Basaveshwar Engineering College, Bagalkote
B.EI- Semester Scheme of Teaching and Examinations
(Academicyear2023-24)

I –Semester (Computer Science Engineering Stream) Branches: CSE/ISE/AIML/BT (Chemistry Group)

Sl. No.	Course			TD	Teaching (Hours/Week)		Examination				Credits
	Category	Code	Title		Theory Lecture	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	P					
1.	BSC(IC)	22UMA103C	Mathematics for Computer Sciences-I	Mathematics	3	2	3	50	50	100	4
2.	BSC(IC)	22UCH111C	Chemistry for Computer Sciences	Chemistry	3	2	3	50	50	100	4
3.	ESC	22UCS119C	Principles of Programming using 'C'	Computer Science	2	2	3	50	50	100	3
4.	ESC-I	22UXXXXXN	Engineering Science Course -I	Respective Engg. Dept	2 3	2 0	3	50	50	100	3
5.	ETC - I	22UXXXXXB	Emerging Technology Course - I	Any Engg. Dept.	3	0	3	50	50	100	3
	OR										
	PLC-I	22UCSXXXB	Programming Language Course-I	Any Engg. Dept.	2	2	3	50	50	100	3
6.	HSSC	22UHS124C	Communicative English	Humanities	1	0	1	50	50	100	1
7.	HSSC	22UHS126C 22UHS127C	Samskruthika Kannada* Balake Kannada**	Humanities	1	0	1	50	50	100	1
8.	AEC	22UHS129C	Innovation and Design Thinking	Any Dept	1	0	1	50	50	100	1
				Total	**16/16**	**8/8**		**400**	**400**	**800**	**20**

SDA	::	Skill Development Activities	**TD**	:	Teaching Department	**BSC**	:	Basic Science Course
ESC	:	Engineering Science Courses	**ETC**	:	Emerging Technology Course	**AEC**	:	Ability Enhancement Course
HSSC	:	Humanities & Social Science Course	**SDC**	:	Skill Development Course	**IC**	:	Integrated Course (Theory & Lab integrated)
CIE	:	Continuous Internal Evaluation	**SEE**	:	Semester End Examination	**PLC**	:	Programming Language Course

*The student who has studied Kannada language as one of the subjects eitherin10th, 12thstd.or PUC-II has to register
**The student who has not studied Kannada language as one of the subjects either in 10th, 12thstd. or PUC-II has to register

UHV-I:Student'sInductionProgram (SIP) The objective is to provide newly admitted students i) a broad understanding of society, relationships and values ii) knowledge &skill of his/her study iii) to nurture character as an essential quality by which he/she shall understand and fulfill the responsibility as an engineer.

Activities: CreativeArts,UniversalHumanValues,Literary,ProficiencyModules,PhysicalActivity,LecturesbyEminentPeople,VisitstoLocalareas,Familiarization with Department/Branch and Innovation, etc.

AICTE Activity Points (AAP):(FordetailsrefertoChapter6,AICTE Activity Point Program, Model Internship Guidelines)

To be earned by all students admitted to BE program over and above the academic grades. A regular student admitted to 4 years Degree program and also through lateral entry shall earn 100 and 75 Activity Points respectively for the award of degree. Students transferred from other Universities to the Vsemesterarerequiredtoearn50ActivityPointsfromtheyearofentry.TheActivityPointsearnedshallbereflectedinthestudent'sVIIIsemesterGradeCard.Theacti vitiescan be spread over the course duration, any time during the semester weekends and holidays, as per the convenience of a student from the year of entry to the program. However, the minimum duration (number of hours)should be fulfilled. Activity Points (non-credit)do not affect SGPA/CGPA and is not considered for vertical progression. In case students fail to earn the prescribed AAP, the VIII Semester Grade Card shall be issued only after earning the required points. AStudentshallbeeligiblefortheawardofthedegreeonlyafterthereleaseoftheVIIIsemesterGradeCard.

(ESC- I)Engineering Science Courses -I

Code	Title	L	T	P
22UME122N	Introduction to Mechanical Engineering	3	0	0
22UCV118N	Introduction to Civil Engineering	3	0	0
22UEE116N	Introduction to Electrical Engineering	3	0	0
22UEC114N	Introduction to Electronics Engineering	3	0	0

(ETC- I) Emerging Technology Courses-I

Code	Title	L	T	P
22UEC134B	Introduction to Embedded Systems	3	0	0
22UEC135B	Introduction to Communication Technology	3	0	0
22UEE136B	Renewable Energy Sources	3	0	0
22UCV138B	Green Buildings	3	0	0
22UCV139B	Waste Management	3	0	0
22UCS140B	Introduction to Internet of Things (IOT)	3	0	0
22UCS141B	Introduction to Cyber Security	3	0	0
22UME142B	Composite Materials	3	0	0
22UME143B	Introduction to Robotics	3	0	0
22UBT148B	Biomass and Bio-energy	3	0	0

(PLC- I)Programming Language Courses-I

Code	Title	L	T	P
22UCS130B	Introduction to Web Programming	2	0	2
22UCS131B	Introduction to Python Programming	2	0	2
22UCS132B	Basics to JAVA programming	2	0	2
22UCS133B	Introduction to C++Programming	2	0	2

NOTE: The student has to,

i) Select one course from ESC –I group

ii) Select one course from either ETC –I o rPLC-I group

iii) Opt for the courses from ESCI group without repeating the course either in1st or 2nd semester

If the student studies a subject from ETC - I in 1st semester, then he/she has to select the course from PLC-I in the2nd semester and vice-versa

Basaveshwar Engineering College, Bagalkote

B.E II- Semester Scheme of Teaching and Examinations

(Academic year 2023-24)

II -Semester (Computer Science Engineering Stream) Branches: CSE/ISE/AIML/BT (Physics Group)

Sl. No.	Course			TD	Teaching (Hours/Week)		Examination				Credits
	Category	Code	Title		Theory Lecture	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	P					
1.	BSC (IC)	22UMA203C	Mathematics for Computer Sciences -II	Mathematics	3	2	3	50	50	100	4
2.	ASC (IC)	22UPH207C	Physics for Computer Sciences	Physics	3	2	3	50	50	100	4
3.	ESC	22UME223C	CAED	Civil/Mechanical/IP	2	2	3	50	50	100	3
4.	ESC-I	22UXXXXXN	Engineering Science Course-I	Respective Engg. Dept	2 3	2 0	3	50	50	100	3
5.	ETC - I	22UXXXXXB	Emerging Technology Course - I	Any Engg. Dept.	3	0	3	50	50	100	3
	OR										
	PLC-I	22UCSXXXB	Programming Language Course-I	Any Engg. Dept.	2	2	3	50	50	100	3
6.	HSSC	22UHS224C	Professional writing skills in English	Humanities	1	0	1	50	50	100	1
7.	HSSC	22UHS225C	Constitution of India	Humanities	1	0	1	50	50	100	1
8.	AEC	22UHS228C	Scientific Foundations of Health	Any Dept	1	0	1	50	50	100	1
				Total	**16/16**	**8/8**		**400**	**400**	**800**	**20**

SDA	::	Skill Development Activities	**TD**	:	Teaching Department	**BSC**	:	Basic Science Course
ESC	:	Engineering Science Courses	**ETC**	:	Emerging Technology Course	**AEC**	:	Ability Enhancement Course
HSSC	:	Humanities & Social Science Course	**SDC**	:	Skill Development Course	**IC**	:	Integrated Course (Theory & Lab integrated)
CIE	:	Continuous Internal Evaluation	**SEE**	:	Semester End Examination	**PLC**	:	Programming Language Course

UHV-I:Student'sInductionProgram(SIP) The objective is to provide newly admitted students i) a broad understanding of society, relationships and values ii) knowledge &skill of his/her study iii) to nurture character as an essential quality by which he/she shall understand and fulfill the responsibility as an engineer.

Activities: Creative Arts, Universal Human Values, Literary, Proficiency Modules, Physical Activity, Lectures by Eminent People, Visits to Local areas Familiarization with Department/ Branch and Innovation, etc

AICTE Activity Points (AAP):(FordetailsrefertoChapter6,AICTE Activity Point Program, Model Internship Guidelines)

To be earned by all students admitted to BE program over and above the academic grades. A regular student admitted to 4 years Degree program and also through lateral entry shall earn 100 and 75 Activity Points respectively for the award of degree. Students transferred from other Universities to the Vsemesterarerequiredtoearn50ActivityPointsfromtheyearofentry.The Activity Points earned shall be reflected in the student's VIII semester Grade Card. The activities can be spread over the course duration, any time during the semester weekends and holidays, as per the convenience of a student from the year of entry to the program. However, the minimum duration (number of hours) should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and is not considered for vertical progression. In case students fail to earn the prescribed AAP, the VIII Semester Grade Card shall be issued only after earning the required points. A student shall be eligible for the award of the degree only after the release of the VIII semester Grade Card.

(ESC- I)Engineering Science Courses -I

Code	Title	L	T	P
22UME222N	Introduction to Mechanical Engineering	3	0	0
22UCV218N	Introduction to Civil Engineering	3	0	0
22UEE216N	Introduction to Electrical Engineering	3	0	0
22UEC214N	Introduction to Electronics Engineering	3	0	0

(ETC- I) Emerging Technology Courses-I

Code	Title	L	T	P
22UME243B	Introduction to Robotics	3	0	0
22UME242B	Composite Materials	3	0	0
22UCV238B	Green Buildings	3	0	0
22UCV239B	Waste Management	3	0	0
22UCS240B	Introduction to Internet of Things(IOT)	3	0	0
22UCS241B	Introduction to Cyber Security	3	0	0
22UEC234B	Introduction to Embedded Systems	3	0	0
22UEC235B	Introduction to Communication Technology	3	0	0
22UEE236B	Renewable Energy Sources	3	0	0
22UBT248B	Biomass and Bio-energy	3	0	0

(PLC- I)Programming Language Courses-I

Code	Title	L	T	P
22UCS230B	Introduction to Web Programming	2	0	2
22UCS231B	Introduction to Python Programming	2	0	2
22UCS232B	Basics to JAVA programming	2	0	2
22UCS233B	Introduction to C++Programming	2	0	2

NOTE: The student has to,

i) Select one course from ESC –I group

ii) Select one course from either ETC-I or PLC- I group

iii) Opt for the courses from ESC-I groupwithoutrepeatingthecourseeitherin1st or 2nd semester

If the student studies a subject from ETC - I in 1st semester, then he/she has to select the course from PLC-I in the 2nd semester and vice-versa

22UMA103C	MATHEMATICS FOR COMPUTER SCIENCES-I (INTEGRATED)	CREDITS:04
L:T:P: 3:0:2		CIE MARKS : 50
TOTAL HOURS : 60 (40L+20 P)		SEE MARKS : 50

Course Objectives:

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students for self–study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.

UNIT-I	10 Hrs.

Calculus

Introduction to polar coordinates and curvature relating to Computer Science and engineering.

Polar coordinates, Polar curves, angle between the radius vector and the tangent, angle between two Curves. Pedal equations. Curvature and Radius of curvature (no proof) - Cartesian, Parametric, Polar and Pedal forms Problems.

Self-study: Center and circle of curvature, evolutes and involutes.

Applications: Computer graphics, Image processing.

UNIT-II	10 Hrs.

Series Expansion and Multivariable Calculus

Introduction of series expansion and partial differentiation in Computer Science & Engineering applications.

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms - L'Hospital's (0/0,∞/∞,∞-∞) rule-Problems.

Partial differentiation, total derivative - differentiation of composite functions. Jacobian and problems. Maxima and minima for a function of two variables. Problems.

Self-study: Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

Applications: Series expansion in computer programming, Errors and approximations, calculators.

UNIT-III	10 Hrs.

Ordinary Differential Equations (ODEs) of first and Higher order

Introduction to first and higher-order ordinary differential equations pertaining to the applications for Computer Science engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations - Integrating factors on $1/N\ (\partial M/\partial y - \partial N/\partial\ )\ and\ 1/M\ (\partial N/\partial x - \partial M/\partial y\ )$. Orthogonal trajectories and Newton's law of cooling.

Higher-order linear ODEs with constant coefficients - Inverse differential operator, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations - Problems.

Self-Study: Applications of ODEs .

Applications: Rate of Growth or Decay, Conduction of heat. Oscillations of a spring, Transmission lines, Highway engineering.

UNIT-IV	10 Hrs.

Modular Arithmetic and Linear Algebra

Introduction of modular arithmetic and its applications in Computer Science and Engineering:

Introduction to Congruences, Linear Congruences, The Remainder theorem, Solving Polynomials,

Linear Diophantine Equation, System of Linear Congruences, Euler's Theorem, Wilson Theorem and Fermat's little theorem. Applications of Congruences-RSA algorithm.

Introduction of linear algebra related to Computer Science & Engineering :

Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigenvalues and Eigenvectors, Rayleigh's power method to find the dominant Eigenvalue and Eigenvector.

Self-Study: Divisibility, GCD, Properties of Prime Numbers, Fundamental theorem of Arithmetic. Solution of system of equations by Gauss-Jacobi iterative method. Inverse of a square Matrix by Cayley- Hamilton theorem.

Applications: Cryptography, encoding and decoding, RSA applications in public key encryption. Boolean matrix, Network Analysis, Markov Analysis, Critical point of a network system. Optimum solution.

List of Experiments:

1 2D Plots for Cartesian curves

i. Plot of parabola $y = x^2$,$and\ y = sinx$,$y = tanx$
ii. Plot of Perfect parabola $y = x^2$
iii. Change the color (Green) of perfect color perfect parabola
iv. Change the color (Red) of perfect color perfect parabola
v. Draw a red color with ' - -' perfect parabola
vi. Draw a red color with ' *' perfect parabola
vii. Draw a red color with axes label perfect parabola
viii. Draw a perfect parabola with animation
ix. Draw parametric curves cycloid
   a. $x = a(t + sint)$,$y = a(1 + cost)$
   b. x = a(t – sint); y = a (1-cost)
   c. x=a(t-sint); y=a(1+cost)
   d. x=a(t + sint), y=a(1-cost)
   e. x=t^2 , y=t-(t^3/3)

2 Plotting of polar

i) Cardiod r = a+b cosθ
ii) Cardiod r=a+bcosθ, if a>b
iii) Cardiod r = a+b cosθ, if b>a
iv) Draw polar petals r = 2 cos4θ
v) R=2cosθ, r=2cos7θ, r=2 cos6θ, r=2cos5θ
vi) Cardoid $r = a(1 + cos\theta)$
vii) Cardoid $r = a(1 - cos\theta)$
viii) Draw histogram curves

3 i)Plot 3-d Surface $z = x^2 + y^2$
ii) Plot 3-d color Surface $z = x^2 + y^2$
iii) Plot 3-d Surface $z = x^4 + y^4$
iv) Plot 3-d Surface $z = sintcost$

4 i) To calculate volume of a sphere
ii)To Evaluate $\int_0^5 xdx$ and $\int_0^5 sinxdx$

5 i)Solve first order o.d.e.$\frac{dy}{dx} = e^{-x}$,$x = 0$,$y = 0$
ii) Solve first order o.d.e.$\frac{dy}{dx} + e^{-x}y = x^2$,$x = 0$,$y = 0$

Note: Change the initial conditions and observe the graph

6	i)Solve $2y'' - 5y' + y = 0$, $y(3) = 6, y'(3) = 1.$ ii)Solve $y'' + 3y' - 10y = 0$, $y(0) = 1, y'(0) = 3$
7	i) Define polynomial and to solve polynomials. ii) Derivatives of polynomials (first,second and higher order)
8	i) Plot Taylor's series of continuous function of single variable. ii)Addition of two matrices iii) Subtraction of two matrices iv) Multiplication of two matrices v)Multiplication by a scalar
9	i) Inverse of a matrix ii) Identity matrix iii) to obtain the sum of diagonal elements of the matrix.
10.	i) Find the rank of a matrix ii) Find the row reduced echelon form of a matrix. iii) Find the rank of a matrix after row reducing the matrix

Reference Books:

1. Maurice D weir, Joel Hass and Frank R. Giordano, "Thomas calculus", Pearson, eleventh edition, 2011
2. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
3. B. V. Ramana: "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Erwin Kreyszing's Advanced Engineering Mathematics volume1 and volume1I,wiley India Pvt.Ltd.,2014
5. Srimanta Pal & Subodh C. Bhunia: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
6. N.P Bali and Manish Goyal: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
7. C. Ray Wylie, Louis C. Barrett: "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
8. Gupta C.B, Sing S.R and Mukesh Kumar: "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education (India) Pvt. Ltd 2015.
9. H. K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
10. James Stewart: "Calculus" Cengage Publications, 7th Ed., 2019.
11. David C Lay: "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
12. Gareth Williams: "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.
13. William Stallings: "Cryptography and Network Security" Pearson Prentice Hall, 6th Ed., 2013.
14. David M Burton: "Elementary Number Theory" Mc Graw Hill, 7th Ed., 2010.

