3)

Lasers (Qualitative): Difference between conventional and laser light; Absorption; Spontaneous and stimulated emission; Relation among Einstein coefficients; Basic principles - Population inversion, pumping methods, optical resonator; Types of lasers- Ruby, Nd-YAG, He-Ne and CO_2 Laser; Applications of lasers: Holography- introduction, formation and reconstruction of a hologram; Applications of holography.

Fiber Optics(Qualitative): Introduction- Total internal reflection; Fiber construction; Numerical aperture and acceptance angle; Types of optical fibers- Step index and graded index; V-number; Fiber drawing- Double crucible technique; Splicing- Fusion & Mechanical; Power losses in optical fibers- Attenuation, dispersion, bending; Fiber optic communication system; Applications of optical fibers - endoscope; Fiber optic sensors (temperature and displacement).

UNIT-IV (9+3)

Elements of Quantum Mechanics: de-Broglie concept of matter waves- de-Broglie wavelength, properties of matter waves; Schrodinger time-independent wave equation (one dimension); Physical significance of wave function (Max Born interpretation); Particle in a box (one dimension)- energy quantization; Uncertainty principle - illustration and application to the non- existence of free electron in the nucleus.

Modern Materials (Qualitative):

Magnetic Materials: Introduction- Origin of magnetic moment; Bohr magneton; Permeability; Magnetization; susceptibility; Classification of magnetic material; Applications of magnetic materials: Magnetic recording and Magnetic memories.

Superconducting Materials: Superconductivity; Meissner effect; Transition temperature; Isotope effect; London's penetration depth; Type-I and Type-II superconductors; High T_c superconductors; Applications of superconductors.

Nanomaterials: Introduction- Classification of nanomaterials; Surface area to volume ratio; Quantum confinement; Properties of nanomaterials- Physical, chemical, electrical, optical, magnetic and mechanical properties; Applications of nanomaterials (in brief); Synthesis of nanomaterial: Bottom up approach (sol-gel method) and Top down approach (ball milling method).

Text Books:

1. Bhattacharya and Bhaskaran, *Engineering Physics*, Oxford University Press, 1/e, 2013.
2. V. Rajendran, *Engineering Physics*, Mc Graw Hill, 2013.

Reference Books:

1. David Halliday, Robert Resnick & Krane, *Physics Volume I & II*, Wiley India Limited, 5/e, *2014.*
2. R.K. Gaur and S.L.Gupta, *Engineering Physics*, Dhanpath Rai and Sons, 2013.
3. P.K. Palanisamy, *Engineering Physics*, Scitech Publishers, 3/e, 2013.
4. M. Avadhanulu and Kshirsagar, *A Text Book of Engineering Physics*, S. Chand & Company Ltd, 10/e, 2013.

Course Learning Outcomes (COs):

After completion of the course, the students will be able to

CO1: determine the time period and frequency of SHM oscillatory system and know the principles and applications of ultrasonics in different fields

CO2: appraise the concepts of interference, diffraction and polarization phenomena in accurate determination of wavelengths, thicknesses, narrow slit widths, optical activity, etc

CO3: interpret the characteristics and working of lasers, optical fibers and their applications in various fields

CO4: categorize the properties of magnetic, superconducting and nanomaterials and know their engineering applications

Course Articulation Matrix (CAM):

U18PH103/ U18PH203 - ENGINEERING PHYSICS

CO		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	U18PH103.1/ U18PH203.1	2	1	-	-	1	1	-	-	1	-	-	-	-	-
CO2	U18PH103.2/ U18PH203.2	2	1	1	1	-	1	1	-	1	-	-	-	-	-
CO3	U18PH103.3/ U18PH203.3	3	1	1	1	2	1	1	-	1	-	-	-	-	-
CO4	U18PH103.4/ U18PH203.4	3	-	1	1	1	2	1	-	1	-	-	-	-	-
U18PH103/ U18PH203		2.5	1	1	1	1.33	1.25	1	-	1	-	-	-	-	-

U18CH103 / U18CH203 ENGINEERING CHEMISTRY

Class: B.Tech. I–Semester
B.Tech. II-Semester

Branch(s) : CE, EEE, ECE, ECI, CSAIML
ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on...

LO1: fundamental concepts of electrochemistry, electrochemical cells

LO2 : corrosion science, phase rule application to various equilibria, I/C engine fuels.

LO3 : basic spectroscopic techniques of chemical analysis, water analysis and treatment

LO4: basic concepts of organic chemistry, polymerization reactions, versatile applications of polymers

UNIT-I (9+3)

Electrochemistry: Specific conductance ,equivalent conductance, effect of dilution, Conductometric titrations -acid base titrations, their advantages over conventional methods, Electrode potential, Nernst equation, Electrochemical series and its applications, Calomel electrode, Determination of pH using quinhydrone electrode, hydrogen electrode, Potentiometric titrations (acid base titrations), Commercial cells- Lead-acid storage cell , Fuel cells-Hydrogen-oxygen fuel cell.

UNIT-II (9+3)

Corrosion: Introduction-corrosion by pure chemical reaction (dry corrosion), Electrochemical corrosion(wet corrosion), Factors influencing corrosion, Prevention methods of corrosion - cathodic protection, hot dipping methods(galvanizing, tinning), cladding, electroplating.

Phase rule: Description of the terms-phase, component and degrees of freedom, Gibbs phase rule equation, Application of the phase rule to one-component system (water system), two-component system (silver-lead system), Pattinson's process for desilverisation of lead.

Fuels: Characteristics of fuels for internal combustion engines, Knocking , Octane number, Cetane number, Compressed natural gas(CNG), Power alcohol.

UNIT-III (9+3)

Introduction to Methods of Chemical Analysis: Introduction to spectroscopy- Microwave spectra- theory, Application of microwave spectra in the determination of bond length of a diatomic molecule; Infra-red spectra, theory, Applications- calculation of force constant and identification of functional groups in organic compounds, Lambert-Beer's law and its applications.

Water Analysis and Treatment: Hardness of water, Determination of hardness of water by using EDTA, Determination of alkalinity, Determination of fluoride by spectrophotometry, Determination of dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, Softening of water by ion-exchange process, Desalination of brackish water- Reverse osmosis, Electrodialysis

UNIT-IV (9+3)

Organic Chemistry: Fission of a covalent bond, Types of electronic effects- inductive effect, mesomeric effect , Reaction intermediates, their stabilities, Types of reagents- electrophilic, nucleophilic reagents, Mechanisms of nucleophilic substitution($SN^1$and SN^2) , addition (electrophilic, nucleophilic and free radical) reactions .

Polymers: Introduction -Types of polymerization reactions-addition, condensation , Mechanism of free radical, cationic and anionic addition polymerization, Thermo-setting and thermo plastic resins, Conducting polymers and their applications.

Text Books:

1. Jain and Jain, *Engineering Chemistry*, 16th ed. Dhanpat Rai Publishing Company, 2012.

Reference Books:

1. J.C.Kuriacose and J.Rajaram, *Chemistry in Engineering and Technology(vol.I & vol.II)*, Tata Mc. Graw-Hills Education Pvt. Ltd., 2010.
2. Shashi Chawla, *Text book of Engineering Chemistry*, 3rd ed., Dhanpat Rai Publishers, 2003.
3. S.S. Dara, S S. Umare, *A Text book of Engineering Chemistry*, 12th ed., S.Chand & Company Ltd., 2010.

Course Learning Outcomes(COs):

On completion of this course, students will be able to …

CO1: discuss the concepts of electro chemistry and electrochemical cells

CO2: apply the materials in the field of engineering and phase rule in the study of material science, select suitable fuels for I/C engines.

CO3: determine molecular parameters using spectroscopic techniques and quality parameters of water sample, discuss softening methods of hard water.

CO4: appraise the concepts of organic chemistry, polymerization reactions and applications of polymers.

Course Articulation Matrix (CAM): U18CH103 / U18CH203 ENGINEERING CHEMISTRY

CO		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	U18CH103.1/ U18CH203.1	2	2	1	1	1	-	1	-	1	-	-	-	-	-
CO2	U18CH103.2/ U18CH203.2	2	1	2	2	-	1	1	-	2	-	-	-	-	-
CO3	U18CH103.3/ U18CH203.3	2	1	1	2	-	1	-	-	2	-	-	-	-	-
CO4	U18CH103.4/ U18CH203.4	1	-	1	2	-	1	-	-	2	-	-	-	-	-
U18CH103/ U18CH203		**1.75**	**1.33**	**1.25**	**1.75**	**1.00**	1	1	-	**1.75**	-	-	-	-	-

U18MH104/204: ENGLISH FOR COMMUNICATION

Class: B.Tech. I-semester
B.Tech.II-Semester

Branch (s): ME, CSE, CSN, IT, CSIo
CE, EEE, ECE, ECI, CSAIML

Teaching Scheme:

L	T	P	C
2	–	2	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in...

LO1: accuracy in and familiarity with various sentence structures to communicate correctly and effectively

LO2: judicious and situational use of vocabulary to bring effectiveness to communication

LO3: various reading skills to comprehend the text

LO4: writing strategies, academic writing, pre-planning before writing and maintenance of coherence while writing a paragraph

UNIT-I (6)

Grammar:

Clause Analysis - Types of Clauses: Noun Clause - Relative Clause - Adverb Clause.

Transformation: Simple, Complex, Compound Sentences.

Errors-Nouns-Pronouns-Adjectives-Adverbs-Prepositions-Tenses-Articles-Subject-Verb Agreement

Reading

"In Banaras"- from "The Stories of My Experiments with Truth-An Autobiography of Mahathma Gandhi"

UNIT-II (6)

Vocabulary:

Vocabulary-Antonyms-Synonyms-Prefixes-Suffixes-Phrasal Verbs-One Word Substitutes-Word Pairs

Reading

"Education Provides a Solid Foundation"- from Wings of Fire –An Autobiography of APJ Abdul K

UNIT-III (6)

Reading Skills:

"An Astrologer's Day" by R.K.Narayan
"On Saying Please" by A. G. Gardiner

UNIT-IV (6)

Writing Skills:

Precis Writing
Essay Writing
Report Writing

Text Books:

1."Work Book on English for Communication" (Unit 1, 2, 3, 4) by the faculty of English, Kakatiya Institute of Technology and Science, Warangal

Reference Books:

1. Harper Collins, "Cobuild English Grammar" Third Edition, *Harper Collins Publishers Ltd.*
2. Sanjay Kumar & Pushp Lata, "Communication Skills" Second Revised Edition,2015, *Oxford University Press Ltd.*
3. R.K. Narayan," Malgudi Days" Indian Thought Publications,1943
4. APJ Abdul Kalam, "Wings of Fire" An Autobiography, Universities Press,1999
5. Mahatma Gandhi," The Story of My Experiments with Truth" An Autobiography, Global Vision Press,2013.

Course Learning Outcomes (COs):

On completion of this course, students will be able to...

CO1: Speak and write with accuracy a variety of sentence structures.
CO2: Build vocabulary through contextual clues from the text
CO3: Apply appropriate reading strategies to summarize and paraphrase the text by understanding the main ideas.
CO4: Write well organized paragraphs with accuracy contextually suitable vocabulary.

Course Articulation Matrix (CAM): U18MH104/204 ENGLISH FOR COMMUNICATION

CO		PO 1	PO	PO	PO 4	PO	PO	PO	PO	PO	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	U18MH104.1 / U18MH204.1	-	1	-	1	1	1	1	1	1	3	2	1		
CO 2	U18MH104.2 /	1	1	-	--	--	--	1	--	3	2	--	3		
CO 3	U18MH104.3 /	-	1	-	--	--	--	--	--	2	2	2	3		
CO 4	U18MH104.4 /	-	1	1	1	--	--	1	--	3	2	1	3		
U18MH104/204		1	1	1	1	1	1	1	1	2.2	2.25	1.7	2.5		

ENGLISH LANGUAGE LAB

Listening Skills (3×2):

Listening to Sounds, Stress and Intonation

Listening for Information

Life Skills (3×2)

Etiquette

Goal Setting

Body Language

Speaking Skills & Writing Skills (6×2)

a. ***Presentation Techniques:***

Self Introduction

JAM (Just A Minute)

Group Discussion

Debate

Description

Interview Skills

b. ***Assignment:***

Students have to present PPT on the topics given in the English Laboratory

Writing Skills

a) planning
b) coherence
c) accuracy

U18ME104 / U18ME204 ENGINEERING DRAWING

Class: B. Tech. I- Semester
B.Tech. II-Semester

Branch(s): CE, EEE, ECE, ECI, CSAIML
ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
2	-	4	4

Examination Scheme:

Continuous Internal Evaluation	:	40 marks
End Semester Exam	:	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on...
LO1: projections of points and straight lines-I
LO2: projections of straight lines-II and planes
LO3: projections of solids and sections of solids
LO4: isometric and orthographic projections

UNIT – I (6+12)

Introduction: Importance of Engineering Drawing, instruments- uses; Layout of drawing sheets, Types of Lines, Lettering and dimensioning, Construction of regular polygons **Projection of Points**: Introduction to orthographic projections-Vertical Plane, Horizontal plane; Views-Front view, Top view and Side view; Projection of Points-different quadrants