Course Outcomes:

At the end of the course the student will be able to:

CO1: Apply the knowledge of calculus to solve problems related to polar curves and learn the notion of partial differentiation to compute rate of change of multivariate functions

CO2: Analyze the solution of ordinary differential equations

CO3: Get acquainted and to apply modular arithmetic to computer algorithms

CO4: Make use of matrix theory for solving for system of linear equations and compute Eigen values and eigenvectors

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-

22UCH111C/22UCH211C	CHEMISTRY FOR COMPUTER SCIENCE (INTEGRATED)	CREDITS: 04
L:T:P: 3:0:2		CIE MARKS:50
TOTAL HOURS 60 HRS (40T +20P)		SEE MARKS:50

Course Objectives:

1. To enable students to acquire knowledge on principles of chemistry for engineering applications.
2. To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.
3. To provide students with a solid foundation in analytical reasoning required to solve societal problems.

UNIT-I	10 Hrs.

Energy Systems

Electrode System: Introduction, types of electrodes. Reference electrode; Introduction, calomel electrode–construction, working and applications of calomel electrode. Ion selective electrodes; Introduction, construction, working and applications of glass electrode. Determination of pH using glass electrode. Concentration cell; Definition, construction and working. Numerical problems.

Battery Systems: Introduction to batteries, construction, working and applications of Lithium ion and Sodium ion batteries.

Green Fuels: Introduction, construction and working of solar photovoltaic cell, advantages and disadvantages. Quantum Dot Sensitized Solar Cells (QDSSC's); Principle, Properties and Applications. Generation of energy (green hydrogen) by electrolysis of water and its advantages.

Self Study: Characteristics of batteries & Introduction to Fuel cell, MeOH–O_2 fuel cell, Applications.

UNIT-II	10 Hrs.

Corrosion Science and Polymers

Corrosion: Introduction, electrochemical theory of corrosion, types of electro-chemical corrosion; differential metal corrosion and differential aeration corrosion (Waterline and Pitting). Factors affecting rate of corrosion. Corrosion Penetration Rate (CPR); Introduction and numerical problems.

Corrosion control: Introduction, Metal coating; Galvanization, surface conversion coating; Anodization and cathodic protection; Sacrificial anodic method.

Polymers: Introduction, monomer, polymer, polymerization, degree of polymerization. Glass transition temperature (Tg), factors affecting Tg. Molecular weight-Number average and Weight average molecular weight, poly dispersity and numerical problems. Conducting polymers; Synthesis and conducting mechanism of poly acetylene (n & p type) and commercial applications. Preparation, properties and commercial applications of Silicon rubber and ABS Plastic.

Self Study: Stress corrosion and Biodegradable polymers.

UNIT-III	10 Hrs.

Display systems

Liquid crystals (LC's): Introduction, classification, positional and orientational order, director, requirement of a substance to exhibit liquid crystal state. Chemical constitution and liquid crystalline behavior, molecular ordering in liquid crystal phase, liquid crystal behavior in homologous series; PAA and MBBA homologous series, electro-optic effect in liquid crystals, construction of liquid crystal display and applications of Liquid Crystal in Displays.

Light Emitting Diode (LED): Introduction, working principle of LED. Application of LED.

Organic Light Emitting Diode (OLED): Introduction, Anatomy of OLED, Types of OLED. Comparison between LED and OLED. Advantages and Disadvantages of OLED, Applications of OLED. Quantum Light Emitting Diodes (QLED's); Properties and applications.

Self Study: Light emitting electro chemical cells.

UNIT-IV	10 Hrs.

Analytical Techniques & E-Waste Management

Analytical Techniques: Sensors, Introduction, basic principle of sensor, Types of chemical sensors; Conductometric sensors, Electrochemical sensors and Optical sensors. Potentiometric sensors; Introduction, principle, working and application in the estimation of iron. Colorimetric sensors; Introduction, principle, working and application in the estimation of copper. Conductometric sensors; Introduction, principle, working and application in the estimation of weak acid.

E-Waste: Introduction, sources of e-waste, Composition, Characteristics and Need of e-waste management. Toxic materials used in manufacturing of electronic and electrical products, health hazards due to exposure to e-waste. Recycling and Recovery; Different approaches of recycling (separation, thermal treatments, hydrometallurgical extraction, pyrometallurgical methods, direct recycling).Extraction of gold from E-waste. Role of stake holders in environmental management of e-waste (producers, consumers, recyclers and statutory bodies).

Self Study: Glucose sensor, Impact of heavy metal on environment, human health and control measures.

List of Experiments

Compulsory conducting experiments

1. Estimation of total hardness of water by EDTA method
2. Potentiometric estimation of FAS using K2Cr2O7
3. Determination of pKa of vinegar using pH sensor (Glass electrode)
4. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)
5. Conductometric estimation of acid mixture
6. Estimation of iron in TMT bar by diphenyl amine/external indicator method
7. Determination of Alkalinity of given water sample by dual indicator method.
8. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)

Virtual experiments (any one)

1. Electro-gravimetric estimation of metals
2. Preparation of urea formaldehyde resin
3. Synthesis of iron oxide nano-particles
4. Electrolysis of water

Open Ended Experiments (Suggestive - any one)

1. Precipitation titration.
2. Determination of percentage of copper present in the given brass piece.
3. Determination of percentage of CaO in cement solution.
4. Determination of manganese dioxide in pyrolusite ore.

Reference Books:

1. Suba Ramesh etl. "*Engineering Chemistry*", Wiley India Pvt. Ltd. New Delhi, 2013-2nd Edition.
2. S S Dara & Dr.S S Umare, "*A Text book of Engineering Chemistry*", S Chand & Company Ltd., 12th Edition, 2011.
3. R.V.Gadag and Nityananda Shetty, "*A Text Book of Engineering Chemistry*", I.K.International Publishing house. 2nd Edition, 2016.
4. F.W.Billmeyer, "*Text Book of Polymer Science*", JohnWiley & Sons,4th Edition,1999.
5. M.G.Fontana, N.D.Greene, "*Corrosion Engineering*", McGraw Hill Publications, NewYork, 3rd Edition, 1996.
6. Linden's "*Hand book of Batteries*", Kirby W.Beard, Fifth Edition, McGraw Hill, 2019.
7. Takatoshi Tsujimura "*OLED Display Fundamentals and Applications*", Wiley–Blackwell 1st Edition 2012.

8. Laboratory Manual, Department of Chemistry, BEC Bagalkot 2023.
9. Dr. Sudha Rani, Laboratory Manual on "*Engineering Chemistry*", DhanapathRai Publishing Co. Ltd., First Edition, 1998.

Web links and Video Lectures (e-Resources):

http://libgen.rs/
https://nptel.ac.in/downloads/122101001/
https://nptel.ac.in/courses/104/103/104103019/
https://ndl.iitkgp.ac.in/
https://www.youtube.com/watch?v=faESCxAWR9k
https://www.youtube.com/watch?v=TBqXMWaxZYM&list=PLyhmwFtznRhuz8L1bb3X-9IbHrDMjHWWh

Course Outcomes:

At the end of the course the student will be able to:

CO1: Analyse the properties of raw materials in designing energy systems for industrial and social applications.

CO2: Assess properties of metallic and polymer materials for variety of engineering applications.

CO3: Choose appropriate materials for design of display systems.

CO4: Identify and determine composition of various materials using sensors and develop e-waste management for electrical and electronic products.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	1	1	-	-	-	1	-	-	-	-	-
CO2	3	1	1	-	-	-	1	-	-	-	-	-
CO3	3	1	1	-	-	-	1	-	-	-	-	-
CO4	3	1	1	-	-	-	1	-	-	-	-	-
CO5	3	1	1	-	-	-	1	-	-	-	-	-

22UCS119C/22UCS219C	PRINCIPLES OF PROGRAMMING USING C (INTEGRATED)	CREDITS:03
L:T:P: 2:0:2		CIE MARKS:50
TOTAL HOURS: 46HRS (26T+20P)		SEE MARKS:50

Course Objectives:

1. To learn the basic principles of problem solving
2. To understand the various steps in programme development
3. To learn the syntax and semantics of C programming language
4. To learn the usage of structured programming approach in solving problems

UNIT – I	06 Hrs

Basic Organization of a Computer, Steps in problem solving, Algorithms and Flowcharts with examples. **Overview of C:** Features of C, Structure of C program, process of compiling and executing the C program.

C**onstants, Variables and Data types:** Introduction, Character set, C tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables, Example programs.

Operators and Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, Conditional operator, Bitwise operators, Special operators, Arithmetic expressions, Evaluation of expressions, Precedence of arithmetic operators, Type conversion in expressions, Operator precedence and Associativity.

UNIT – II	06 Hrs

Managing Input and Output Operations: Formatted and Unformatted input and output statements.

Decision making and Branching: Decision making with *if*, *if-else*, Nesting of *if-else* statements, *else-if* ladders, *switch* statement,?: Operator, *go to* statement.

Decision making and Looping: *while* statement, *do-while* statement, *for* statement, jumps in loops.

UNIT – III	06 Hrs

Arrays: Introduction, One dimensional arrays, declaration and initialization of one-dimensional arrays, Two dimensional arrays, declaration and initialization of two-dimensional arrays. Operationson arrays.

Strings: Introduction, Declaring and initializing string variables, String-handling functions, Array of String.

UNIT – IV	08 Hrs

User defined functions: Introduction, Need for user-defined functions, a multi-function program, Elements of user defined function, Definition of functions, Return values and their types, Function calls, Function declaration. Category of functions: Based on call by value, call by reference, argument and return type and recursion.

Structures and Unions: Defining a structure, Declaring structure variables, Accessing structure members, Initialization, Arrays of structure, Structures and Functions.

Pointers: Introduction, Accessing the address of a variable, Declaring and initialization of pointer variables, Pointers as function arguments.

Reference Books

1. E. Balaguruswamy, "*Programming in ANSI C*"**,** 7th Edition, Tata McGraw Hill Publications, 2017.
2. Reema Thareja, " *Computer fundamentals and programming in C*", Oxford University, 2nd Edition, 2017.
3. Kernighan and Ritchie, "*C Programming Language*", 2nd Edition, 2017
4. Wesley J. Chun, " *A Structured Programming approach using C"*, Pearson Education India, 3rdEdition, 2015.

5. Stephen Kochan, "*Programming in C*", 4th Edition, 2014
6. B. S. Anami, S. A. Angadi & S. S. Manvi, "*Computer Concepts and C programming-A Holistic approach to learning C*", 2nd Edition, PHI, 2010.

Programming Exercises

Part – A

1. Write a C program that aid in evaluating return on investment of Principal amount for 3 years at 9% rate of interest using simple interest and compound interest. SI=PTR/100 and CI=P[1+R/100]t-P.
2. Compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages.
3. An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs. 100 as meter charge. If the total amount is more than Rs 400, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges.
4. A cashier has currency notes of denominations 10, 50 and 100. If the amount to be withdrawn is input through the keyboard. Help the cashier to find the total number of currency notes of each denomination to be given to the customer.
5. Write a C program to determine whether a seller has made the profit or incurred the loss and display the amount and percentage of profit or loss.
6. Write a C program to identify whether the entered character belongs to an alphabet, digit or special character.
7. Write a C program to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and display the grade according to following:

   Percentage Grade
   More than or equal to 90% S Between 80% - 89.99% A
   Between 70%-79.99% B
   Between 60%-69.99% C
   Between 40%-59.99% D
   Between 35%-40% E
   Below 35% F
8. Write a C program, to check whether a person is eligible for the marriage or not.
9. Write a C program to identify the quadrant of a point, when coordinates (x,y) are given.
10. Write a C program to compute area of the following of geometric objects based onuser's preference using switch case:
    i. Circle
    ii. Triangle
    iii. Parallelogram
    iv. Square

Part - B

11. Write a C Program to display the following by reading the number of rows as input,

1
1 2
1
1 2
3 2
1
1 2
3 4
3 2
1
nth row

12. Write a C program to generate the prime numbers between 1 to n.
13. Write a C program to Implement Binary Search on Integers.
14. Implement Matrix multiplication and validate the rules of multiplication.
15. Compute sin(x)/cos (x) using Taylor series approximation. Compare your result with the built-in library function. Print both the results with appropriate inferences.
16. Sort the given set of N numbers using Bubble sort.
17. Write functions to implement string operations such as compare, concatenate, and find string length. Use the parameter passing techniques.
18. Write a C program to find the factorial of a number using recursive function.
19. Implement structures to read, write and compute average- marks of the students, list the students scoring above and below the average marks for a class of N students.
20. Write a C program to read two numbers and swap them with help of function through call by reference method.

Course Outcomes:

CO1: Explain the basic architecture and functionalities of a computer and also recognize the hardware parts.
CO2: Apply programming constructs of C language to solve the real world problem.
CO3: Explore the usage of arrays in implementing solutions to problems
CO4: Illustrate the modular programming approach using user-defined functions.
CO5: Design and develop solutions to problems using modular programming approach.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	2	-	-	-	-	-	-	-
CO2	-	1	-	-	2	-	-	-	-	-	-	2
CO3	-	1	-	-	-	-	-	-	-	-	-	2
CO4	-	2	-	-	-	-	-	-	-	-	-	2
CO5	-	3	3	2	-	-	-	-	-	-	-	2

22UME122N/22UME222N	INTRODUCTION TO MECHANICAL ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

1. Acquire a basic understanding about scope of mechanical engineering, different energy sources.
2. Acquire a basic knowledge about conventional and advanced manufacturing processes.
3. Acquire a basic understanding about IC engines.
4. Acquire a basic knowledge about joining processes and CNC machines.
5. Acquire a basic insight into future mobility, mechatronics, robotics and IoT.

UNIT-I	10Hrs.

Introduction: Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Energy: Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel, Solar, wind, and bio-fuels, Environmental issues like Global warming and Ozone depletion

Engineering Materials: Types and applications of Ferrous & Nonferrous Metals, silica, ceramics, glass, graphite, diamond and polymer. Shape Memory Alloys.

UNIT–II	10Hrs.

Machine Tool Operations:

Working Principle of lathe, Lathe operations: Turning, facing, knurling. Working principles of Drilling Machine, drilling operations: drilling, boring, reaming. Working of Milling Machine, Milling operations: plane milling and slot milling.

(No sketches of machine tools, sketches to be used only for explaining the operations).

Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantages and applications of CNC, 3D printing.

Joining Processes: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding and types of flames.

UNIT–III	10 Hrs.

Introduction to IC Engines: Components and Working Principles, 4-Strokes Petrol and Diesel Engines, Application of IC Engines.

Insight into Future Mobility; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of EVs and Hybrid vehicles.

UNIT–IV	10Hrs.

Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Classification based on robotics configuration: polar cylindrical, Cartesian coordinate and spherical. Application, Advantages and disadvantages.

Automation in industry: Definition, types – Fixed, programmable and flexible automation, basic elements with block diagrams, advantages

Introduction to IOT: Definition and Characteristics, Physical design, protocols, Logical design of IoT, Functional blocks, and communication models.

Reference Books:

1. Hazra Choudhry and Nirzar Roy, "Elements of Workshop Technology" Vol. 1 and 2, Media
2. Promoters and Publishers Pvt. Ltd., 2010.
3. P.N.Rao, "Manufacturing Technology- Foundry, Forming and Welding", Tata McGraw Hill 3rd Edition 2003.
4. V. Ganesan, "Internal Combustion Engines", Tata McGraw Hill Education; 4th edition, 2017.
5. Appu Kuttan KK K "Robotics", International Pvt. Ltd, volume 1

6. Dr SRN Reddy, RachitThukral and Manasi Mishra, " Introduction to Internet of Things: A Practical Approach", ETI Labs
7. Raj kamal, "Internet of Things: Architecture and Design", McGraw hill.
8. K R Gopala Krishna, "Elements of Mechanical Engineering" , Subhash Publications, 2008
9. Jonathan Wickert and Kemper Lewis, "An Introduction to Mechanical Engineering", 3rd Edition, 2012.