Projection of Straight lines - I: Line parallel to both the planes, Line parallel to one plane and perpendicular to the other reference plane, Line parallel to one plane and inclined to the other reference plane

UNIT – II (6+12)

Projection of Straight Lines – II: Line- inclined to both the planes and Traces

Projection of Planes: Planes - Perpendicular and Oblique planes; Projections of planes - parallel to one of the reference planes, inclined to one of the reference plane and perpendicular to the other; Projections of oblique planes

UNIT – III (6+12)

Projection of Solids: Types-prisms, pyramids, cylinder and cone; Simple Positions-axis parallel to a reference plane and perpendicular to the other plane, axis parallel to one plane and inclined to other reference plane; axis inclined to both the reference planes

Sections of Solids: Types-prisms and pyramids; Section planes, Sectional views and true shape of a section

UNIT – IV (6+12)

Orthographic projections: Conversion of isometric views into orthographic views

Isometric Projections: Isometric axis, Isometric Planes, Isometric View, Isometric projection, Construction of isometric view from orthographic views

AutoCAD: Introduction to AutoCAD, DRAW tools, MODIFY tools, TEXT, DIMENSION, PROPERTIES tool bar, Standard tool bars, LAYERS; drawing of orthographic and isometric projections in AutoCAD.

Textbook:

[1] Bhatt N.D., *Elementary Engineering Drawing*, Anand: Charotar Publishing House India, 2017.

Reference Books:

[1] Dhananjay A Jolhe, *Engineering Drawing*, Tata Mc Graw- hill, 2008.

[2] Venugopal K., *Engineering Graphics with Auto CAD*, Hyderabad: New Age International Publishers Ltd., 2012.

[3] W J Luzadder and J M Duff, *Fundamentals of Engineering Drawing*, Prentice-Hall of India, 1995.

Course Outcomes (COs):

On completion of this course, students will be able to…

CO1: develop projections of points & straight lines-I.

CO2: develop projections of straight lines-II & planes.

CO3: construct projection of solids and analyze internal details of an object through sectional views.

CO4: construct 2D orthographic views from 3D isometric views and develop 3D isometric views from 2D views.

Course Articulation Matrix (CAM): U18ME104 / U18ME204 ENGINEERING DRAWING													
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	U18ME104.1/ U18ME204.1	2	1	1	-	-	-	-	-	-	1	-	1
CO2	U18ME104.2/ U18ME204.2	2	1	1	-	-	-	-	-	-	1	-	1
CO3	U18ME104.3 / U18ME204.3	2	1	1	-	-	-	-	-	-	1	-	1
CO4	U18ME104.4/ U18ME204.4	2	1	1	-	1	-	-	-	-	1	-	1
U18ME104/ U18ME204		**2**	**1**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**-**	**1**

U18EE105 / U18EE205 BASIC ELECTRICAL ENGINEERING

Class: B.Tech. I- Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40
End Semester Examination	60

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: network elements and analysis of simple electrical DC circuits

LO2: DC network theorems

LO3: fundamentals of 1- and 3- AC circuits

LO4: working principles and applications of DC & AC machines, concepts of earthing, fuses, lighting sources, MCB & batteries

UNIT – I (9+3)

DC circuits: Introduction, network elements, Ohm's law, electric power, electrical energy, Kirchhoff's laws, resistances in series-voltage divider rule, resistances in parallel-current divider rule, series & parallel circuits, mesh analysis, nodal analysis (T & π networks only)

UNIT – II (9+3)

DC network theorems (Independent sources only): Introduction, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem (T and π networks only)

UNIT – III (9+3)

1- AC circuits: Phasor representation of sinusoidal quantities, average and R.M.S values of sinusoidal wave form, AC through resistor, inductor, capacitor and series R-L-C circuit

3-f AC circuits: Production of 3-f voltages, voltage & current relationships of line and phase values for balanced star and delta connections

UNIT – IV (9+3)

Introduction to electrical machines (Qualitative treatment): Construction, principle of operation &applications of 1-f transformer, 3-f induction motor, 1-f induction motor and DC motor

Electrical earthing, fuses & lighting sources: Basic concepts of earthing, fuses and lighting sources-incandescent, fluorescent, CFL & LED lamps, Miniature Circuit Breaker(MCB), types of batteries

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Text Book:

1. K. Uma Rao, *Basic Electrical Engineering*, New Delhi: Pearson Education, 2011.

Reference Books:

1. B.L.Thereja, A.K.Thereja, *Electrical Technology Vol. I & II*,23rd ed., New Delhi: S.Chand& Company Ltd, 2005.
2. Edward Hughes, *Electrical & Electronics Technology*, 10th ed., New Delhi: Pearson Education,2010.
3. D. P. Kothari and I. J. Nagrath, *Basic Electrical Engineering*, New Delhi: Tata McGraw Hill Education (India) Pvt. Ltd., 2010.
4. Chakravarthy A, Sudhipanath and Chandan Kumar, *Basic Electrical Engineering*, Tata McGraw Hill Education (India) Pvt. Ltd., 2009.

Course Outcomes (COs):

On completion of the course, the students will be able to…

CO1: determine voltage, current & power in electrical circuits using mesh & nodal analysis

CO2: apply suitable DC network theorems to analyze T & π networks

CO3: find current, voltage & power in 1-phase& 3 -phase AC circuits

CO4: explain construction, working principle & applications of electrical machines; electrical earthing, fuses, lighting sources, MCB & batteries

Course Articulation Matrix: U18EE105 / U18EE205 BASIC ELECTRICAL ENGINEERING													
CO		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	U18EE105 / U18EE205.1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	U18EE105 / U18EE205.2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	U18EE105 / U18EE205.3	3	3	1	1	1	-	1	-	-	1	-	-
CO4	U18EE105 / U18EE205.4	3	3	1	1	1	1	1	1	-	1	-	-
U18EE105 / U18EE205		**2.5**	**2.25**	**1**	**1**	**1**	**1**	**1**	**1**	-	**1**	-	-

U18CE105 / U18CE205 ENGINEERING MECHANICS

Class: B.Tech. I-Semester
B.Tech. II-Semester

Branch(s): CE, EEE, ECE, ECI, CSAIML
ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on/in...

LO1: force systems and their applications

LO2: concepts and application of friction, analysis of plane trusses

LO3: centroid and moment of inertia of geometric and composite areas

LO4: dynamics of a particle and its applications

UNIT – I (9+3)

Laws of Mechanics: Parallelogram law of forces, triangle law of forces, Newton's law of gravitation, law of superposition and transmissibility of forces.

Force Systems: Types of forces, co-planar, concurrent and parallel forces, moment and couple, free body diagram, resultant of force systems, resolution of forces, composition of forces, equilibrium equations of forces, Lami's theorem, Varignon's theorem, moment equilibrium equations, types of supports, beams and loadings, statically determinate structures, resultant and equilibrium of general force system.

UNIT –II (9+3)

Friction: Introduction, classification, laws of friction, coefficient of friction, angle of friction, ladder friction and wedge friction.

Plane Trusses: Rigid truss, stability and determinacy conditions, basic assumptions for a perfect truss, analysis of trusses by method of joints and method of sections of a cantilever and simply supported statically determinate pin-jointed trusses.

UNIT– III (9+3)

Centroid: Centroid of one dimensional figures, centroid of simple figures from first principles, centroid of composite sections.

Moment of Inertia: Moment of inertia of plane sections from first principles, theorems of moment of inertia – parallel axis theorem and perpendicular axis theorem, moment of inertia of standard sections and composite sections.

UNIT - IV (9+3)

Kinematics: Introduction to dynamics, rectilinear motion of a particle – displacement, velocity and acceleration, motion with uniform acceleration and motion with variable acceleration, curvilinear motion- rectangular components, components, acceleration of normal and tangential acceleration, projectile motion.

Kinetics: Rectilinear motion-equations of rectilinear motion, equations of dynamic equilibrium, D'Alembert's principle, curvilinear motion-equations of motion in rectangular components, tangential and normal components, equations of dynamic equilibrium, applications of work-energy, impulse –momentum principles of rectilinear motion and curvilinear motion.

Text Books:

1. Tayal A.K., *Engineering Mechanics: Statics and Dynamics*, 14th ed. New Delhi: Umesh Publishers, 2014.

Reference Books:

1. Timoshenko S., Young D.H., Rao J.V., and Sukumar Pati, *Engineering Mechanics in SI units*, 5th ed. New Delhi: McGraw Hill Education Pvt. Ltd., 2013.
2. Vijaya Kumar Reddy K., Suresh Kumar J. *Singer's, Engineering Mechanics Statics and Dynamics*, 3rd ed. (SI Units), 8th Reprint , New Delhi: BS Publications / BSP Books, 2014.
3. Bhavikatti S.S., *Engineering Mechanics*, 4th ed. New Delhi: New Age International, 2013 (reprint).
4. Basudeb Bhattacharyya, *Engineering Mechanics*, 9th ed. New Delhi: Oxford University Press, 2013.

Course Learning Outcomes (COs):

On completion of this course, the student will be able to...

CO1: articulate various force systems and their applications

CO2*: demonstrate concepts of friction and analyze plane trusses*

CO3: calculate centroid and moment of inertia of geometric and composite areas

CO4: analyze dynamics of a particle and its applications

Course Articulation Matrix (CAM): U18CE105/U18CE205 ENGINEERING MECHANICS																	
CO		**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CO1	U18CE105.1/ U18CE205.1	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
CO2	U18CE105.2/ U18CE205.2	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
CO3	U18CE105.3/ U18CE205.3	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
CO4	U18CE105.4/ U18CE205.4	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
U18CE105/ U18CE205		**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**1**

U18MH201 ENGINEERING MATHEMATICS- II

Class: B.Tech. II-Semester

Branch(s): ME, CSE, IT, CSN, CSIOT
CE, EEE, ECE, ECI,CSAIML

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in

LO1: various methods of solving system of linear equations and eigen value problems

LO2: double integral, triple integral and their applications.

LO3: vector differential calculus with few engineering applications.

LO4*: integration of vector valued functions with few engineering applications*

UNIT-I (9+3)

Matrices: Elementary transformations on a matrix. To find inverse of a matrix using elementary transformations- Rank of matrix, Normal form of a matrix, Solution of system of homogenous and non homogeneous linear equations, Linear dependence and independence of vectors.

Eigen values and Eigen vectors of a matrix- Cayley Hamilton's theorem, Reduction of a matrix to diagonal form, Reduction of a quadratic form to canonical form.

UNIT-II (9+3)

Multiple Integrals and Applications: Double integral, change of order of integration, Double integration in polar coordinates, Triple integrals, Applications: Area enclosed by plane curves, Volumes of solids, Calculation of mass, Center of gravity, Moment of Inertia of plane lamina.

Beta and Gama functions and their relations. Evaluation of improper integrals in terms of Beta and Gamma functions.

UNIT-III (9+3)

Vector Differential Calculus: Vector functions - Derivative of a vector function of a scalar variable, Velocity and acceleration, Curves in Space, Tangent, Principal normal, Binormal, Curvature, Torsion of a given curve and Frenet -Serret Formulae.

Scalar and vector point functions, Vector operators – Gradient of a scalar field, Directional derivative, angle between two surfaces.

Divergence of a vector field, Curl of a vector field and their physical interpretations. Irrotational fields & Solenoidal fields. to find scalar potential of a conservative vector field.

UNIT-IV (9+3)

Vector Integration: Integration of vector valued functions of a scalar variable, Application to find velocity and displacement of a particle. Line integral of scalar point and vector point functions, Applications: Work done by a force, Circulation; Surface Integral & Volume integral.

Green's theorem in plane, and area of a plane region using Green's theorem. Stokes theorem & Gauss divergence theorems (without proof)

Text Books:

[1] Grewal, B.S., Higher Engineering Mathematics, 43/e, Delhi, *Khanna Publishers* ,2014.

Reference Books:

[1] Kreyszig E, Advanced Engineering Mathematics,9th edition, Inc, U.K, John wiely *& sons,* 2013.

[2] Spiegel M., Vector Analysis -Schaum Series", McGraw Hill

[3] S.S. Sastry, Engineering Mathematics 3/e, Vol.II, Prentice Hall of India,2014

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *demonstrate matrix theory in solving system of linear equations and Eigen value problems*

CO2: *apply basic concepts of multiple integrals in evaluating physical quantities of real life engineering problems*

CO3: *apply differential operators on vector and scalar point functions and their few applications in the field of engineering*

CO4: *solve line, surface, volume integrals and corelate these with applications of Green, Stoke and Gauss divergence theorems*

Course Articulation Matrix (CAM): U18 MH101 ENGINEERING **MATHEMATICS- II**

CO		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	**U18MH201.1**	3	2	1	--	--	--	--	--	--	--	--	1	-	-
CO2	**U18MH201.2**	3	3	2	--	--	--	--	--	--	--	--	-	-	-
CO3	**U18MH201.3**	3	2	2	--	--	--	--	--	--	--	--	1	-	-
CO4	**U18MH201.4**	3	2	2	--	--	--	--	--	--	--	--	-	-	-
U18MH201		**3**	**2.25**	**1.75**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**1**		

U18CS202_R1 DATA STRUCTURES THROUGH C

Class: B. Tech II-Semester **Branch:** All Branches

Teaching Scheme :			
L	T	P	C
3	-	-	3

Examination Scheme:	
Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on

LO1: fundamentals data structures and their implementation with arrays
LO2: representation of data structures using stacks and various forms of queues
LO3: representing the data using linked lists
LO4: various sorting techniques on the given data and representing different hashing techniques

UNIT – I(9+3)

Introduction to Data Structures: Basic terminology, classification of data structures, operations on data structures, time and space complexity

Arrays: Operations on arrays-traversing an array, inserting an element in an array, deleting an element from an array, searching an element using linear search & binary search and their time complexities; sparse matrix representation.