Course Outcomes:

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

CO1: Explain the role of Mechanical Engineering with respect to the emerging trends and technologies in various sectors, knowledge of various sources of energy and engineering materials

CO2: Describe different conventional, advanced manufacturing systems and various metal joining processes

CO3: Compute and analyze the performance of IC engines used in automobiles and concept of electric and hybrid vehicles for future mobility

CO4: Enlighten about the fundamentals of Mechatronics, Robotics, Automation in industry and IOT

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	-	-	1	1	-	-	-	1
CO2	2	2	-	-	1	1	1	-	-	-	-	1
CO3	2	1	-	-	1	1	-	-	-	-	-	1
CO4	2	1	-	-	1	1	-	1	1	-	-	1

22UCV118N/22UCV218N	INTRODUCTION TO CIVIL ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40 HRS		SEE MARKS:50

Course Objectives:

1. To make students learn the scope of various specializations of civil engineering.
2. To develop students' ability to analyze the problems involving forces, moments with their application ns.
3. To develop the student's ability to find out the center of gravity and its applications.
4. To develop the student's ability to find out the moment of inertia and its applications.

UNIT - I — **10 Hrs.**

Civil Engineering Disciplines and Building Science:

Introduction to Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Hydraulics & Water Resources, Transportation Engineering, Environmental Engineering, Construction planning & Project management.

Basic Materials of Construction: Bricks, Cement & mortars, Plain, Reinforced & Pre-stressed Concrete, Structural steel, Construction Chemicals.

Structural elements of a building: foundation, plinth, lintel, chejja, Masonry wall, column, beam, slab and staircase

Societal and Global Impact of Infrastructure

Infrastructure: Introduction to sustainable development goals, Smart city concept, clean city concept, Safe city concept.

Built-environment: Energy efficient buildings; Smart buildings.

UNIT – II — **10 Hrs.**

Analysis of force systems: Concept of idealization, system of forces, principles of super position and transmissibility, Resolution and composition of forces, Law of Parallelogram of forces, Resultant of concurrent and non-concurrent coplanar force systems, moment of forces, couple, Varignon's theorem, free body diagram, equations of equilibrium, equilibrium of concurrent and non-concurrent coplanar force systems. Numerical examples

UNIT - III — **10 Hrs.**

Centroid: Importance of centroid and centre of gravity, methods of determining the centroid, locating the centroid of plane lamina from first principles, centroid of built-up sections. Numericalexamples.

UNIT - IV — **10 Hrs**

Moment of inertia: Importance of Moment of Inertia, method of determining the second moment of area (moment of inertia) of plane sections from first principles, parallel axis theorem and perpendicular axis theorem, radius of gyration, moment of inertia of built-up sections. NumericalExamples.

Reference Books:

1. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, "Basic Civil Engineering and Engineering Mechanics", Laxmi Publications, 2015.
2. Kolhapure B K, "Elements of Civil Engineering and Engineering Mechanics", EBPB, 2014.
3. Beer F. P. and Johnston E. R., "Mechanics for Engineers, Statics and Dynamics", McGraw Hill, 1987.
4. Irving H. Shames, "Engineering Mechanics", Prentice-Hall, 2019.
5. Hibbler R.C., "Engineering Mechanics: Principles of Statics and Dynamics", PearsonPress, 2017.
6. Timoshenko S, Young D.H., Rao J.V., "Engineering Mechanics", PearsonPress, 5th Edition, 2017.
7. Bhavikatti S S, Engineering Mechanics, New Age International, 2019.

Course Outcomes:

At the end of the course the student will be able to,

CO1: Understand the various disciplines of Civil Engineering

CO2: Compute the resultant and equilibrium of force systems.

CO3: Locate the centroid of plane and built-up sections

CO4: Compute the moment of inertia of plane and built-up sections

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	1	-	-	-	-	1	-	-	-	-	-	-
CO2	1	-	-	-	-	1	1	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-

22UEE116N/22UEE216N	INTRODUCTION TO ELECTRICAL ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

1. To understand the working of Hydro –electric, Thermal and Nuclear power plants
2. To determine current, voltage, and power in various branches by applying electric circuit theorems to DC and AC (single phase and three phase) circuits
3. To analyze the working principle and construction to identify the suitable applications of DC generators, motors and transformers by identifying the specifications
4. To identify the safety aspects in different types of wiring mechanisms and evaluate the energy consumption in domestic loads

UNIT – I	10 Hrs

Introduction: General structure of electrical power systems using single line diagram approach.
Power Generation: Hydel, thermal, nuclear power plants (block diagram approach).
DC Circuits: Ohm's law and its limitations, KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical.

UNIT – II	10 Hrs

AC. Fundamentals:
Equation of AC voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor (only definitions), voltage and current relationship with phasor diagrams in R, L, and C circuits, concept of impedance, analysis of R-L, R-C, R-L-C series circuits, active power, reactive power and apparent power, concept of power factor. (Simple Numerical).
Three Phase Circuits:
Generation of three phase AC quantity, advantages and limitations, star and delta connection, relationship between line and phase quantities (excluding proof)

UNIT – III	10 Hrs

DC Generator, DC Motor, Transformers:
Working principle, construction, equations, types and classifications, specifications, applications, cost. Simple numerical.

UNIT – IV	10 Hrs

Domestic Wiring: Requirements, Types of wiring, Two way and three way control of loads.
Electrical Energy Calculation: Power rating of household appliances, two-part electricity tariff, calculation of electricity bill for domestic consumers.
Electrical Safety Measures:
Equipment: Types of equipment, voltage and current issues, safety.
Human: Electric shock, effect of shock on body, factors affecting severity of shock, safety precautions.

Reference Books:

1. B.L Theraja, "Fundamentals of Electrical Engineering and Electronics", S. Chand Publications, 27th Edition, 2014.
2. D C Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 10th Edition, 2019.
3. Edward Hughes, "Electrical and Electronic Technology", Pearson Publications, 10th Edition, 2010.
4. Rajendra Prasad, "Fundamentals of Electrical Engineering", PHI Learning, 2nd Edition, 2009.

5. V.N.Mittle and A.Mittal, “Basic Electrical Engineering”, Tata McGraw-Hill Education, 2005.

Course Outcomes:

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

CO1: Understand the working of Hydro –electric, Thermal and Nuclear power plants

CO2: Apply the electric circuit theorems to DC and AC (single phase and three phase) circuits to determine current, voltage, and power in various branches

CO3: Analyze the working principle and construction to identify the suitable applications of DC generators, motors and transformers by identifying the specifications

CO4: Identify the safety aspects in different types of wiring mechanisms and evaluate the energy consumption in domestic loads

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	-	-	-	-	-	-	-	-	1
CO2	3	1	1	1	-	-	-	-	-	-	-	1
CO3	3	1	1	1	-	-	-	-	-	-	-	1
CO4	3	1	1	1	-	-	-	1	-	1	-	1

22UEC114N/22UEC214N	INTRODUCTION TO ELECTRONICS ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives

1. Understand the operation of semiconductor devices and their applications.
2. Know transistor (BJT) as an amplifier.
3. Study Op-Amps and its applications.
4. Know logic circuits and their optimization.
5. Understand the principles of transducers and communication systems.

UNIT - I	10 Hrs

Power Supplies –Block diagram, PN Junction Diode Characteristics, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers.

BJT Characteristics and Biasing- Common Base and Common Emitter Configurations, Voltage Divider Biasing.

Self study component: Switched Mode Power Supply.

UNIT – II	10 Hrs

Amplifier and Oscillators – Single Stage CE Amplifier, Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator, Multi vibrators, Single-stage a stable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)

Operational amplifiers - Ideal op-amp; characteristics of ideal and practical op-amp; Practical op-amp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, integrator, differentiator.

Self study component: Op-Amp as zero crossing detector

UNIT - III	10 Hrs

Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates

Combinational logic: Introduction, Design procedure, Adders- Half adder, Full adder, Parallel Adder

Self study component: Half subtractor and full subtractor.

UNIT - IV	10 Hrs

Analog Communication Schemes – Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM, FM.

Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.

Sensors and Interfacing – Instrumentation and control systems, Transducers, Sensors.

Self study component: Opto-couplers

Reference Books:

1. Mike Tooley, "Electronic Circuits, Fundamentals & Applications", 4th Edition, Elsevier, 2015.
2. M. Morris Mano, "Digital Logic and Computer Design", PHI Learning, 2008.
3. D . P . Kothari, I . J . Nagrath, "Basic Electronics", 2nd edition, McGraw Hill Education (India), Private Limited, 2018.

Course Outcomes:

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

CO1: Differentiate semiconductor devices and their parameters based on V-I characteristics.

CO2: Analyze the applications of electronic devices and circuits.

CO3: Analyze logic circuits built with basic gates.

CO4: Solve numerical problems related to basic electronic circuits and systems.

CO5: Decide type of transducer, sensor and modulation for a given application.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	2	-	2	2	-	-	-	-	-	-
CO2	3	2	3	-	2	1	-	-	-	-	-	-
CO3	3	2	3	-	3	-	-	-	1	-	-	-
CO4	2	1	1	-	2	1	-	-	1	-	-	1
CO5	2	1	1	-	2	1	-	-	1	-	-	1

22UEC134B/22UEC234B	INTRODUCTION TO EMBEDDED SYSTEM	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

1. To provide knowledge of embeddedsystems, applications, purpose and processor architectures.
2. To provide background knowledge of communication interfaces, characteristics and quality attributes of embedded systems.
3. To study general purpose processors software and processor peripherals.
4. To impart knowledge of 8051 Microcontroller, features and its applications.

UNIT – I	10 Hrs

Introduction to embedded systems, Embedded system vs. general computing system, Classifications, Purpose of embedded system, Major application areas. The typical embedded system, Microcontrollers, Microprocessors, RISC, CISC, Harvard and Von-Neumann, Big Endian, Little Endian processors.

UNIT – II	10 Hrs

Memory, Sensors, Actuators, Communication interface: Inter Integrated Interface, Serial Peripheral interface, UART, Parallel interface, RS232 and Bluetooth. Characteristics and quality attributes of embedded systems.

UNIT - III	10 Hrs

General purpose processors software: Introduction, Basic architecture, Operation, Instruction set, program and data memory space, registers, I/O, interrupts, Operating System, ASIP's, Microcontrollers, DSP, Selecting Microprocessor.

Standard Single Purpose Processors peripherals: Introduction, Timers, Counters and watch dog timers, UART.

UNIT - IV	10 Hrs

8051 Microcontroller: Introduction, Features of 8051 Microcontroller, Block diagram, ALU, PC, ROM, RAM, Address line, Data line, Special function registers, RAM organization, Stack, Basicsof Serial Communication, Interrupts, Timers and counters, Input output ports, simple pseudo code.

Reference Books:

1. Shibu K V, "Introduction to embedded systems", Tata McGraw Hill private limited, 2010.
2. Frank Vahid, Tony Givargis, "Embedded system design: A unified hardware/software introduction", John Wiley and Sons, 2001.
3. Kenneth J Ayala, "The 8051 Microcontroller, Architecture programming and applications", West publishing company, college and school division, 1997.
4. Rajkamal, "Embedded systems: architecture, programming and design", Tata McGraw Hill private limited, second edition.

Course Outcomes:

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

CO1: Gain comprehensive knowledge about embedded systems, major application area of embedded systems and processor architectures.

CO2: Analyze communication interfaces, characteristics and quality attributes of embedded systems.

CO3: Identify general purpose processors software and processor peripherals necessary for embedded systems.

CO4: Explore 8051 Microcontroller capabilities and able to write pseudo codes.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	-	-	2	1	1	1	1	1	-	1
CO2	3	2	2	-	1	1	1	1	1	2	-	1
CO3	3	2	2	-	1	2	1	1	2	1	-	2
CO4	3	2	2	-	1	2	1	1	2	1	-	2

22UEC135B/22UEC235B	INTRODUCTION TO COMMUNICATION TECHNOLOGY	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

1. Know the fundamentals of different communication systems.
2. Understand modern communication techniques and their utility in modern cellular communication systems.
3. Know the design principles of cellular communication systems.
4. Understand the different communication standards.

UNIT – I	10 Hrs

Introduction to communication systems: Elements of communication systems, Need for modulation, Electromagnetic spectrum and applications, Terminologies in communication systems
Introduction to wireless .communication systems: Evolution of mobile radio communication, Beginning of Radio, Wireless mobile communication, Applications of wireless communication, Disadvantages of wireless communication systems, Examples of wireless communication systems, Difference between fixed telephone network and wireless telephone network, Development of wireless communication, Fixed network transmission hierarchy, Comparison of wireless communication systems.

UNIT – II	10 Hrs

Modern communication systems: Introduction, First generation (1G), Second generation (2G), Generation (2.5G), Third generation (3G), Evolution from 2G to 3Gt, Fourth generation (4G), Digital cellular parameters, Differences between analog cellular and digital cellular systems, wireless local loop (WLL), wireless local area networks (WLANs), Personal Area Networks (PANs), Bluetooth
Introduction to cellular mobile systems: Introduction, Spectrum allocation, International telecommunication union (ITU), Wireless communication system, Basic components of cellular systems, Cellular system architecture, GSM: Most popular cellular system, type of channels, Cell concept in wireless communication, shape selection of the cell.

UNIT – III	10 Hrs

Cellular system design fundamentals: Introduction, Frequency reuse, Cellular capacity increasing parameters, channel assignment strategies, Hand-off strategies, Hands-off Initiation, Type of hands-off on the basis of decision making process, channel assignment strategies for hands-off,Interference, Tracking, Trunking, Grade of service.

UNIT – IV	10 Hrs

Multiple access techniques for wireless communication: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Advanced TDMA, Multipath interference, Comparison between TDMA & FDMA, Space Division Multiple Access (SDMA), Spread spectrum, types of spread spectrum, Code Division Multiple Access (CDMA)
Radio wave propagation: Introduction, Doppler shift, parameters of multipath channels, fading, diversity techniques, free space propagation model, Phenomenon of propagation, Propagation Models.

Reference Books:

1. George Kennedy, Bernard Davis, S R M Prasanna, “Electronic Communication Systems”, Tata McGraw Hill Education Private Limited, New Delhi, 5th Edition.
2. Rajeshwar Dass, “Wireless Communication Systems”, I. K. international Publishing House Pvt. Ltd., New Delhi.

Course Outcomes:
After completion of this course the students are able to**,** **CO1:** Analyze different communication systems with respect to operation and utility. **CO2:** Choose suitable modulation technique for cellular mobile systems. **CO3:** Decide specific channel multiple access techniques for a communication application. **CO4:** Choose specific communication standards for a given communication application.

Course Outcomes	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	**3**	**1**	**1**	**-**	**1**	**1**	**1**	**1**	**1**	**1**	**-**	**1**
CO2	**3**	**2**	**2**	**-**	**1**	**1**	**1**	**1**	**1**	**2**	**-**	**1**
CO3	**3**	**2**	**2**	**-**	**1**	**2**	**1**	**1**	**2**	**1**	**-**	**2**
CO4	**3**	**2**	**2**	**-**	**1**	**2**	**1**	**1**	**2**	**1**	**-**	**2**

22UEE136B/22UEE236B	RENEWABLE ENERGY SOURCES	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

1. To identify the parameters required for solar, wind, biomass, geothermal and ocean energy conversion systems.
2. To apply and analyze concepts and theory related to solar, wind, biomass, geothermal and ocean energy conversion systems.
3. To derive power output of solar and wind energy conversion systems based on the corresponding solar irradiation and wind speed respectively.
4. To analyze pros and cons of solar, wind, biomass, geothermal and ocean energy conversion systems.

UNIT – I	10 Hrs

Introduction to Energy Sources:

Classification of energy resources, conventional energy resources–availability and their limitations; non-conventional energy resources–classification, advantages, limitations; comparison of conventional and non-conventional energy resources.

Solar Energy Basics:

Introduction, solar constant, basic sun-earth angles – definitions and their representation; solar radiation geometry, solar radiation data measuring instruments–Pyranometer and Pyrheliometer.

UNIT – II	10 Hrs

Solar Thermal Systems:

Principle of conversion of solar radiation into heat, solar water heaters (Flat plate collectors); solar cookers – box type, concentrating dish type; solar driers, solar still.

Solar Electric Systems:

Solar thermal electric power generation – solar pond and concentrating solar collector (parabolic trough, parabolic dish, central tower collector), advantages and disadvantages; solar photovoltaic – solar cell fundamentals, module, panel and array; solar PV systems – street lighting, domestic lighting and solar water pumping systems.

UNIT – III	10 Hrs

Wind Energy:

Wind and its properties, history of wind energy, basic principles of Wind Energy Conversion Systems (WECS), wind data measuring instrument, classification of WECS, parts of a WECS, power in the wind; Vertical axis wind turbine generator - Savinous and Darrius types, advantages and limitations of WECS.

Biomass Energy:

Introduction, photosynthesis process, biomass conversion technologies, biomass gasification – principle and working of gasifiers; biogas - production of biogas, factors affecting biogas generation; types of biogas plants–KVIC and Janata model.