Dynamic Memory Allocation: Memory allocation functions, dynamic memory allocation for single and two dimensional arrays

UNIT – II(9+3)

Stacks: Introduction to stacks, array representation of stacks, operations on a stack–push and pop; Multiple stacks, applications of stacks-recursion, fibonacci series, tower of hanoi, evaluation of expressions (infix to postfix conversion, evaluation of postfix expression)

Queues: Introduction to queues, array representation of queues, circular queues, deques, priority queues

UNIT - III(9+3)

Linked Lists: Basic terminologies, linked list versus arrays, memory allocation and de-allocation for a linked list, singly linked list with header, circular linked lists with header, doubly linked lists with header, circular doubly linked lists with header (linked list operations: traversing, searching, inserting, deleting, reversing, concatenation); XOR-Linked List, skip list, representing stack and queue using linked list. Time Complexities of the above linked list operations.

UNIT – IV(9+3)

Sorting Techniques: bubble sort, selection sort, insertion sort, shell sort and radix sort; time complexities of above sorting techniques.

Hashing: Hashing techniques, collision resolution techniques, closed hashing, open hashing, comparison of collision resolution techniques

Text Book:

[1] Debasis Samanta, "Classic Data Structures", *Prentice Hall India*, 2nd Edn., ISBN-13:978-81-203-3731-2,2009.

Reference Books:

[1] Reema Thareja, "Data Structures Using C", Oxford University Press, 2nd Edn., ISBN-13: 978-0-19-809930-7, 2014.
[2] E Balagurusamy, "Data Structure Using C",*McGraw Hill Education*, 1st Edn.,ISBN-13: 978-125-902-9547, 2017.
[3] Richard F. Gilberg and Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", Cengage Learning, 2nd Edn., ISBN-13: 9788131503140, 2007.

Course Research Papers(CRP): Research papers (Indexed journal/conference papers) relevant to the course content by the course faculty in CourseWeb page. Students have to write a two-page summary on CRP and submit as part of special assignment.

Course Patents (CP): Patents relevant to the course content will be posted by the course faculty in Course Web page. Students have to write a two-page summary on CP and submit as part of special assignment.

Course Projects: Course project is an independent project carried out by the student during the course period, the supervision of course faculty. Course faculty will post few course projects titles in Course Webpage. Students are encouraged to come up and experiment with the ideas that interest them

Course Learning Outcomes (COs):

After completion of this course, students' will be able to

CO1: implement programs using static & dynamic arrays for performing different manipulations on homogeneous data
CO2: apply the linear data structures such as stacks and queues in manipulating the data with LIFO or FIFO order.
CO3: organize and retrieve the data through various linked list representations in non-contiguous memory storing
CO4: apply different sorting techniques on unsorted data and able to store the data using hashing techniques to retrieve the data very effectively

Course Articulation Matrix (CAM): U18CS202 DATA STRUCTURES THROUGH C																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18CS202.1	2	2	2	2	1	1	-	1	1	1	-	1	2	2	2
CO2	U18CS202.2	2	2	2	2	1	1	-	1	1	1	-	1	2	2	2
CO3	U18CS202.3	2	2	2	2	1	1	-	1	1	1	-	2	2	2	2
CO4	U18CS202.4	2	2	2	2	1	1	-	1	1	1	-	2	2	2	2
U18CS202		2	2	2	2	1	1	-	1	1	1	-	1.5	2	2	2

U18EE106 / U18EE206 BASIC ELECTRICAL ENGINEERING LABORATORY

Class: B.Tech. I-Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT,CSIoT
CE, EEE, ECE, ECI, CSAIML

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40
End Semester Examination	60

Course Learning Objectives (LOs):
This laboratory course will develop students' knowledge in/on
LO1: domestic wiring & basic electrical installations
LO2: network elements and analysis of electrical circuits
LO3: 1-phase and 3-phase AC circuits
LO4: measurement of illumination

LIST OF EXPERIMENTS

1. Verification of Kirchhoff's Laws
2. Verification of voltage divider rule and current divider rule
3. Verification of Thevenin's theorem
4. Verification of Norton's theorem
5. Verification of Superposition theorem
6. Verification of Maximum power transfer theorem
7. Determination of internal parameters of a choke coil
8. Impedance calculations and phasor representation of R-L series circuit
9. Impedance calculations and phasor representation of R-C series circuit
10. Load test on 1-phase transformer
11. Voltage and current relationships between line & phase quantities for balanced 3-phase star & delta connections
12. Measurement of illumination for various lighting sources

** DEMONSTRATION OF ELECTRICAL INSTALLATIONS **

[Wires, Cables, Fuse, MSB, Batteries, Earthing]

Text Books:

1. *Basic Electrical Engineering Laboratory Manual*, Department of EEE, KITSW

Course Outcomes (COs):
On completion of this course, the students will be able to…
CO1: handle basic electrical equipment
CO2: understand the concepts of network elements and theorems
CO3: understand fundamental concepts of 1-phase and 3-phase AC circuits
CO4: determine illumination of various lighting sources

Course Articulation Matrix (CAM): U18EE106 / U18EE206BASIC ELECTRICAL ENGINEERING LABORATORY													
CO		**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	U18EE106/U18EE206.1	2	2	1	1	1	1	-	-	2	2	1	2
CO2	U18EE106/U18EE206.2	2	1	-	1	-	1	-	-	2	1	1	1
CO3	U18EE106/U18EE206.3	2	2	2	2	1	1	1	-	2	1	2	1
CO4	U18EE106/U18EE206.4	2	1	1	2	1	1	1	-	2	1	1	1
U18EE106/ U18EE206		**2**	**1.5**	**1.33**	**1.5**	**1**	**1**	**1**	**-**	**2**	**1.25**	**1.25**	**1.25**

U18CS107 PROGRAMMING FOR PROBLEM SOLVING USING C LAB

Class: B.Tech. I- Semester

Branch(s): ME, CSE, CSN, IT, CSIoT CE, EEE, ECE, ECI, CSAIML

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1*: operators and decision making statements*