UNIT – IV	10 Hrs

Geothermal Energy:

Introduction, classification, conversion technologies, applications, advantages and limitations of geothermal resources.

Energy from Ocean:

Principle of tidal power, components of Tidal Power Plant (TPP), classification, advantages and limitations of TPP.

Ocean Thermal Energy Conversion (OTEC): Principle of OTEC system, types of OTEC power generation, block diagram, applications, advantages and limitations.

Reference Books:

1. B. H. Khan, "Conventional Energy Resources", Tata McGraw-Hill Education Private Limited, New Delhi, 3rd Edition, 2007.
2. G. D. Rai, "Non-conventional Energy sources", Khanna Publication, 4th Edition, 2015.
3. G. N. Tiwari and M K. Ghosal, "Fundamentals of Renewable Energy Resources", Alpha Science International Ltd, 1st Edition, 2007.
4. Shobh Nath Singh, "Non-Conventional Energy Resources", Pearson Education, 2nd Edition 2018.
5. Bent Sorensen, "Renewable Energy", Academic Press, 5th Edition, 2017 (e-book).
6. David Buchla, Thomas Kissell and Thomas Floyd, "Renewable Energy Systems", Pearson, 1st Edition, 2014 (e-book).
7. Roland Wengenmayr, Thomas Buhrke, "Renewable Energy: Sustainable Energy Concepts for the Future", Wiley-VCH, 2nd Edition, 2008 (e-book).

Course Outcomes:

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

CO1: Identify electrical and mechanical devices of solar, wind, biomass, geothermal and ocean Energy conversion systems.

CO2: Measure performance parameters related to solar, wind, biomass, geothermal and ocean energy conversion systems.

CO3: Compute the power generation of wind and solar energy correspond to variable data.

CO4: Compare the features of solar, wind, biomass, geothermal and ocean energy conversion systems.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	1	1	-	-	1	1	1	-	1	1	1
CO2	3	1	1	1	-	1	1	1	-	1	-	1
CO3	3	2	3	1	-	-	-	-	-	-	1	1
CO4	3	3	3	2	-	-	-	1	-	-	-	1

22UCV138B/22UCV238B	GREEN BUILDINGS	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

1. Understand the Definition, Concept & Objectives of the terms cost effective construction and green building.
2. Apply cost effective techniques in construction
3. Apply cost effective Technologies and Methods in Construction
4. Understand the Problems due to Global Warming
5. State the Concept of Green Buildings
6. Understand Green Buildings

UNIT – I	10 Hrs

Introduction to the concept of cost effective construction

Uses of different types of materials and their availability -Stone and Laterite blocks- Burned Bricks- Concrete Blocks- Stabilized Mud Blocks- Lime Poszolana Cement- Gypsum Board- Light Weight Beams- Fiber Reinforced Cement Components- Fiber Reinforced Polymer Composite- Bamboo- Availability of different materials- Recycling of building materials – Brick- Concrete- Steel- Plastics - Environmental issues related to quarrying of building materials

UNIT – II	10 Hrs

Environment friendly and cost effective Building Technologies

Different substitute for wall construction Flemish Bond - Rat Trap Bond – Arches – Panels - Cavity Wall - Ferro-Cement and Ferro-Concrete constructions – different pre-cast members using these materials - Wall and Roof Panels – Beams – columns - Door and Window frames - Water tanks - Septic Tanks - Alternate roofing systems - Filler Slab - Composite Beam and Panel Roof -Pre-engineered and ready to use building elements - wood products - steel and plastic - Contributions of agencies - Costford - Nirmithi Kendra – Habitat.

Global Warming

Definition - Causes and Effects - Contribution of Buildings towards Global Warming - Carbon Footprint – Global Efforts to reduce carbon Emissions Green Buildings – Definition - Features- Necessity – Environmental benefit - Economical benefits - Health and Social benefits - Major Energy efficient areas for buildings – Embodied Energy in Materials Green Materials - Comparison of Initial cost of Green V/s Conventional Building - Life cycle cost of Buildings.

UNIT - III	10 Hrs

Green Building rating Systems

BREEAM – LEED - GREEN STAR -GRIHA (Green Rating for Integrated Habitat Assessment) for new buildings – Purpose - Key highlights - Point System with Differential weight age. Green Design – Definition - Principles of sustainable development in Building Design - Characteristics of Sustainable Buildings – Sustainably managed Materials - Integrated Life cycle design of Materials and Structures (Concepts only)

UNIT - IV	10 Hrs

Utility of Solar Energy in Buildings

Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings.

Green Composites for Buildings

Concepts of Green Composites. Water Utilisation in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment

Reference Books::

1. K. S Jagadish, B. V. Venkataramana Reddy, K. N Nanjundarao "Alternative Building Materials and Technologies", New Age International Publishers.
2. G Harihara Iyer, "Green Building Fundamentals", Notion Press.
3. Dr. Adv. Harshul Savla, "Green Building: Principles & Practices", Notion Press.

Course Outcomes::

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

CO1: Select different building materials for cost effective construction

CO2: Apply effective environmental friendly building technology to reduce global warming

CO3: Analyse buildings for green rating systems.

CO4: Use alternate source of energy and effective use of water.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	1	-	-	-	1	1	-	-	-	-	-
CO2	2	1	-	-	-	1	1	-	-	-	-	-
CO3	2	1	-	-	-	1	1	-	-	-	-	-
CO4	2	1	-	-	-	1	1	-	-	-	-	-

22UCV139B/22UCV239B	WASTE MANAGEMENT	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

1. To learn broader understandings on various aspects of solid waste management.
2. To learn collection, storage, transport, processing, and disposal of waste.
3. To learn identification, management and treatment of hazardous waste.

UNIT – I	10 Hrs

INTRODUCTION TO SOLID WASTE MANAGEMENT

Classification of solid wastes (source and type based), Solid Waste Management (SWM), elements of SWM, (ESSWM) Environmentally Sound Solid Waste Management and (EST) Environmentally Sound Technologies, factors affecting SWM, Indian scenario, progress in (MSW) Municipal Solid Waste management in India.

UNIT – II	10 Hrs

WASTE GENERATION ASPECTS

Waste Stream Assessment (WSA), waste generation and composition, waste characteristics (physical and chemical), health and environmental effects (public health and environmental), comparative assessment of waste generation and composition of developing and developed nations, a case study results from an Indian city, handouts on solid waste compositions.

UNIT – III	10 Hrs

COLLECTION, STORAGE, TRANSPORT, PROCESSING TECHNIQUES ANDDISPOSAL OF WASTES

Waste Collection, Storage and Transport: Collection components, storage-containers/collection vehicles, collection operation, transfer station, waste collection system design, record keeping, control, inventory and monitoring, implementing collection and transfer system, a case study.

Waste Disposal: key issues in waste disposal, disposal options and selection criteria, sanitary landfill, landfill gas emission, leachate formation, environmental effects of landfill, landfill operation issues.

Waste Processing Techniques: Purpose of processing, mechanical volume and size reduction, component separation, drying and dewatering.

UNIT – IV	10 Hrs

SOURCE REDUCTION, REUSE, PRODUCT RECOVERY & RECYCLING

Refuse, Source Reduction, Reuse, Product Recovery and Recycling (SR's): basics, purpose, implementation monitoring and evaluation of source reduction, reuse, significance of recycling, planning of a recycling programme, recycling programme elements, commonly recycled materials and processes, recovery of waste materials, a case study.

HAZARDOUS WASTE MANAGEMENT AND TREATMENT

Identification and classification of hazardous waste, hazardous waste treatment, pollution prevention and waste minimization, hazardous wastes management in India.

Reference Books:

1. Tchobaanoglous, G., Theisen, H., and Samuel A Vigil, "Integrated Solid Waste Management", McGraw-Hill Publishers, 1993.
2. Bilitewski B., Hard He G., Marek K., Weissbach A., and Boeddicker H., " Waste Management", Springer, 1994.
3. White, F. R., Franke P. R. & Hindle M., "Integrated solid waste management: a life cycle inventory", Mc Dougall, P. John Wiley & Sons, 2001.
4. Nicholas, P., & Cheremisinoff, P. D., "Handbook of solid waste management and waste minimization technologies", Imprint of Elsevier Science, 2005.

Course Outcomes:
CO1: Apply the basics of solid waste management towards sustainable development **CO2:** Study the composition and characteristics of the waste and its affect on the environment **CO3:** Apply technologies to process waste and dispose the same. **CO4:** Study the 5Rs, management and treatment of the hazardous waste.

Course Outcomes	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	-	-	-	-	1	3	-	-	-	-	-
CO2	3	1	-	-	-	3	2	-	2	-	-	1
CO3	3	1	-	-	2	2	3	-	-	-	1	1
CO4	3	-	-	-	-	3	2	-	-	-	1	2

22UCS140B/22UCS240B	INTRODUCTION TO INTERNET OF THINGS (IoT)	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

1. Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics. Understand the recent application domains of IoT in everyday life.
2. Gain insights about the current trends of associated IOT technologies and IOT Analytics.

UNIT - I	10 Hrs

Basics of Networking: Introduction, Network Types, Layered network models

Emergence of IoT: Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components

UNIT – II	10 Hrs

IoT Sensing and Actuation: Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics.

IoT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading.

UNIT - III	10 Hrs

Associated IoT Technologies

Cloud Computing: Introduction, Virtualization, Cloud Models, Service-Level Agreement in Cloud Computing, Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.

IoT Case Studies

Agricultural IoT – Introduction and Case Studies

UNIT - IV	10 Hrs

IoT Case Studies and Future Trends

Vehicular IoT – Introduction

Healthcare IoT – Introduction, Case Studies

IoT Analytics – Introduction

Reference Books:

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, “Introduction to IoT”, Cambridge University Press, 2021.
2. S. Misra, C. Roy, and A. Mukherjee, “Introduction to Industrial Internet of things and industry 4.0”. CRC Press, 2020.
3. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014.
4. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, A press Publications, 2013.

Course Outcomes:

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

CO1: Describe the evolution of IoT, IoT networking components and addressing strategies in IoT.

CO2: Classify various sensing devices and actuator types.

CO3: Demonstrate the processing in IoT.

CO4: Explain associated IoT Technologies.

CO5: Illustrate the architectures of IoT application.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	3	2	-	-	-	-	-	-	-	-
CO3	-	2	3	-	-	-	-	-	-	-	-	-
CO4	1	2	3	-	-	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-

22UCS141B/22UCS241B	INTRODUCTION TO CYBER SECURITY	CREDITS: 03
L:T:P: 3:0:0		CIE Marks:50
TOTAL HOURS: 40HRS		SEE Marks:50

Course Objectives:

1. To familiarize cybercrime terminologies and perspectives
2. To understand Cyber Offenses and Botnets
3. To gain knowledge on tools and methods used in cybercrimes
4. To understand phishing and computer forensics

UNIT – I	10 Hrs

Introduction to Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, An Indian Perspective, Hacking and Indian Laws.

UNIT – II	10 Hrs

How Criminals Plan Them: Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercafe & cybercrimes.

Botnets: The fuel for cybercrime, Attack Vector.

Tools and Methods used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key Loggers and Spywares

UNIT – III	10 Hrs

Different Forms of attacks in Cybercrime: Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attackers, Attacks on Wireless networks.

Phishing and Identity Theft: Introduction, phishing, methods of phishing, phishing techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft

UNIT – IV	10 Hrs

Understanding Computer Forensics: Introduction, Historical Background of Cyber forensics, Digital Forensics Science, Need for Computer Forensics, Cyber Forensics and Digital Evidence, Digital Forensic Life cycle, Chain of Custody Concepts, network forensics.

Reference Books:

1. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt. Ltd, First Edition, 2011.
2. Rajkumar Singh Rathore, Mayank Bhushan, "Fundamentals of Cyber Security", BPB; First Edition, 2017.
3. Anand Shinde, "Introduction to Cyber Security", Notion Press, First Edition, 2020.
4. Nilakshi Jain and Dhananjay R. Kalbande, "Cyber Security and Cyber Laws", Wiley India Pvt. Ltd., 2020.

Course Outcomes:

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

CO1: Explain the cybercrime terminologies and laws.

CO2: Illustrate tools and methods used on Cybercrime

CO3: Describe the different forms of attacks, Phishing and Identity Theft

CO4: Comprehend cyber offences and Botnets

CO5: Justify the need of computer forensics

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	1	-	-	-	-	-	-	2	-	-	-	-
CO2	-	2	-	3	3	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	2

22UME142B/22UME242B	COMPOSITE MATERIALS	CREDITS: 03
L:T:P: 3:0:0		CIEMARKS:50
TOTAL HOURS: 40HRS		SEEMARKS:50

Corse Objectives:

1. Explain the behavior of constituents in the composite materials
2. Enlighten the students in different types of reinforcement
3. Develop the student's skills in understanding the different manufacturing methods available for composite material.
4. Illuminate the knowledge of macro mechanical analysis and cutting and joining of the composite materials

UNIT-I	10 Hrs

Introduction to composite materials

Definition and classification of composites based on matrix and reinforcement, Characteristics of composite materials, Fibrous composites, Laminate composites and particulate composites.

Factors which determine the properties of composites, Benefits of composites, properties and types of reinforcements and matrices, Reinforcement-matrix interface.

UNIT–II	10 Hrs

Polymer matrix composites

Introduction, Polymer matrices, Processing methods like Layup and curing, open and closed mold process- hand layup techniques, laminate bag molding.

Production procedures for bag molding, filament winding, pultrusion, pulforming, thermo-forming, molding methods, properties of PMCs and applications, Some commercial PMCs.

UNIT–III	10 Hrs

Metal matrix composites

Introduction, Metallic matrices, Classification of MMCs, Need for production of MMCs, Interface reactions, processing methods like Powder metallurgy, diffusion bonding.

Melt stirring, Compo/Rheo casting, Squeeze casting, Liquid melt infiltration, Spray deposition and In situ Processes, Properties of metal matrix composites, Applications, Some commercial MMCs.

UNIT–IV	10 Hrs

Cutting, Machining and Joining of Composites

Continuous fibers, Iso-stress condition, Iso-strain condition, critical volume fraction of fiber and minimum volume fraction of fiber, Numericals on modulus of rigidity, and mechanics of discontinuous fibers.

Cutting and machining of composites: Reciprocating knife cutting, cutting of cured composite, Joining of composites: Mechanical fastening, Adhesive bonding.

Reference Books:

1. K. K. Chawla, "Composite Science and Engineering", , Springer Verlag, 1998.
2. Hull and Clyne, "Introduction to composite materials" Cambridge University Press, 2nd Edition, 1990.
3. F. L. Mathew and R. D. Rawlings, Composite Materials: Engineering and Science Woodhead Publishing Limited, 1999.
4. MeingSchwaitz, "Composite materials handbook", McGraw Hill Book Company, 1984.
5. Robert M. Jones, "Mechanics of Composite Materials", McGraw Hill Kogakusha Ltd, 1998.
6. S. C. Sharma, "Composite materials", Narosa Publishing House, 2000.
7. ArtarKaw, "Mechanics of composites", CEC Press, 2002.

Course Outcomes:
After completion of the course student will be able to **CO1:** Solve the numerical problems on modulus of elasticity of the FRP composites. **CO2:** Analyse the critical volume fraction of fibres in the FRP composites. **CO3:** Synthesize polymer matrix and metal matrix composites. **CO4:** Use the abrasive water jet machining of composites.

Course Outcomes	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**
CO2	**1**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**
CO3	**-**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**
CO4	**-**	**-**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**1**

21UME143B/21UME243B	INTRODUCTIONS TO ROBOTICS	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

1. Understand robot configuration, structures, basic components, workspace and generations of robots.
2. Get acquainted with performing spatial transformations and solve kinematics of the robot.
3. Learn about various sensors, actuators, robot programming.
4. Understand the present &future applications of a robot.

UNIT - I — **10 Hrs**

Robot Basics

Robot-Basic concepts, Need, Law, History, Anatomy, specifications. Robot configurations-cartesian, cylinder, polar and articulate. Robot wrist mechanism, Precision and accuracy of robot.

Robot Elements

End effectors-Classification, Types of Mechanical actuation, Gripper design, Robot drive system Types, Position and velocity feedback devices-Robot joints and links-Types, Motion interpolation

UNIT – II — **10 Hrs**

Robot Kinematics and Control

Robot kinematics – Basics of direct and inverse kinematics, Robot trajectories, 2D and 3D Transformation-Scaling, Rotation, Translation Homogeneous transformation.

Control of robot manipulators – Point to point, Continuous Path Control, Robot programming

UNIT – III — **10 Hrs**

Robot Sensors

Sensors in robot – Touch sensors-Tactile sensor – Proximity and range sensors. Force sensor-Light sensors, Pressure sensors, Introduction to Machine Vision and Artificial Intelligence.