LO2: *loop techniques and array operations for problem solving*

LO3: *string functions and modular programming approach for problem solving*

LO4: *structures, unions, pointers and files*

LIST OF EXPERIMENTS

1. Programs using input output functions, operators (arithmetic, relational and conditional)
2. Programs using operators (bit-wise, logical, increment and decrement)
3. Programs using conditional control structures: if, if-else, nested if
4. Programs using else if ladder, switch and goto
5. Programs using loop control structures: while
6. Programs using loop control structures: do-while and for
7. Programs on one dimensional array and two dimensional arrays
8. Programs on string handling functions
9. Programs on different types of functions, parameter passing using call-by-value, call- by-reference, recursion and storage classes
10. Programs using structures, unions, pointers to arrays and pointers to strings
11. Programs using array of pointers and pointers to structures
12. File operations and file handling functions for sequential file

Laboratory Manual:

1. Programming in C Lab Manua, Dept. of CSE, KITSW.

Reference Books:

1. E.Balagurusamy, Programming in ANSIC**,** 6th ed, New Delhi: Tata McGraw Hill, 2012
2. Kerninghan and Ritchie, The C Programming Language, 2nd ed, New Delhi: Prentice Hall of India, 1988
3. Yaswanth Khanetkar, Let Us C, 13th ed. Bangalore: BPB Publications, 2012

Course Learning Outcomes (COs):

After completion of the course, the students will be able to

CO1: *develop programs using operators and decision making statements*
CO2: *apply the loops and array operations for logical programming*
CO3: *implement string programs and apply modular programming techniques*
CO4: *develop programs using structures, unions, pointers and files*

Course Articulation Matrix (CAM): U18CS107 PROGRAMMING FOR PROBLEM SOLVING USING C LAB																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18CS102.1	1	1	1	1	-	-	-	1	1	1	-	1	**2**	**1**	**1**
CO2	U18CS102.2	1	2	2	1	-	-	-	-	1	1	-	1	**2**	**2**	**2**
CO3	U18CS102.3	1	2	2	1	-	-	-	-	1	1	-	1	**2**	**2**	**2**
CO4	U18CS102.4	1	2	2	2	1	-	-	-	1	1	-	1	**2**	**2**	**2**
U18CS102		**1**	**1.75**	**2.25**	**1.25**	**1**	-	-	1	1	1	-	**1**	**2**	**1.75**	**1.75**

U18PH108/ U18PH208 - ENGINEERING PHYSICS LABORATORY

Class: B.Tech. I– Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives (LOs):

This laboratory course will develop students' knowledge in/on...

LO1: determination of various properties like rigidity modulus, moment of inertia, acceleration due to gravity and other elastic properties from SHMs

LO2: determination of the wavelengths, diameters of thin wires, limit of resolution and optical activity with high degree of accuracy from interference, diffraction and polarization phenomena using conventional light

LO3: determination of the wavelengths, slit widths with high degree of accuracy from diffraction phenomena using laser light

LO4: determination of optical fiber characteristics

LIST OF EXPERIMENTS

1. Determination of (a) rigidity modulus of a given wire and (b) moment of inertia of a ring using torsional pendulum
2. Acceleration due to gravity (g) by compound pendulum
3. Determination of force constant of a spiral spring using static method
4. Determination of wavelengths in mercury light using diffraction Grating- Normal incidence method
5. Determination of wavelength of He-Ne laser using reflection grating
6. Resolving power of a telescope
7. Determination of slit width using He-Ne laser
8. Dispersive power of a prism using spectrometer
9. Determination of wavelength of a monochromatic light using Newton's rings
10. Determination of thickness of thin wire using wedge method
11. Determination of specific rotation of sugar solution using Polarimeter (Saccharimeter)
12. Numerical aperture of an optical fiber

Laboratory Manual:

1. *Manual for Engineering Physics Laboratory* prepared by the Department of Physical Sciences/Physics, KITSW

Reference Book:

1. C.V. Madhusudhana Rao and V. Vasanth Kumar, *Engineering Lab Manual*, Scitech publications India Pvt. Ltd, 3/e, 2012.

Course Learning Outcomes (COs):

After completion of this course, students will be able to …

CO1: determine precisely the values of elastic properties, moments of inertia, acceleration due to gravity, etc

CO2: assess precise measurements of wavelengths, diameter of thin wires, limit of resolution and optical rotation from light phenomena (Interference, diffraction and polarization)

CO3: evaluate the wavelengths, slit widths from diffraction patterns using laser light

CO4: estimate the numerical aperture, acceptance angle and fiber losses of optical fibers

Course Articulation Matrix (CAM):

U18PH108/ U18PH208 - ENGINEERING PHYSICS LABORATORY

CO		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	U18PH108.1/ U18PH208.1	1	-	-	3	-	-	2	-	2	-	-	-	-	-
CO2	U18PH108.2/ U18PH208.2	1	-	-	3	-	-	2	-	2	-	-	-	-	-
CO3	U18PH108.3/ U18PH208.3	1	-	-	3	-	-	2	-	2	-	-	-	-	-
CO4	U18PH108.4/ U18PH208.4	2	-	1	3	-	-	2	-	2	-	-	-	-	-
U18PH108/U18PH208		1.25	-	1	3	-	-	2	-	2	-	-	-	-	-

U18CH108 / U18CH208 ENGINEERING CHEMISTRY LABORATORY

Class: B.Tech. I -Semester
B.Tech. II -Semester

Branch(s): CE, EEE, ECE, ECI, CSAIML
ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop students knowledge in /on..

LO1: water analysis techniques
LO2: determination of metals from their ores, concepts of adsorption
LO3: instrumentation methods of chemical analysis
LO4: saponification/acid value of an oil

LIST OF EXPERMENTS

1. Determination of alkalinity of test sample of water
2. Estimation of available chlorine in test sample of bleaching powder
3. Determination of hardness of water by using complexometric method
4. Determination of calcium in lime stone / dolomite
5. Estimation of cupric ions in the test solution
6. Adsorption of an acid on charcoal -applicability of adsorption isotherm
7. Synthesis of a polymer
8. Conductometric titrations
9. Potentiometric titrations
10. Colorimetric analysis-verification of Lambert-Beer's law
11. Estimation of metal ion using ion-exchange resin
12. Determination of saponification / acid value of an oil

Laboratory Manual:

1. *Manual for Engineering Chemistry Laboratory* prepared by the Department of Physical Sciences/Chemistry, KITSW

Course Learning Outcomes (COs):

On completion of this course, students will be able to...

CO1: determine water quality parameters - alkalinity, hardness
CO2: assess metals present in their ores, apply Freundlich adsorption isotherm
CO3: handle analytical instruments for chemical analysis
CO4: measure saponification /acid value of an oil

Course Articulation Matrix (CAM):

U18CH108/U18CH208 ENGINEERING CHEMISTRY LABORATORY

CO		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	U18CH108.1/ U18CH208.1	2	-	1	3	-	1	2	-	2	-	-	-	-	-
CO2	U18CH108.2/ U18CH208.2	2	-	1	3	-	-	2	-	2	-	-	-	-	-
CO3	U18CH108.3/ U18CH208.3	2	-	1	3	-	-	3	-	2	-	-	-	-	-
CO4	U18CH108.4/ U18CH208.4	2	-	1	3	-	-	1	-	2	-	-	-	-	-
U18CH108/ U18CH208		2	-	1	3	-	1	2	-	2	-	-	-	-	-

U18CS207_R1 DATA STRUCTURES THROGH 'C' LABORATORY

Class: B. Tech II-Semester **Branch:** ALL Branches

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop student's knowledge in/on

LO1: implementing array operations
LO2: organizing the data using stacks and queues
LO3: memory and data management using linked list
LO4: different types of sorting techniques

List of Experiments

Experiment-I

1. Program to implement initialization of array and perform traversal operations in both the directions
2. Program to implement searching operation on array using Linear Search
3. Program to display the count of occurrences of every number in an array

Experiment-II

4. Program to implement searching operation on array using Binary Search
5. Program to implement insertion operation on array
6. Program to implement deletion operations on array

Experiment-III

7. Program to represent and display the sparse matrix
8. Program to implement initialization of arrays and traversal operation with DMA
9. Program to implement matrix addition and subtraction with DMA

Experiment-IV

10. Program to implement matrix multiplication with DMA
11. Program to implement stack operations
12. Program to convert infix expression into postfix

Experiment-V

13. Program to evaluate given postfix expression
14. Program to define recursive function to solve tower of hanoi puzzle
15. Program to display the Fibonacci series with the help of recursive function
16. Program to implement MultiStack

Experiment-VI

17. Program to implement queue operations using arrays
18. Program to implement circular queue operations using arrays
19. Program to implement double ended queue operations using arrays

Experiment-VII

20. Program to implement priority queues
21. Program to create single linked list with header and implement its operations

Note:- Linked list Operations: i) traversing ii) inserting iii) deleting iv) searching v) reversing vi) concatination

Experiment-VIII

22. Program to create circular linked list with header and implement its operations
23. Program to create double linked list with header and implement its operations

Experiment-IX

24. Program to create circular double linked list with header and implement its operations
25. Program to implement stack operations using linked list
26. Program to implement queue operations using linked list

Experiment-X

27. Program to implement XOR linked list with insertion and traversal operations
28. Program to implement bubble sort

Experiment-XI

29. Program to implement selection sort
30. Program to implement insertion sort

Experiment-XII

31. Program to implement shell sort
32. Program to implement radix sort
33. Program to implement hash table.

Laboratory Manual:

[1] Data Structures Using C' laboratory manual, *prepared by faculty of Dept. of Computer Science &Engineering.*

Reference Books:

[1] Debasis Samanta, "Classic Data Structures", *Prentice Hall India*, 2nd Edn., ISBN-13:978-81-203-3731- 2,2009.
[2] Reema Thareja, "Data Structures Using C", *Oxford University Press*, 2nd Edn., ISBN-13: 978-0-19-809930- 7, 2014.
[3] E.Balagurusamy, "Programming in ANSI-C", *Tata McGraw Hill*, 6th Edn., ISBN-13: 978-1-25-90046-2, 2012.

Course Learning Outcomes (COs):

After completion of this course, students' will be able to

CO1: apply the concepts of static & dynamic arrays to performing different manipulations on homogeneous data
CO2: apply the linear data structures such as stacks and queues in manipulating the data with LIFO or FIFO order.
CO3: apply various linked list representations in non-contiguous memory allocation for organizing and retrieving the data effectively
CO4: apply different sorting techniques on unsorted data and able to store the data using hashing techniques to retrieve the data very effectively

Course Articulation Matrix (CAM): U18CS207 DATA STRUCTURES THROUGH C

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18CS207.1	2	2	2	2	1	1	-	1	1	1	-	1	**2**	**2**	**2**
CO2	U18CS207.2	2	2	2	2	1	1	-	1	1	1	-	1	**2**	**2**	**2**
CO3	U18CS207.3	2	2	2	2	1	1	-	1	1	1	-	2	**2**	**2**	**2**
CO4	U18CS207.4	2	2	2	2	1	1	-	1	1	1	-	2	**2**	**2**	**2**
U18CS207		2	2	2	2	1	1	-	1	1	1	-	1.5	2	**2**	**2**

U18ME109 / U18ME209 WORKSHOP PRACTICE

Class: B. Tech. I- Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation :	40 marks
End Semester Exam :	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on...
LO1: tools and development of joints in carpentry
LO2: mould cavity using single and two piece pattern
LO3: tools and development of joints using fitting and plumbing
LO4: principle and operation of arc welding, gas welding and soldering

LIST OF EXPERIMENTS

Carpentry:
1. Prepare a cross half lap joint
2. Prepare a half lap dovetail joint
3. Prepare mortise and tenon joint

Foundry:
1. Prepare a sand mould using single piece pattern-bracket
2. Prepare a sand mould using two piece pattern-dumbbell

Fitting:
1. Prepare a square fit.
2. Prepare a half round fit.

Plumbing:
1. Prepare a PVC Pipe joint using elbows & tee
2. Prepare a PVC Pipe joint using union & coupling

Welding:
1. Prepare a single V – Butt Joint using Arc welding
2. Preparation of pipe joint using gas welding
3. Soldering and de-soldering of Resistor in PCB.

Laboratory Manual:
[1] Workshop Practice Manual, Dept. of ME, KITSW.

Reference Book:
[1] Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy., *Elements of Workshop Technology,* Vol-I-2008 &Vol-II-2010, Media Promoters and publishers Pvt. Ltd, India.