UNIT – IV — **10 Hrs**

Robot Applications

Industrial applications of robots, Medical, Household, Entertainment, Space, Underwater, Defense, Disaster management. Applications, Micro and Nano-robots, Future Applications.

Reference Books:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel, Nicholas G Odrey, “Industrial Robotics Technology, Programming and Applications”, Tata –McGraw Hill Pub. Co., 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw Hill Publishing Company Limited, 2010.
3. Klafter.R.D, Chmielewski.T.A, and Noggin’s., “Robot Engineering: An Integrated Approach”, Prentice Hall of India Pvt. Ltd., 1994.
4. Fu.K.S, Gonzalez.R.C &Lee.C.S.G, “Robotics control, sensing, vision and intelligence”, Tata-McGraw Hill Pub. Co., 2008
5. Yu. “Industrial Robotics”, MIR Publishers Moscow, 1985.

Course Outcomes:

After completion of the course student will be able to

CO1: Comprehend the basic elements of industrial robots

CO2: Analyse robot kinematics and its control methods.

CO3: Classify the various sensors used in robots for better performance.

CO4: Summarize various industrial and non-industrial applications of robots.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	1	1	-	-	-	-	1	-	1	-	-
CO2	1	2	1	-	-	-	-	1	-	1	-	-
CO3	-	1	1	2	-	-	-	1	-	1	-	-
CO4	-	-	1	1	2	-	-	1	-	1	-	-

22UBT148B/22UBT248B	BIOMASS AND BIOENERGY	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

1. To understand the basic concepts of biomass and bioenergy.
2. To gain the knowledge about different biomass conversion technologies.
3. To know about innovative bioenergy plants and bio refinery concept.

UNIT - I	10 Hrs

Biomass

Definition, constituents and energy properties. Biomass as an energy core and its different mode of utilization. Biomass typologies: lignocellulosic, starchy, sugary, oilseeds, MSW, sewage sludge.

Introduction to Biofuels - definition (liquid -biodiesel, bioethanol; gaseous -syngas, biogas; solid - charcoal and biochar), advantages and disadvantages. Biofuel life cycle. Conventional fuels and their environmental impacts. Renewable energy sources. Modern fuels and their environmental
impacts.

UNIT – II	10 Hrs

Types of Bioenergies:

First generation, Second generation, third generation and next/future generation fuels Biomass Conversions Technologies:

Physical conversion: Dewatering, drying, size reduction, steam explosion, densification, pelleting, chipping, oil extraction.

Thermochemical conversion: Oil trans-esterification

Chemical conversion: Lignocellulosic conversion (2G technology)

Biochemical conversion: Anaerobic digestion (biogas production from organic waste and Waste water), CBG. Fermentation (bioethanol production)

UNIT - III	10 Hrs

Thermal conversion:

Combustion plants for heat generation: wood andpellet burning stoves; wood, pellet and wood chipsboiler. Gasification plants, Pyrolysis plants.

Innovative bioenergy plants: biomass to synthetic natural gas; biomass to liquid biofuels through
Fisher-Tropsch; absorption enhanced reforming. Hydrothermal processes: carbonization, Liquefaction,gasification.

UNIT - IV	10 Hrs

Bio-Energy and Bio-Refinery

Overview of Integrated biorefinery concept, value-added processing of bioenergy residues. Economic feasibility of producing bioenergy (with one example), Issues with bioenergy production & use. Impact of bioenergy in global climate change & food production. Strategies for new vehicle technologies. Current research on biomass & bioenergy production. Market barriers of bioenergy.

Reference Books:

1. Samir K. Khanal,Anaerobic Biotechnology for Bioenergy Production: Principles andApplications. Wiley-Blackwell Publishing, 2008.
2. E.J. Dasilva, C Ratledge & A Sasson, Biotechnology, Economic & Social Aspects:, Cambridge Univ. Press, Cambridge, 2000.
3. Pradipta Kumar Mahopatra, Environmental Biotechnology 2007.
4. Caye M. Drapcho, Nghiem Phu Nhuan, Terry H. Walker, Biofuel Engineering Processtechnology Mc Grow Hill company, 2008.
5. Dominik Rutz & Rainer Janssen, Biofuel Technology Handbook 2008.

Course Outcomes:
After completion of the course student will be able to **CO1:** Emphasize on the basic aspects of Biomass and Bio-Energy. **CO2:** Interpret and describe biomass conversion technologies. **CO3**: Acquire knowledge of innovative bioenergy plants. **CO4**: Interpret and describe of Bio-Refinery concept.

Course Outcomes	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	**3**	**1**	**2**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**2**
CO2	**1**	**3**	**3**	**2**	**3**	**1**	**3**	**-**	**-**	**-**	**-**	**1**
CO3	**1**	**1**	**3**	**2**	**3**	**1**	**3**	**-**	**-**	**-**	**-**	**1**
CO4	**1**	**-**	**2**	**-**	**2**	**1**	**2**	**-**	**-**	**-**	**-**	**2**

22UCS130B/22UCS230B	INTRODUCTION TO WEB PROGRAMMING (INTEGRATED)	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS:50
TOTAL HOURS: 46HRS (26T+20P)		SEE MARKS:50

Course objectives

1. To use the syntax and semantics of HTML and XHTML
2. To develop different parts of a web page
3. To understand how CSS can enhance the design of a webpage.
4. To create and apply CSS styling to a webpage

UNIT-I	08 Hrs.

Fundamentals of WEB: Introduction to Internet, World Wide Web, Web Browsers, Web Servers, Uniform Resource-Locators, MIME, HTTP. Traditional HTML and XHTML: First Look at HTML and XHTML, Hello HTML and XHTML World, HTML and XHTML: Version History, HTML and XHTML DTDs: Document Type Statements and Language Versions, (X) HTML Document Structure, Browsers and (X) HTML, The Rules of (X) HTML, Major Themes of (X) HTML.

UNIT–II	06 Hrs.

HTML5: Hello HTML5, Loose Syntax Returns, XHTML5, HTML5: Embracing the Reality of Web Markup, Presentational Markup Removed and Redefined, HTML5 Document Structure Changes, Adding Semantics: HTML5's Open Media Effort, HTML5 Form Changes.

UNIT–III	06 Hrs.

Cascading Style Sheets (CSS): Introduction, CSS Overview , CSS Rules, Example with Type Selectors and the Universal Selector, CSS Syntax and Style, Class Selectors, ID Selectors, span and div Elements, Cascading, style Attribute, style Container, External CSS Files, CSS Properties, Color Properties, RGB Values for Color, , Font Properties, line-height Property, Text Properties, Border Properties, Element Box, padding Property, margin Property .

UNIT–IV	06 Hrs.

Tables and CSS, Links and Images: Table Elements, Formatting a Data Table: Borders, Alignment, and Padding, CSS Structural Pseudo- Class Selectors, thead and tbody Elements, Cell Spanning. CSS display Property with Table Values, **Links and Images**:a Element, Relative URLs, Navigation Within a Web Page, CSS for Links, Bitmap Image Formats: GIF, JPEG, PNG.

Reference Books:

1. Thomas A. Powell,**The Complete Reference HTML & CSS (**Fifth Edition), Tata McGraw Hill.
2. John Dean,**WEB PROGRAMMING with HTML5**CSS and JavaScript(First Edition), Jones & Bartlett Learning.
3. Chris Bates,**WEB PROGRAMMING (**Second Edition), Wiley.

Programming Assignments:

1. To create a simple html file to demonstrate the use of different tags.

   Create an html page named as "Basic_Html_Tags.html" and add the following tags

   a) Different heading tags (h1 to h6)
   b) Paragraph
   c) Horizontal line
   d) Line Break

e) Pre tag
f) Different Logical Style (<b>,<u>,<Sup>,<sub>)

2. Create a HTML code to display the following web page using list.

Learning Web Development

I. Background Skills
  A. Unix Commands
  B. Vim Text Editor
II. HTML
  A. Minimal Page
  B. Headings
  C. Tags
  D. Lists
    i. Unordered
    ii. Ordered
    iii. Definition
    iv. Nested
  E. Links
    i. Absolute
    ii. Relative
  F. Images

3. Create an html page named as "Table.html" to display the following table.

NAME	SUBJECT	MARKS
Hillary	Advanced Web	75
	Operating Syatem	60
Lary	Advanced Web	80
	Operating Syatem	75
	Total Average: 72.5	

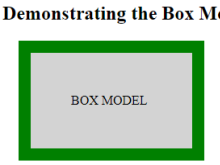
4. Create an internal style sheet to define the following CSS properties for element(s) on your page:
   a. text-decoration
   b. text-align
   c. font-size
   d. font-family
   e. font-weight

5. Create an external style sheet to define the following CSS properties for element(s) on your page:
   a. background-color
   b. color
   c. margin-xxx (left, right, top, or bottom)
   d. padding
   e. border-style , border-color , border-width

6. To create HTML code to insert image and to add a link to a web page.

7. Write a HTML code to perform the following CSS properties
   a. Text Properties
      - text-color
      - text-align
      - text-decoration
      - text-transformation
   b. Font Properties
      - font-style
      - font-size
      - font-family

8. Create a HTML code to display following output(using box properties)



9. Create the following table using CSS properties.

Roll No	Name	Team
1001	John	Red
1002	Peter	Blue
1003	Henry	Green

10. Create a HTML code for simple registration form which include
    i. Firstname ii. Middlename iii.Lastname iv.Course with option button v.Gender with radio button vi.Phone No vii.Address viii.Submit and reset button

Course Outcomes:

After completion of the course student will be able to,

CO1: Analyze historical context and justification for HTML over XHTML.

CO2: Develop HTML5 documents and adding various semantic markup tags.

CO3: Learn various attributes, values and types of CSS.

CO4: Build a web page using links and images.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	3	-	-	-	-	-	-	-	-	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3
CO3	3	2	3	-	-	-	-	-	-	-	-	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3

22UCS131B/22UCS231B	INTRODUCTION TO PYTHON PROGRAMMING	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS: 50
TOTAL HOURS: 46HRS (26T+20P)		SEE MARKS: 50

Course objectives

1. Learn the syntax and semantics of the python programming languages
2. Illustrate the process of structuring the data using list, tuples, string and dictionaries
3. Demonstrate the use of built-in function to navigate the file system

UNIT – I	07 Hrs

Python Basics

Our first python script, Comments, Basic data types, Identifiers, Keywords, variables, basic input and output: printing using the print function, Taking input using the input function

Python control structures:

Getting started with programs, decisions, loops, terminating control

UNIT – II	06 Hrs

Lists:

Creating lists, Accessing list elements, counting list elements, Iterating through list elements, searching elements within lists, list slices, adding and deleting elements, adding multiplying and copying lists, simple programs on lists, nested lists

Tuples: Creating Tuples, accessing tuple elements, counting tuple elements, Iterating through tuple elements, searching elements within tuples, tuple slices, adding multiplying and copying tuples, comparison of tuples and lists, simple programs

Introduction to sets: Creating sets, Accessing set elements, Iterating through set elements

UNIT – III	06 Hrs

Strings:

Conversion from and to strings, searching in strings, splitting strings, joining strings, modifying strings,padding strings

Dictionaries:

Creating Dictionaries, accessing Dictionary elements, counting Dictionary elements, Iterating through

Dictionary elements, searching elements within Dictionaries, adding and deleting Dictionary, comparison simple programs

UNIT – IV	07 Hrs

Functions:

Introduction to functions, function definitions, function call, positional arguments, default arguments, keyword arguments, variable arguments, returning from functions,

Files:

Introduction to file handling, opening and closing files, reading from text files, writing to text files, seeking within files, reading to binary files, wring to binary files

Programming Exercises:

1. Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages.
2. Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.
3. Develop a program to generate Fibonacci sequence of length (N). Read N from the console.
4. Write a function to calculate factorial of a number. Develop a program to compute

binomial coefficient (Given N and R).

5. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.
6. Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.
7. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use
8. Dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display dictionary slice of first 10 items]
9. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip (), len (), list methods sort (), append (), and file methods open (), read lines (), and write ()].
10. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods.
11. Write a function named DivExp which takes TWO parameters a, b and returns a value c (c=a/b). Write suitable assertion for a>0 in function DivExp and raise an exception for when b=0. Develop a suitable program which reads two values from the console and calls a function DivExp.
12. Write python program to implement simple library system using dictionary: Library = { ISBN1 : [No of copies, title, author] . . . } to support i) add new look ii) issue book iii) Return book operations
13. Given price list: {item1: amt, item2: amt . . .} and list of items purchased, write python program to find amount to be paid for purchased items.
14. Ex: pricelist ; { “pen”:10, “Notebook”:50, “book”:100} Items_purchased = [“pen”, “book”]
15. o/p: amt_to_be_paid = 110

Reference Books:

1. B. Nagesh Rao, “Learning Python”, Cyberplus publication, 2nd edition
2. Gaowrishankar S., Veena A, “Introduction to python programming”, CRC press
3. Al Sweigart, “Automate the boring stuff with Python”, No Starch press, 1st Edition, 2015.
4. Allen B. Downey, “Think Python: How to Thik Like a Computer Scientist”, Green Tea Press, 2nd Edition, 2015.

Course Outcomes:

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

CO 1: Explain the syntax and semantics of different statements and functions.

CO 2: Demonstrate the use of strings, files, lists, tuples, dictionaries and exceptions

CO 3: Develop the solution to a given problem by selecting appropriate data types and modules

CO 4: Able to create, read data from and write data to files

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	1	-	-	-	-	-	-	2
CO3	-	3	3	1	2	-	-	-	-	-	-	2
CO4	-	3	3	1	2	-	-	-	-	-	-	2

22UCS132B /22UCS232B	BASICS OF JAVA PROGRAMMING	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS: 50
TOTAL HOURS: 46HRS (26 T+20 P)		SEE MARKS: 50

Course Objectives:

1. Learn fundamental features of object oriented language and JAVA
2. Set up Java JDK environment to create, debug and run simple Java programs.
3. Learn object oriented concepts using programming examples.
4. Study the concepts of importing of packages and exception handling mechanism.

UNIT – I	07 Hrs

An Overview of Java: Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements, Using Blocks of Code, Lexical Issues, The Java Class Libraries,
Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, A Closer Look at Literals, Variables, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays, A Few Words About Strings

UNIT – II	06 Hrs

Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The? Operator, Operator Precedence, Using Parentheses, Control Statements: Java‟s Selection Statements, Iteration Statements, Jump Statements.

UNIT – III	06 Hrs

Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The finalize Method, A Stack Class, A Closer Look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Recursion, Introducing Access Control, Understanding static, Introducing final, Arrays Revisited.

UNIT – IV	07 Hrs

Inheritance: Inheritance, Using super, Creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance, The Object Class.
Text book 1: Ch 8.

Reference Books:

1. Herbert Schildt, Java the Complete Reference, 7th Edition, Tata McGraw Hill, 2007.

Web links and Video Lectures (e-Resources):

- https://onlinecourses.nptel.ac.in/noc22_cs47/preview

Programming Exercises:

1. Develop simple java programs to demonstrate the use of conditional statements
2. Develop simple java programs to demonstrate the use
   i. loop statements
   ii. Reading & printing different data types in java
3. Develop simple java programs on arrays(single & multidimensional) & recursion
4. Develop simple java programs to demonstrate Interfaces concept
5. Develop simple java programs to demonstrate Polymorphism mechanisms
6. Develop simple java programs to demonstrate Inheritance concept
7. Develop simple java programs to demonstrate Package concept
8. Develop simple java programs to demonstrate exception handling

9. Develop simple java programs to demonstrate use of Constructors
10. Develop simple java programs to demonstrate Method overloading & overriding

Course Outcomes:

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

CO1: Explain features of JAVA.

CO2: Analyse the problem statement and Identify the requirement.

CO3: Design and develop standalone applications using Java.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-

22UCS133B /22UCS233B	INTRODUCTION TO C++ PROGRAMMING	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS:50
TOTAL HOURS: 46HRS (28T+20P)		SEE MARKS:50

Course Objectives:

1. Understanding about object oriented programming and Gain knowledge about the capability to store information together in an object.
2. Understand the concept of structure and functions
3. Understand the capability of a class to relay upon another class and functions.
4. Understand about constructors which are special type of functions.
5. Understand the concept of polymorphism and inheritance.

UNIT – I	08 Hrs

Introduction: Features of object oriented programming, C++ and C , C++ overview, Layout of C++ Program, Cin and Cout statements, Preprocessor directives, Comments, Manipulators, Data types,variables, constants, Arithmetical operators, Logical operators, Relational operators, Conditional operators, Loops and Decisions: for- loop, while loop, do-while loop, if statement, if-else statement, else-if statement, switch statement.