Course Learning Outcomes (COs):
On completion of the course, the student will be able to...
CO1: identify and apply suitable tools to produce cross, half lap, mortise & tenon joints in carpentry trade
CO2: apply basic gating system and produce a mould cavity for single & split pattern
CO3: identify and apply suitable tools to make various joints in fitting & plumbing trade
CO4: adapt suitable welding process and build joints in welding trade

Course Articulation Matrix (CAM): U18ME109 / U18ME209 WORKSHOP PRACTICE													
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**U18ME109.1 / U18ME209.1**	2	1	1	-	-	1	-	-	-	1	-	1
CO2	**U18ME109.2 / U18ME209.2**	2	1	1	-	-	1	-	-	-	1	-	1
CO3	**U18ME109.3 / U18ME209.3**	2	1	1	-	-	1	-	-	-	1	-	1
CO4	**U18ME109.4 / U18ME209.4**	2	1	1	-	-	1	-	-	-	1	-	1
U18ME109 / U18ME209		**2**	**1**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**-**	1

U18CH109/ U18CH209 ENVIRONMENTAL STUDIES

Class: B.Tech. I -Semester
B.Tech. II -Semester

Branch(s):CE, EEE, ECE, ECI,CSAIML
ME, CSE, CSN, IT, CSIoT

Teaching Scheme

L	T	P	C
2	-	-	-

Examination Scheme:

Continuous Internal	40 marks
End Semester	60 marks

Course Learning objectives (LOs):
This course will develop students' knowledge in/on...
LO1: *necessity to use natural resources more equitably*
LO2 : *concepts of ecosystem and the importance of biodiversity conservation*
LO3 : *causes, effects and control measures of various environmental issues*
LO4 : *issues involved in enforcement of environmental legislation*

UNIT-I(6)

Introduction - The multidisciplinary nature of environmental studies - definition, scope and importance.
Natural Resources: Forest Resources - Use and over–exploitation of forests, deforestation, timber extraction, mining, dams - their effects on forests and tribal people; **Water Resources -** Use and over-utilization of surface and ground water, floods, drought, conflicts over water; **Mineral Resources -** Environmental effects of extracting and using mineral resources; **Agricultural Land -** Land as a resource, land degradation, soil erosion and desertification; **Food Resources** - World food problems, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity; **Energy Resources -** Renewable and non-renewable energy sources, use of alternate energy sources.

UNIT-II(6)

Ecosystem and Biodiversity: Ecosystem - Concepts of an ecosystem, food chain, food webs, ecological pyramids, energy flow in the ecosystem and ecological succession;
Biodiversity and its Conservation – Introduction, definition, genetic, species and ecosystem diversity, value of biodiversity, biodiversity in India, hot spots of biodiversity, man-wildlife conflicts, endangered and endemic species of India, in-situ and ex-situ conservation.

UNIT-III(6)

Environmental Pollution: Global climatic change, green house gases, effects of global warming, ozone layer depletion; International conventions/protocols - Earth summit, Kyoto protocol and Montreal protocol; causes and effects of air, water, soil, marine and noise pollution with case studies; solid and hazardous waste management, effects of urban industrial and nuclear waste; natural disaster management - flood, earthquake, cyclone and landslides.

UNIT-IV(6)

Social Issues and the Environment: **Role of Individual and Society** - Role of individual in prevention of pollution, water conservation, Rain water harvesting and watershed management; **Environmental Protection / Control Acts** - Air (Prevention and control of Pollution) Act- 1981, water (Prevention and Control of Pollution) Act-1974, water Pollution Cess Act-1977, Forest conservation Act (1980 and 1992), wildlife Protection Act 1972 and environment protection Act 1986, issues involved in enforcement of environmental legislations; **Human Population and Environment** - Population growth, family welfare programmes, women and child welfare programmes, role of information technology in environment and human health.

Text Book:

1. Erach Bharucha, *Text Book of Environmental Studies for Under Graduate Courses,* 2nd ed . Universities Press (India) Pvt. Ltd, 2013.

Reference Books:

1. Y. Anjaneyulu, *Introduction to Environmental Science* , B.S. Publications, 2004.
2. Gilbert M. Masters, *Introduction to Environmental Engineering & Science* , 3 rd ed. Prentice Hall of India ,1991.
3. Anubha Kaushik, C.P. Kaushik, *Environmental Studies*, 4th ed. New Age International Publishers, 2014.
4. R.Rajagopalan, *Environmental Studies from crisis to cure*, *Oxford University Press*, 2nd ed. 2011.

Course Learning Outcomes(COs):

On completion of this Course, the student will be able to…

CO1 : *investigate any environmental issue using an interdisciplinary framework*

CO2 : *formulate an action plan for sustainable alternatives and conserving biodiversity that integrates science, humanist, social and economic perspective*

CO3 : *identify and explain the complexity of issues and processes which contribute to an environmental problem*

CO4 : *participate effectively in analysis and problem-solving through knowledge in environmental legislations*

Course Articulation Matrix (CAM): U18CH109/ U18CH209 ENVIRONMENTAL STUDIES

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	U18CH109.1/ U18CH209.1	2	1	2	1	-	2	1	-	1	-	-	-		
CO2	U18CH109.2/ U18CH209.2	-	-	2	-	-	1	2	-	1	-	-	-		
CO3	U18CH109.3/ U18CH209.3	1	2	1	-	-	1	1	1	1	-	-	-		
CO4	U18CH109.4/ U18CH209.4	-	-	1	-	-	1	2	-	1	-	-	-		
U18CH109/ U18CH209		1.5	1.5	1.5	1	-	1.25	1.5	1	1	-	-	-		

U18EA110 / U18EA210 EAA: SPORTS/YOGA/NSS

Class: B. Tech. I -Semester
B. Tech. II -Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML

Teaching Scheme :

L	T	P	C
-	-	-	-

Examination Scheme :

Continuous Internal Evaluation	
End Semester Exam	

I. SPORTS

Course Learning objectives (LOs):
The objectives of the Sports is to..
LO1: to perform and engage in a variety of physical activities
LO2 : to develop and maintain physical health and fitness through regular participation in physical activities
LO3: to demonstrate positive self esteem, mental health and physiological balance through body awareness and control
LO4 : to exhibit the spirit of fair play, team work and sportsmenship

Activities related to:

1. Physical Fitness
2. Games & Sports

II. NATIONAL SERVICE SCHEME (NSS)

Course Learning objectives (LOs):
The objectives of the NSS is to..
LO1: arouse the social consciousness of the students
LO2 : provide them with opportunity to work with people in villages and slums
LO3 : expose them to the reality of life
LO4 : bring about a change in their social perceptions
LO5 : develop competence required for responsibility sharing and team work

List of Activities:

1. Shramadanam
2. Tree Plantation
3. General Medical camps in Villages
4. Awareness on Eye Donation
5. Awareness on “Child Labour and Child Marriages”
6. Awareness programs on “ Literacy, Good Health Practices, etc.”
7. Safe Riding Program
8. Awareness program on “RTI Act”
9. Awareness on Blood Donation

Course Learning Outcomes (COs):
After completion of the course, the student will be able to..
CO1: develop his/her personally through community service rendered
CO2 : apply their education to find solutions to individual and community problems
CO3 : acquire capacity to meet emergencies and natural disasters
CO4 : acquire a democratic attitude, leadership qualities and practice national integration