UNIT – II	06 Hrs

Structures: A simple structure, defining a structure, defining structure variables, accessing structure members, Functions: Simple functions, passing arguments to functions, returning value to a function, overloaded functions.

UNIT – III	06 Hrs

Class and Objects: Class specification, Access Specifiers, Defining Member Function, Objects Declaration, Accessing Data members and Member Function, Constructors, parameterized constructor, Destructors.

UNIT – IV	08 Hrs

Inheritance& Polymorphism: Derived class Constructors, destructors-Types o inheritance-Defining Derived classes, Single Inheritance, Multiple, Hierarchical Inheritance, Hybrid Inheritance.

Reference Books:

1. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publishing
2. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd , Fourth Edition 2010.

Web links and Video Lectures (e-Resources):

1. Basics of C++ - https://www.youtube.com/watch?v=BCIS40yzssA
2. Functions of C++ - https://www.youtube.com/watch?v=p8ehAjZWjPw Tutorial Link: https://www.w3schools.com/cpp/cpp_intro.asp
2. https://www.edx.org/course/introduction-to-c-

Programming Assignments

1. a. Write a C++program to find the sum of all the natural numbers from 1to n.
   b. Write a C++ program to find the factorial of a given number
   c. Write a C++ program to find the given number is prime or not
2. Write a C++ program to make a simple calculator.
3. Write a C++ program to declare Strut. initialize and display contents of member variables
4. Write a C++program to demonstrate function overloading for the following prototypes. Add (int a, int b) Add (double a , double b)
5. Write a C++ program to find Area of square, rectangle ,circle and triangle using Function Overloading
6. Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents..
7. Given that an EMPLOYEE class contains following members: data members: Employeenumber, Employee

name, Basic, DA, IT, Net Salary and print data member

8. Program to illustrate default constructor, parameterized constructor
9. Develop simple C++ programs to demonstrate Inheritance concept
10. Suppose we have three classes Vehicle, Four Wheeler, and Car. The class Vehicle is the base class, the class Four Wheeler is derived from it and the class Car is derived from the class Four Wheeler. Class Vehicle has a method' vehicle 'that prints I am a vehicle, class Four Wheeler has a method four Wheeler' that prints I have four wheels, and class Car has a method car that prints Iam a car .So, as this is a multi- inheritance; we can have access to all the other classes methods from the object of the class Car.
11. We invoke all the methods from a Car object and printthe corresponding outputs of the methods.
12. So, if we invoke the methods in this order, car(), four Wheeler(), and vehicle(), then the outputwill be
13. I am a car
14. I have four
15. wheels I am a vehicle

Course Outcomes:

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

CO1: Demonstrate the basic concept of programming.

CO2: Able to understand and design the solution to a problem using struct, function and function overloading concepts.

CO3: Able to understand and design the solution to a problem using object-oriented programming concepts.

CO4: Develop programs using inheritance and polymorphism.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	2	-	-	-	-	-	-	-
CO2	-	1	-	-	2	-	-	-	-	-	-	2
CO3	-	1	-	-	-	-	-	-	-	-	-	2
CO4	-	2	-	-	-	-	-	-	-	-	-	2

22UHS124C	COMMUNICATIVE ENGLISH	CREDIT: 01
L:T:P: 1:0:0		CIE MARKS:50
TOTAL HOURS: 15 HRS		SEE MARKS:50

Course Objectives:

1. To know about fundamentals of communicative english and communication skills ingeneral.
2. To train the students and identify the nuances of phonetics, intonation and enhance pronunciation skillsfor better communication skills.
3. To impart basic English grammar and essentials of important language skills.
4. To enhance with English vocabulary and language proficiency for better communication skills.
5. To learn about techniques of information transfer through presentation.

UNIT - I	3 Hrs

Introduction to Communication Skills: Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.

UNIT – II	4 Hrs

Introduction to Phonetics: Phonetics and its importance, Phonetic Transcription, Pronunciation Guidelines Related to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables & Structure, Word Accent and Stress Shift, Intonation, Spelling Rules & Words often Miss spelt. Common Errors in Pronunciation.

Basic English Grammar and Vocabulary PART- I: Introduction to English Grammar, Parts of Speech.

UNIT - III	4 Hrs

Basic English Grammar and Vocabulary PART - II: Articles and Preposition, kinds of Preposition and Prepositions often Confused. Articles: Use of Articles – Indefinite and Definite Articles, Verbs and Tenses, Types of tenses, Question Tags, Question Tags for Assertive Sentences (Statements) – Some Exceptions in Question Tags. One Word Substitutes. Strong and Weak forms of words, Word formation - Prefixes and Suffixes, Contractions and Abbreviations.

UNIT - IV	4 Hrs

Communication Skills for Employment: Information Transfer & Its types: Oral Presentation & Extempore/Public Speaking, Difference between Extempore/Public Speaking, Communication Guidelines for Practice. Mother Tongue Influence (MTI) – South Indian Speakers, Various Techniques for Neutralization of Mother Tongue Influence.

Reference Books:

1. Infinite Learning Solutions “A Textbook of English Language Communication Skills” (RevisedEdition) 2021.
2. Sanjay Kumar and Pushpalata “Communication Skills”, Oxford University Press - 2019.
3. N. P. Sudharshana and C. Savitha, “English for Engineers”, Cambridge University Press – 2018.
4. D Praveen Sam, KN Shoba, “A Course in Technical English”, Cambridge University Press – 2020.
5. Gajendra Singh Chauhan and Et al, “Technical Communication”, Cengage learning India Pvt.Limited 2019.
6. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt. Limited 2019.

Course Outcomes:

After completion of the course student will be able to

CO1: Apply the Fundamentals of Communicative English in their communication skills.

CO2: Identify the nuances of phonetics, intonation and enhance pronunciation skills.

CO3: Practice Basic English grammar skills and utilize essential language skills as per requirement.

CO4: Build and use all types of English vocabulary and language proficiency.

CO5: Solve the hindrances faced by (MTI) - Mother Tongue Influence.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	3

22UHS226C	SAMSKRUTHIKA KANNADA	CREDITS:01
L:T:P: 1:0:0		CIE MARKS:50
TOTAL HOURS:15HRS		SEE MARKS:50

ಕೋರ್ಸ್ ಉದ್ದೇಶಗಳು :

1. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ' ಪಠ್ಯದ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ನಾಡು, ನುಡಿ, ಭಾಷೆ, ಮತ್ತು ಕನ್ನಡಿಗರ ಸಾಂಸ್ಕೃತಿಕ ಬದುಕಿನ ಬಗೆಗೆ ಅರಿವು ಮೂಡಿಸುವುದು.
2. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆ ಹಾಗೂ ಅದಕ್ಕೆ ಪೂರಕವಾಗಿರುವ ಕನ್ನಡ ವ್ಯಾಕರಣಾಂಶಗಳ ಬಗೆಗೆ ಅರಿವು ಮೂಡಿಸುವುದು. ಪ್ರಾದೇಶಿಕ ಭಾಷೆಯಲ್ಲಿ ಅರ್ಜಿ ಮತ್ತು ಪತ್ರವ್ಯವಹಾರಗಳನ್ನು ಸಮರ್ಥವಾಗಿ ನಿರ್ವಹಿಸಲು ಪ್ರೇರೇಪಿಸುವುದು. .
3. ತಾಂತ್ರಿಕ ಅಧ್ಯಯನದ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯ ಬರವಣಿಗೆ ಮತ್ತು ಬರವಣಿಗೆಯಲ್ಲಾಗುವ ದೋಷಗಳನ್ನು ಗುರುತಿಸುವ ಸಾಮರ್ಥ್ಯವನು ಬೆಳೆಸುವುದು.
4. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಅಡಗಿರುವ ಸುಪ್ತ ಪ್ರತಿಭೆಯನ್ನು ಅನಾವರಣಗೊಳಿಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಅವರಲ್ಲಿ ಕಲೆ, ಬರವಣಿಗೆ ಮತ್ತು ಭಾಷಾಂತರ ಕಲೆಯಲ್ಲಿ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.ಎಲ್ಲದಕ್ಕೂ ಮೇಲಾಗಿ ಮಾನವೀಯ ಮೌಲ್ಯಗಳೊಂದಿಗೆ ಸರ್ವಾಂಗೀಣವಾಗಿ ಸಂವರ್ಧನೆಗೊಳಿಸಿ ಅವರನ್ನು ರಾಷ್ಟ್ರದ ಅಮೂಲ್ಯ ಸಂಪತ್ತನ್ನಾಗಿ ರೂಪಿಸಿಸುವುದು.
5. ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಯಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯ ಪರೀಕ್ಷೆಯ ಬರೆಯಲು ಸಾಮರ್ಥ್ಯ ಹೊಂದಿರುತ್ತಾರೆ.

¨sAUA-I — 4 Hrs.

1 ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ : ಹಂಪ ನಾಗರಾಜಯ್ಯ

2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದುಅಪೂರ್ವಚರಿತ್ರೆ – ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ : ಡಾ.ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ.ವಿ.ಕೇಶವಮೂರ್ತಿ

¨sAUA-II

1. ವಚನಗಳು : ಜೇಡರದಾಸಿಮಯ್ಯ,ಬಸವಣ್ಣ,ಅಕ್ಕಮಹಾದೇವಿ,ಅಲ್ಲಮಪ್ರಭು,ಆಯ್ದಕ್ಕಿಲಕ್ಕಮ್ಮ
2. ಕೀರ್ತನೆಗಳು : ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೆ–ಕನಕದಾಸರು
3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು – ಶಿಶುನಾಳ ಷರೀಫರು
4. ಜನಪದಗೀತೆ : ಬೀಸುವ ಪದ

¨sAUA-III

1. ಮಂಕುತಿಮ್ಮನಕಗ್ಗ : ಡಿ.ವಿ.ಜಿ.
2. ಕುರುಡುಕಾಂಚಾಣಾ : ದ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು
4. ಚೋಮನ ಮಕ್ಕಳ ಹಾಡು : ಡಾ.ಸಿದ್ಧಲಿಂಗಯ್ಯ
5. ಆ ಮರ ಈ ಮರ : ಡಾ.ಚಂದ್ರಶೇಖರ ಕಂಬಾರ

¨sAUA-IV

1. ಡಾ.ಸರ್.ಎಂ.ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ ಎನ್ ಮೂರ್ತಿರಾವ್
2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ
3. 'ಕ' ಮತ್ತು 'ಬ' ಬರಹ ತಂತ್ರಾಂಶಗಳು ಕನ್ನಡದ ಟೈಪಿಂಗ್

¥ÀoÀå ¥ÀÅ¸ÀÛPÀUÀ¼ÀÄ

"¸Á0¸ÀÌöÈwPÀ PÀ£ÀßqÀ" (¸À0)
qÁ. ». a. ¨ÉÆÃgÀ°0UÀ0iÀÄå ªÀÄvÀÄÛ J¯ï. wªÉÄäÃ±À.
Prasaranga VTU, Belagavi, Karnataka, 2020

PÉÆÃ¸Àð ¥sÀ°vÁ0±ÀUÀ¼ÀÄ

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

CO1: ವಿದ್ಯಾರ್ಥಿಗಳು ಬೌದ್ಧಿಕವಾಗಿ ಬೆಳೆಯುವುದರೊಂದಿಗೆ ನಮ್ಮ ನಾಡಿನ ಮತ್ತು ದೇಶದ ಸಾಂಸ್ಕೃತಿಕ ವಾರಸುದಾರರಾಗಿ ಬೆಳೆದು ಸ್ವಾವಲಂಬಿಯಾಗಿ ಬದುಕು ಕಟ್ಟಿಕೊಳ್ಳುತ್ತಾರೆ.

CO2: ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಸಮರ್ಥವಾಗಿ ಮಾತನಾಡುವುದರೊಂದಿಗೆ, ಅನ್ಯರನ್ನು ಅರ್ಥೈಸಿಕೊಳ್ಳುವ ಮನೋಬಲ ಬೆಳೆಸಿಕೊಳ್ಳುತ್ತಾನೆ. ಇವತ್ತಿನ ಸಂಕೀರ್ಣವಾದ ಸಾಮಾಜಿಕ ವ್ಯವಸ್ಥೆಯಲ್ಲಿ ಸೌಹಾರ್ದಯುತ ವಾದ ನಡುವಳಿಕೆಯೊಂದಿಗೆ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಯಾಗಿ ರೂಪುಗೊಳ್ಳುತ್ತಾನೆ.

CO3: ಜಾಗತಿಕರಣದ ಸಂದರ್ಭದಲ್ಲಿ ವಿದ್ಯಾರ್ಥಿಗಳು ಸ್ವತಂತ್ರವಾಗಿ ಆಲೋಚಿಸುವ, ಸ್ವತಂತ್ರವಾಗಿ ಬರೆಯುವ, ಸ್ವತಂತ್ರವಾಗಿ ಚಿಂತನಶೀಲರಾಗುವ ಸಾಮರ್ಥ್ಯವನ್ನು ಪಡೆದು, ಸಮಯೋಚಿತವಾಗಿ ಸೂಕ್ತ ನಿರ್ಧಾರಗಳನ್ನು ಕೈಗೊಳ್ಳುವಲ್ಲಿ ಈ ಅಧ್ಯಯನ ದೀಪಸ್ತಂಬವಾಗಿದೆ.

CO4: ವಿದ್ಯಾರ್ಥಿಗಳು ಇಂದಿನ ಜಾಗತಿಕ ವಿದ್ಯಮಾನಗಳನ್ನು ಅರ್ಥೈಸಿಕೊಂಡು, ಸಮಾಜದಲ್ಲಿ ಸಂಘಜೀವಿಯಾಗಿ ಬೆಳೆಯುವ ಮನೋಬಲವನ್ನು ಮತ್ತು ಆತ್ಮಸ್ಥೈರ್ಯವನ್ನು ತುಂಬುವಲ್ಲಿ ಈ ಅಧ್ಯಯನ ಸೂಕ್ತವಾದ ಮಾರ್ಗದರ್ಶಿಕೆಯಾಗಿದೆ.

Note: Eligibility criteria for registration of Kannada subject who have studied Kannada language as one of the subjects either in tenth standard or PUC have to register Samskruthika Kannada

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	1	-	-	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-	-
CO4	-	-	-	-	-	1	3	-	-	-	-	-

22UHS127C/22UHS227C	BALAKE KANNADA	CREDITS:01
L:T:P: 1:0:0		CIE MARKS:50
TOTAL HOURS:15HRS		SEE MARKS:50

ಕೋರ್ಸ್‌ಉದ ೇಶಗಳು:

1 'ಬಳಕೆ ಕನ್ನಡ 'ಪಠ್ಯದ ಅಧ್ಯಯನ ದಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳು ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಅರ್ಥೈಸಿಕೊಂಡು, ಕನ್ನಡದಲ್ಲಿ ಸಂವಹನ ಮಾಡಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ.

2 ಕನ್ನಡ ವರ್ಣಮಾಲೆಯ ಬಗೆಗೆ ಅರಿವು ಮೂಡಿಸುವುದು ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಆಂತರಿಕ ಸಂವಹನ ಕ್ರಿಯೆಯನ್ನು ವೃದ್ಧಿಗೊಳಿಸುವುದು.

3 ಕನ್ನಡ ಸಂಖ್ಯೆಗಳ ಬಗೆಗೆ ಅರಿವು ಮೂಡಿಸಿ, ಅವುಗಳನ್ನು ಸಮಯೋಚಿತವಾಗಿ ಬಳಸುವ ವಿಧಾನವನ್ನು ಕಲಿಸಿಕೊಡುವುದು.

4 ನಮ್ಮ ನಾಡಿನ ಸಾಂಸ್ಕೃತಿಕ ವೈವಿಧ್ಯತೆಯನ್ನುಅರಿತು, ಅರ್ಥೈಸಿಕೊಂಡು ನಾಡಜನರೊಂದಿಗೆ ಸೌಹಾರ್ದಯುತವಾಗಿ ಬದುಕಲು ಕಲಿಸುವುದು.

UNIT-I — 4 Hrs.

- Necessity of learning a local language:
- Tips to learn the language with easy methods.
- Easy learning of a Kannada Language: A few tips
- Hints for correct and polite conservation
- Key to Transcription

Lessons to teach and Learn Kannada Language

1. ವೈಯಕ್ತಿಕ,ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು –
   Personalpronouns, possessive Forms, Interrogative words
2. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮ ಪದಗಳು–
   Possessive forms of nouns, dubitive question and Relative nouns
3. ಗುಣ,ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು – Qualitative, Quantitative and Colour Adjectives, Numerals

UNIT-II — 4 Hrs.

1. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು – Ordinal numerals and plural markers
2. ನ್ಯೂನ/ ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ಮತ್ತುವರ್ಣ ಗುಣವಾಚಕಗಳು – Defective/Negative Verbs and Colour Adjectives
3. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ,ನಿರ್ದೇಶನ,ಪ್ರೋತ್ಸಾಹ ಮತ್ತುಒತ್ತಾಯ ಅರ್ಥ ರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು
   Permission, Commands, encouraging and Urging words Imparative words and sentences
4. ಹೋಲಿಕೆ (ತರತಮ). ಸಂಬಂಧ ಸೂಚಕ ಮತ್ತು ವಸ್ತುಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ – Comparitive, Relationship, identification and Negation words

UNIT-III	4 Hrs.

1.ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿದ ಪ್ರಕಾರಗಳು
Different types of forms of Tense, Time and Verbs
2.ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು – Kannada words in Conversation
3.ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮತ್ತು ರಾಜ್ಯದ ಬಗ್ಗೆ ಕುರಿತಾದ ಇತರೆ ಮಾಹಿತಿಗಳು–
Karnataka State and General information about the State
4.ಭಾಷೆ ಕಲಿಯಲು ಏನನ್ನುಮಾಡಬೇಕು ಮತ್ತು ಮಾಡಬಾರದು – Do's and don'ts in learning a language

UNIT-IV	4 Hrs.

1.Kannada language script part – 1
2.Kannada language script part – 1

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ಬಳಕೆ ಕನ್ನಡ –"Balake Kannada" -
Author : Dr. L Thimmesha
Published by Prasaranga,
Visvesvara a Technolo ical Universi , Bela avi, Karnataka.

PÉÆÃ¸Àð ¥sÀ°vÁ0±ÀUÀ¼ÀÄ

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

CO1: ವಿದ್ಯಾರ್ಥಿಗಳು ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಸುಲಭವಾಗಿ ಅರ್ಥೈಸಿಕೊಂಡು, ಸಾಮಾಜಿಕವಾಗಿ,ಆರ್ಥಿಕವಾಗಿ ಆಯಾ ಪ್ರದೇಶದ ಜನರೊಂದಿಗೆ ಅನ್ಯೋನ್ಯವಾಗಿ ವ್ಯವಹರಿಸುತ್ತಾರೆ.

CO2: ಈ ಪಠ್ಯಾಧ್ಯಯನದಿಂದ ವಿದ್ಯಾರ್ಥಿಯು ಆಯಾ ಪ್ರದೇಶಗಳ ನಂಬಿಕೆ,ಸಂಪ್ರದಾಯ ಮತ್ತು ಆಚರಣೆಗಳನ್ನು ಸುಲಭವಾಗಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ.

CO3: ಕನ್ನಡ ಸಂಖ್ಯೆಗಳ ಪರಿಕಲ್ಪನೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಯು ವಾಣಿಜ್ಯ ವ್ಯವಹಾರಗಳನ್ನು ಸುಲಭವಾಗಿ ನೆರೆವೇರಿಸಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ.

CO4: ಹಂತಹಂತವಾಗಿ ವಿದ್ಯಾರ್ಥಿಯು ಕನ್ನಡ ಭಾಷೆಯಲ್ಲಿ ಬರವಣಿಗೆಯ ಕಲೆಯನ್ನು ಮತ್ತು ಓದುವ ಕಲೆಯನ್ನು ಬೆಳೆಸಿಕೊಳ್ಳುತ್ತಾನೆ.

Note: Eligibility criteria for registration of Kannada subject who have studied Kannada language as one of the subjects either in tenth standard or PUC have to register Samskruthika Kannada

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	-	-	-	-	2	-	-
CO2	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	-	-	-	-	-	-	-	-	2	-	-
CO4	-	-	-	-	-	-	-	-	-	2	-	-

22UHS129C/22UHS229C	INNOVATION AND DESIGN THINKING	CREDIT: 01
L:T:P: 1:0:0		CIE MARKS:50
TOTAL HOURS: 15HRS		SEE MARKS:50

Course Objectives:

1. To explain the concept of design thinking for product and service development
2. To explain the fundamental concept of innovation and design thinking.
3. To discuss the methods of implementing design thinking in the real world.

UNIT - I	3Hrs

Understanding Design thinking:
Introduction about the design thinking, steps in Design Thinking Empathize, Design, Ideate, Prototype and Test, Explore presentation signers across globe–MVP or Prototyping.

UNIT – II	4Hrs

Tools for Design Thinking: Importance of tools for design thinking, Visualization, Journey mapping, Value chain analysis, Mind mapping, Rapid concept development, Assumption testing,
Prototyping, Customer co-creation, Learning launches, Storytelling.

UNIT – III	4Hrs

Design Thinking in IT:
Agile in Virtual collaboration environment – Scenario based Prototyping.
DTF or strategic innovations: Growth – Story telling representation, predictability- Strategic Foresight, Change – Sense Making,

UNIT – IV	4Hrs

Design Thinking in IT:
Agile in Virtual collaboration environment – Scenario based Prototyping.
DTF or strategic innovations: Growth – Story telling representation, predictability- Strategic Foresight, Change – Sense Making,

Reference Books:

1. John R. Karsnitz, Stephen O' Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition)2nd edition,2013.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press, 2009.
3. Hasso Plattner, Christoph Meinel and Larry Leifer, "Design Thinking : Understand–Improve–Apply",Springer, 2011
4. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Businessor Design School", John Wiley & Sons 2013.
5. Yousef Haik and Tamer M. Shahin, "Engineering Design Process", Cengage Learning, 2nd edition, 2011.

Course Outcomes:

After completion of the course the students will be able to,
CO1: Demonstrate the knowledge and concepts of design thinking.
CO2: Analyze various tools of design thinking and use an appropriate tool for design thinking.
CO3: Describe the role of design thinking in IT industry.
CO4: Demonstrate design thinking solutions to business challenges.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	3	3	2	-	-	-	-	-	-	-	-
CO2	-	2	3	2	3	-	-	-	-	-	-	-
CO3	-	-	1	1	3	-	-	-	-	-	-	-
CO4	-	3	2	1	-	-	-	-	-	-	-	-

22UMA203C	MATHEMATICS FOR COMPUTER SCIENCES-II (INTEGRATED)	CREDITS:04
L:T:P: 3:0:2		CIE MARKS : 50
TOTAL HOURS : 60 (40L+20 P)		SEE MARKS : 50

Course Objectives:

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students for self–study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.

UNIT-I	10 Hrs.

Introduction to Integral Calculus in Computer Science & Engineering.

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions.Problems.

Self-Study: Center of gravity, Duplication formula.

Applications: Antenna and wave propagation, Calculation of optimum value in various geometries. Analysis of probabilistic models.

UNIT-II	10 Hrs.

Introduction to Vector Calculus in Computer Science & Engineering:

Scalar and vector fields. Gradient, directional derivative, curl and divergence – physical interpretation, solenoidal and irrotational vector fields. Problems.

Curvilinear coordinates: Scale factors, base vectors, Cylindrical polar coordinates, Spherical polar coordinates, transformation between cartesian and curvilinear systems, orthogonality. Problems.

Self-Study: Volume integral.

Applications: Conservation of laws, Electrostatics, Analysis of streamlines.

UNIT-III	10 Hrs.

Importance of Vector Space and Linear Transformations in the field of Computer Science & Engineering.

Vector spaces: Definition and examples, subspace, linear span, Linearly independent and dependent sets, Basis and dimension. Problems.

Linear transformations: Definition and examples, Algebra of transformations, Matrix of a linear transformation. Change of coordinates, Rank and nullity of a linear operator, rank-nullity theorem. Inner product spaces and orthogonality. Problems.

Self-study: Angles and Projections. Rotation, reflection, contraction and expansion.

Applications: Image processing, AI & ML, Graphs and networks, computer graphics.

UNIT-IV	10 Hrs.

Importance of numerical methods for discrete data in the field of computer science & Engineering:

Solution of algebraic and transcendental equations - Regula-Falsi and Newton-Raphson methods (only formulae). Problems.Finite differences, Interpolation using Newton's forward and backward difference formulae,Newton's

divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.

Numerical integration: Trapezoidal, Simpson's (1/3)rd and (3/8)th rules (without proof). Problems.

Numerical Solution of Ordinary Differential Equations (ODE's): Numerical solution of ordinary differential equations of first order and first degree - Taylor's series method, Modified Eulers method, Runge-Kutta method of fourth order and Milne's predictor-corrector formula (No derivations of formulae). Problems.

S**elf-Study:** Bisection method, Lagrange's inverse Interpolation. Adam-Bashforth method.

Applications: Estimating the approximate roots, extremum values, Area, volume, and surface area. Errors in finite precision. Estimating the approximate solutions of ODE.

List of experiments

1 Program to calculate double integration of the given function under the given limits

i. Evaluate double integration of exp(x+y) between the limits (0,1) and (0,1) andverify the answer is 2.9524924.

ii. Evaluate double integration of exp(x+y) between the limits (0,1) and (0,2) andverify the answer is 10.978199.

iii. Evaluate double integration of exp(x+y) between the limits (0,2) and (0,2) andverify the answer is 40.820038.

iv. Evaluate double integration of exp(x+y) between the limits (1,2) and (0,2) andverify the answer is 29.841839.

v. Evaluate double integration of exp(x+y) between the limits (1,2) and (1,2) andverify the answer is 21.816132.

vi. Evaluate double integration of x^2+y^2 between the limits (1,2) and (1,2) andverify the answer is 4.6666667.

vii. Evaluate double integration of x^2+y^2 between the limits (0,2) and (1,2) andverify the answer is 7.3333333.

viii. Evaluate double integration of x^2+y^2 between the limits (0,2) and (0,2)and verify the answer is 10.666667.

ix. Evaluate double integration of x^2+y^2 between the limits (0,1) and (0,2) andverify the answer is 3.3333333.

x. Evaluate double integration of x^2+y^2 between the limits (0,1) and (0,1) andverify the answer is 0.6666667.

2 Program

i. To calculate the gradient of the tangent to the given angle.

ii. To calculate the gradient of the tangent to the given points.

iii. To calculate the gradient of the tangent to the given curve usingnumerical derivatives.

iv. To calculate the gradient of the tangent to the given curve usingderivatives.

3 Program

i. To find the divergence of the given function at the given point.

ii. To find the curl of the given function at the given point.

4 Program to find the Solution of algebraic or transcendental equations by Newton-Raphson method

5 Program

i. To calculate Newton forward difference for a given point.

ii. To calculate Newton backward difference for a given point.

6 Program to calculate trapezoidal rule

7 Program
   i. To calculate simpsons1/3 rule
   ii. To calculate simpsons3/8 rule

8 Program
   i. To calculate ode by Taylors series.
   ii. To calculate ode by modified Euler's method

9 Program to find the solution of ode by Runge Kutta method

10. Program to find the solution of ode by Milne predictor corrector method.

Reference Books:

1. Maurice D weir, Joel Hass and Frank R. Giordano, "Thomas calculus", Pearson, eleventh edition, 2011
2. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.
3. B. V. Ramana: "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Erwin Kreyszing's Advanced Engineering Mathematics volume1 and volume1I,wiley India Pvt.Ltd.,2014
5. Srimanta Pal & Subodh C. Bhunia: "Engineering Mathematics" Oxford University Press,3rd Ed., 2016.
6. N.P Bali and Manish Goyal: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
7. C. Ray Wylie, Louis C. Barrett: "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6th Ed., 2017.
8. Gupta C.B, Sing S.R and Mukesh Kumar: "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education (India) Pvt. Ltd 2015.
9. H. K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
10. James Stewart: **"**Calculus" Cengage Publications, 7th Ed., 2019.
11. David C Lay: "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.

Course Outcomes:

At the end the course the student should be able to:

CO1: Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing area and volume.

CO2: Understand the applications of vector calculus refer to solenoidal, and irrotational vectors. Orthogonal curvilinear coordinates.

CO3: Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation

CO4: Apply the knowledge of numerical methods in analysing the discrete data and solving the physical and engineering problems.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-

22UPH107C/22UPH207C	PHYSICS FOR COMPUTER SCIENCES (INTEGRATED)	CREDITS:04
L:T:P: 3:0:2		CIE MARKS : 50
TOTAL HOURS : 60 HRS (40L+20 P)		SEE MARKS : 50

Course objectives:

1. To study the principles of quantum mechanics and its applications in quantum computing
2. To study the properties of conductors and superconductors for engineering applications
3. To study the basics of lasers and optical fibers for engineering applications
4. To study the essentials of physics for computational aspects like design and data analysis

UNIT-I	10Hrs

Quantum mechanics: Introduction, de-Broglie hypothesis and matter waves, de-Broglie wavelength and derivation of expression by analogy. Phase velocity and Group velocity. Heisenberg's uncertainty principle and its physical significance (no derivation), Application of uncertainty principle (non-existence of electron in the nucleus), Principle of complementarity, Wave function, properties and physical significance of a wave function and Born interpretation, Expectation value, Normalization of a wave function. Derivation of one dimensional time independent Schrodinger's wave equation. Eigen functions and eigen values. Applications of Schrodinger's wave equation- eigen functions and energy eigen values of a particle in a one dimensional potential well of infinite height. Numerical problems.

Electrical properties of materials:

Quantum free electron theory – assumptions, Bose-Einstein and Fermi-Dirac distribution (qualitative),Fermi energy, Density of states(qualitative), Fermi factor and variation of Fermi factor with energy for different temperatures, Numerical problems.

Pre-requisite : Wave particle dualism, Basics of electrical conductivity

Self learning: Franck-Hertz experiment, CFET

UNIT-II	10Hrs

Quantum Computation:

Principles of quantum computation: Introduction to quantum computing, bit and qubits, Bloch sphere, multi-qubits

Dirac notation: Vector space, Bra-ket notation, inner and outer products, Hilbert space, Basis and linear dependence, orthonormal vectors, exploratory problems

Quantum operators: Projectors, operators, trace and tensor product, measurement, density operator, partial trace and partial transpose

Non-locality: Bells inequality and entanglement, entanglement measures

Quantum gates: Single, two, three qubit gates, quantum circuits, quantitative measures of quality of quantum circuits – gate count, garbage bit, quantum cost, depth and width of circuits, total cost, optimization rules

Quantum algorithms – Deutsch-Jozsa algorithms, Grover's algorithms

Statistical Physics for Computing: Descriptive statistics and inferential statistics, Poisson distribution and modelling the probability of proton decay, Normal Distributions (Bell Curves), Monte Carlo method, Determination of value of **π.** Numerical problems.

Pre-requisites: Matrices and probability

Self-learning: Moore's law

UNIT-III	10Hrs

Superconductivity: Introduction to superconductors, Temperature dependence of resistivity in conductors, semiconductor and superconductors, Meissner's effect, Critical magnetic filed, Temperature dependence of critical magnetic field, Silsbee effect, Type-I and Type-II superconductors, BCS theory (qualitative), High temperature superconductors, Quantum tunnelling, Josephson junction, DC and AC SQUIDs(qualitative), Applications of superconductors in quantum computing: Charge, Phase and Flux qubits. Numerical problems.

Laser: Introduction, interaction of radiation with matter (absorption, spontaneous emission and stimulated emission), Einstein's coefficients (expression for energy density), Conditions for laser action, requisites of a laser system, working mechanism, Characteristics of a laser, Classification of lasers. Construction and working of semiconductor diode laser. Applications of lasers- Bar code scanner, laser printer and laser cooling, Numerical problems.

Pre-requisite: Properties of light

Self learning: Maglev vehicles, superconducting magnets, Nd: YAG and Carbon dioxide lasers

UNIT-IV	10Hrs

Optical fibers: Introduction, Principle and structure, propagation mechanism in optical fibers, angle of acceptance, numerical aperture and its derivation. Modes of propagation (qualitative), types of optical fibers, attenuation and fiber losses, Applications-optical fiber communication and fiber optic networking, Numerical problems.

Physics of Animation: Taxonomy of physics based animation methods, Frames, Frames per second, Size and Scale, weight and strength, Motion and timing in animations, Constant force and Acceleration, The Odd rule, Odd – rule scenarios, Motion graphs, Examples of character animation: Jumping, Parts of Jump, Jump magnification, Stop time, Walking: Strides and Steps, Walk timing.

Numerical problems.

Pre-requisites: Motion in one dimension

Self-learning: TIR, Frames, Frames per second

List of Experiments:

Any Ten Experiments have to be completed from the list of experiments

1. Verification of Stefan's law
2. Determination of Planck's constant using LEDs
3. Determination of Fermi energy for a conductor
4. The study of characteristics of a laser
5. Determination of acceptance angle and numerical aperture of a given optical fiber
6. Determination of energy gap of a given semiconductor
7. Determination of resistivity of a semiconductor by four probe method.
8. The study of characteristics of a photodiode
9. The study of I-V characteristics of a given bipolar junction transistor
10. Identification of passive components and estimation of their values in a given black box
11. The study of frequency response in series and parallel LCR circuits
12. Determination of dielectric constant of a material in a capacitor by charging and discharging method
13. Determination of magnetic flux density at any point along the axis of a circular coil
14. Determination of velocity of ultrasonic waves in a given liquid using ultrasonic interferometer
15. Step Interactive physical simulations
16. Study of motion using spread sheets
17. Study of application of statistics using spread sheets
18. PHET Interactive simulations.

(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

Reference Books:

1. M. N. Avadhanulu, P. G. Kshirsagar and T. V. S. Arun Murthy, 2019, "A Textbook of Engineering Physics" (11th edition), S. Chand, New Delhi
2. Arthur Beiser, 2006, "Concepts of Modern Physics"(6th edition), TMH, New Delhi.
3. Kenneth Krane, 2006, "Modern physics"(2nd edition), John Wiely, New Delhi
4. A. Pathak, 2016, "Elements of Quantum Computation and Quantum Communication", CRC Press
5. M. A. Nielsen & I. L. Chuang, 2011, "Quantum Computation and Quantum Information"(10th edition), Cambridge university press, NY, USA
6. Preskill's lecture notes on "Quantum Information and Quantum Computation", http://theory.caltech.edu/~preskill/ph229/1998
7. P. Kaye, R. Laflamme and M. Mosca, 2010, "An introduction to Quantum Computing",Oxford University Press
8. N. D. Mermin, 2007, "Qunatum Computer Science An introduction", Cambridge university press, NY, USA
9. G. Benenti, G. Casati, and G. Strini, 2004, "Principles of Quantum Computation and Information"(Vol-1), World Scientific
10. W. H. Steeb and Y. Hardy, 2012, "Problems and Solutions in Quantum Computing andQuantum Information", World Scientific
11. Vishal Sahani, 2007, "Quantum Computing", McGraw Hill Education
12. F. Reif, 2007, "Statistical Physics: Berkely Physics Course", Volume 5, McGraw Hill
13. B.B. Laud, 2002, "Lasers and Non-Linear Optics"(2nd edition), New Age International Publishers, New Delhi
14. Michael Tinkham, 2010, "Introduction to Superconductivity"(2nd edition), McGraw Hill, INC
15. Michele Bousquet with Alejandro Garcia, 2016, "Physics for Animators", CRC Press,Taylor & Francis
16. S. O. Piliai,2010,"Solid State Physics"(6th edition), New Age International Publishers,New Delhi

Web links and Video Lectures (e-Resources):
LASER: https://www.youtube.com/watch?v=WgzynezPiyc
Superconductivity:
https://www.youtube.com/watch?v=MT5Xl5ppn48**Optical Fiber**:
https://www.youtube.com/watch?v=N_kA8EpCUQo
Quantum
Mechanics:https://www.youtube.com/watch?v=p7bzE1E5PMY&t=136s
Quantum Computing:https://www.youtube.com/watch?v=jHoEjvuPoB8
Quantum
Computing:https://www.youtube.com/watch?v=ZuvCUU2jD30
Physics of Animation: https://www.youtube.com/watch?v=kj1kaA_8Fu4

Statistical Physics simulation:
https://phet.colorado.edu/sims/html/plinkoprobability/latest/plinkoprobability_en.html **NPTEL**
Supercoductivity:https://archive.nptel.ac.in/courses/115/103/115103108/
NPTEL Quantum Computing
:https://archive.nptel.ac.in/courses/115/101/115101092 **Virtual**

LAB:https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham
Virtual LAB: https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=
Activity-Based Learning (Suggested Activities in Class)/Practical-Based Learning
http://nptel.ac.in
https://swayam.gov.in
https://virtuallabs.merlot.org/vl_physics.html
https://phet.colorado.edu

Course Outcomes:

At the end the course the student should be able to:

1. Apply principles of quantum mechanics and properties of conductors for engineering applications
2. Apply basic principles of quantum and statistical computing for engineeringapplications
3. Select the appropriate properties of lasers and superconductors for engineering applications
4. Select appropriate type of optical fiber and apply physics of animation for engineering applications

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	2	-	-	-	-	-	-	1	-	-	1
CO2	3	2	-	-	-	-	-	-	1	-	-	1
CO3	3	2	-	-	1	-	-	-	1	-	-	1
CO4	3	2	-	-	1	-	-	-	1	-	-	1

22UME223C	COMPUTER AIDED ENGINEERING DRAWING	CREDITS:03
L:T:P :: 2:0:2		CIE MARKS:50
TOTAL HOURS:46 (26T+20P)		SEE MARKS:50

Course Objectives:

1. To understand the basic principles and conventions of engineering drawing and To generate projection of points and lines
2. To generate orthographic projections of planes using CAD software
3. To generate orthographic projections of solids and development of lateral surfaces of solids using CAD software
4. To understand the isometric projections and freehand sketching

UNIT-I	10Hrs.

Introduction: Significance of engineering drawing, BIS Conventions of Engineering Drawing. Free hand sketching of Engineering Drawing. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, and RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points and Lines:

Introduction to Orthographic projections: Orthographic projections of points in 1^{st} and 3^{rd} quadrants (for practice only, not for CIE and SEE).

Projections of lines located in first quadrant only, line parallel to both the planes, perpendicular to one plane and parallel to other, inclined to one plane and parallel to other, inclined to both the planes. Determinations of true length and true inclinations with principal planes.

UNIT–II	10Hrs.

Orthographic Projections of planes:

Projections of planes- perpendicular to the both the planes, parallel to one plane and perpendicular to other, inclined to one plane and perpendicular to other and inclined to both the planes.(Placed in First quadrant only using change of position method).

UNIT–III	10 Hrs..

Orthographic Projections of solids:

Orthographic Projection of right regular solids (Solids Resting on HP only): Prisms, Pyramids, Cones, and Cylinders (triangle, square, rectangle, pentagon, and hexagon) with axis/base inclined to HP and profile views.

Development of Lateral Surfaces of Solids:

Development of Lateral Surfaces of right regular prisms, pyramids, cylinders and cones resting with base on HP only

UNIT–IV	10Hrs.

Isometric Projections:

Isometric scale, Isometric Projection of hexahedron (cube), right regular prisms, pyramids, Cylinders, Cones and spheres. Isometric Projection of combination of two simple solids (Co-Axial only).

Free hand Sketching:

True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc.

Drawing Simple Mechanisms; Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts etc. (Free hand sketches).

Reference Books

1. K.R.Gopalkrishna, ''*Engineering Drawing*', vol. I and II, 23rd edition, Subhas, 2014.
2. N.D.Bhat "*Engineering Drawing*" 2011.
3. R.K.Hegde and Niranjan Murthy, ''*Engineering Graphics*''1st edition, Sapna, 2003.
4. P.I.Varghese, ''*Engineering Graphics*'', McGraw Hill, 2013.

Course Outcomes

At the end of the course the student will be able to:

CO1: Draw and communicate the objects with definite shape and dimensions

CO2: Recognize and draw the shape and size of objects through different views.

CO3: Develop the lateral surface of the objects

CO4: Draw isometric views and freehand sketches of mechanisms and simple machine parts

CO5: Create a drawing views using CAD software.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	2	-	-	3	1	-	1	1	3	-	1
CO2	3	2	-	-	3	1	-	1	1	3	-	1
CO3	3	2	-	-	3	1	-	1	1	3	-	1
CO4	3	2	-	-	3	1	1	-	-	3	-	1
CO5	3	2	-	-	3	1	-	-	-	-	-	1

22UME122N/22UME222N	INTRODUCTION TO MECHANICAL ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

6. Acquire a basic understanding about scope of mechanical engineering, different energy sources.
7. Acquire a basic knowledge about conventional and advanced manufacturing processes.
8. Acquire a basic understanding about IC engines.
9. Acquire a basic knowledge about joining processes and CNC machines.
10. Acquire a basic insight into future mobility, mechatronics, robotics and IoT.

UNIT-I	10Hrs.

Introduction: Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.

Energy: Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel, Solar, wind, and bio-fuels, Environmental issues like Global warming and Ozone depletion

Engineering Materials: Types and applications of Ferrous & Nonferrous Metals, silica, ceramics, glass, graphite, diamond and polymer. Shape Memory Alloys.

UNIT–II	10Hrs.

Machine Tool Operations:

Working Principle of lathe, Lathe operations: Turning, facing, knurling. Working principles of Drilling Machine, drilling operations: drilling, boring, reaming. Working of Milling Machine, Milling operations: plane milling and slot milling.

(No sketches of machine tools, sketches to be used only for explaining the operations).

Introduction to Advanced Manufacturing Systems: Introduction, components of CNC, advantages and applications of CNC, 3D printing.

Joining Processes: Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding and types of flames.

UNIT–III	10 Hrs.

Introduction to IC Engines: Components and Working Principles, 4-Strokes Petrol and Diesel Engines, Application of IC Engines.

Insight into Future Mobility; Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of EVs and Hybrid vehicles.

UNIT–IV	10Hrs.

Introduction to Mechatronics and Robotics: open-loop and closed-loop mechatronic systems. Classification based on robotics configuration: polar cylindrical, Cartesian coordinate and spherical. Application, Advantages and disadvantages.

Automation in industry: Definition, types – Fixed, programmable and flexible automation, basic elements with block diagrams, advantages

Introduction to IOT: Definition and Characteristics, Physical design, protocols, Logical design of IoT, Functional blocks, and communication models.

Reference Books:

10. Hazra Choudhry and Nirzar Roy, "Elements of Workshop Technology" Vol. 1 and 2, Media
11. Promoters and Publishers Pvt. Ltd., 2010.
12. P.N.Rao, "Manufacturing Technology- Foundry, Forming and Welding", Tata McGraw Hill 3rd Edition 2003.
13. V. Ganesan, "Internal Combustion Engines", Tata McGraw Hill Education; 4th edition, 2017.
14. Appu Kuttan KK K "Robotics", International Pvt. Ltd, volume 1

15. Dr SRN Reddy, RachitThukral and Manasi Mishra, " Introduction to Internet of Things: A Practical Approach", ETI Labs
16. Raj kamal, "Internet of Things: Architecture and Design", McGraw hill.
17. K R Gopala Krishna, "Elements of Mechanical Engineering" , Subhash Publications, 2008
18. Jonathan Wickert and Kemper Lewis, "An Introduction to Mechanical Engineering", 3rd Edition, 2012.

Course Outcomes:

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

CO1: Explain the role of Mechanical Engineering with respect to the emerging trends and technologies in various sectors, knowledge of various sources of energy and engineering materials

CO2: Describe different conventional, advanced manufacturing systems and various metal joining processes

CO3: Compute and analyze the performance of IC engines used in automobiles and concept of electric and hybrid vehicles for future mobility

CO4: Enlighten about the fundamentals of Mechatronics, Robotics, Automation in industry and IOT

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	-	-	1	1	-	-	-	1
CO2	2	2	-	-	1	1	1	-	-	-	-	1
CO3	2	1	-	-	1	1	-	-	-	-	-	1
CO4	2	1	-	-	1	1	-	1	1	-	-	1

22UCV118N/22UCV218N	INTRODUCTION TO CIVIL ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40 HRS		SEE MARKS:50

Course Objectives:

5. To make students learn the scope of various specializations of civil engineering.
6. To develop students' ability to analyze the problems involving forces, moments with their application ns.
7. To develop the student's ability to find out the center of gravity and its applications.
8. To develop the student's ability to find out the moment of inertia and its applications.

UNIT - I	10 Hrs.

Civil Engineering Disciplines and Building Science:

Introduction to Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Hydraulics & Water Resources, Transportation Engineering, Environmental Engineering, Construction planning & Project management.

Basic Materials of Construction: Bricks, Cement & mortars, Plain, Reinforced & Pre-stressed Concrete, Structural steel, Construction Chemicals.

Structural elements of a building: foundation, plinth, lintel, chejja, Masonry wall, column, beam, slab and staircase

Societal and Global Impact of Infrastructure

Infrastructure: Introduction to sustainable development goals, Smart city concept, clean city concept, Safe city concept.

Built-environment: Energy efficient buildings; Smart buildings.

UNIT – II	10 Hrs.

Analysis of force systems: Concept of idealization, system of forces, principles of super position and transmissibility, Resolution and composition of forces, Law of Parallelogram of forces, Resultant of concurrent and non-concurrent coplanar force systems, moment of forces, couple, Varignon's theorem, free body diagram, equations of equilibrium, equilibrium of concurrent and non-concurrent coplanar force systems. Numerical examples

UNIT - III	10 Hrs.

Centroid: Importance of centroid and centre of gravity, methods of determining the centroid, locating the centroid of plane lamina from first principles, centroid of built-up sections. Numericalexamples.

UNIT - IV	10 Hrs

Moment of inertia: Importance of Moment of Inertia, method of determining the second moment of area (moment of inertia) of plane sections from first principles, parallel axis theorem and perpendicular axis theorem, radius of gyration, moment of inertia of built-up sections. NumericalExamples.

Reference Books:

8. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, "Basic Civil Engineering and Engineering Mechanics", Laxmi Publications, 2015.
9. Kolhapure B K, "Elements of Civil Engineering and Engineering Mechanics", EBPB, 2014.
10. Beer F. P. and Johnston E. R., "Mechanics for Engineers, Statics and Dynamics",McGraw Hill, 1987.
11. Irving H. Shames, "Engineering Mechanics", Prentice-Hall, 2019.
12. Hibbler R.C., "Engineering Mechanics: Principles of Statics and Dynamics", Pearson Press, 2017.
13. Timoshenko S, Young D.H., Rao J.V., "Engineering Mechanics", PearsonPress, 5th Edition,

2017.

14. Bhavikatti S S, Engineering Mechanics, New Age International, 2019.

Course Outcomes:

At the end of the course the student will be able to,

CO1: Understand the various disciplines of Civil Engineering

CO2: Compute the resultant and equilibrium of force systems.

CO3: Locate the centroid of plane and built-up sections

CO4: Compute the moment of inertia of plane and built-up sections

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	1	-	-	-	-	1	-	-	-	-	-	-
CO2	1	-	-	-	-	1	1	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-

22UEE116N/22UEE216N	INTRODUCTION TO ELECTRICAL ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

5. To understand the working of Hydro –electric, Thermal and Nuclear power plants
6. To determine current, voltage, and power in various branches by applying electric circuit theorems to DC and AC (single phase and three phase) circuits
7. To analyze the working principle and construction to identify the suitable applications of DC generators, motors and transformers by identifying the specifications
8. To identify the safety aspects in different types of wiring mechanisms and evaluate the energy consumption in domestic loads

UNIT – I	10 Hrs

Introduction: General structure of electrical power systems using single line diagram approach.
Power Generation: Hydel, thermal, nuclear power plants (block diagram approach).
DC Circuits: Ohm's law and its limitations, KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical.

UNIT – II	10 Hrs

AC. Fundamentals:
Equation of AC voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor (only definitions), voltage and current relationship with phasor diagrams in R, L, and C circuits, concept of impedance, analysis of R-L, R-C, R-L-C series circuits, active power, reactive power and apparent power, concept of power factor. (Simple Numerical).
Three Phase Circuits:
Generation of three phase AC quantity, advantages and limitations, star and delta connection, relationship between line and phase quantities (excluding proof)

UNIT – III	10 Hrs

DC Generator, DC Motor, Transformers:
Working principle, construction, equations, types and classifications, specifications, applications, cost. Simple numerical.

UNIT – IV	10 Hrs

Domestic Wiring: Requirements, Types of wiring, Two way and three way control of loads.
Electrical Energy Calculation: Power rating of household appliances, two-part electricity tariff, calculation of electricity bill for domestic consumers.
Electrical Safety Measures:
Equipment: Types of equipment, voltage and current issues, safety.
Human: Electric shock, effect of shock on body, factors affecting severity of shock, safety precautions.

Reference Books:

6. B.L Theraja, "Fundamentals of Electrical Engineering and Electronics", S. Chand Publications, 27th Edition, 2014.
7. D C Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 10th Edition, 2019.
8. Edward Hughes, "Electrical and Electronic Technology", Pearson Publications, 10th Edition, 2010.
9. Rajendra Prasad, "Fundamentals of Electrical Engineering", PHI Learning, 2nd Edition, 2009.

10. V.N.Mittle and A.Mittal, “Basic Electrical Engineering”, Tata McGraw-Hill Education, 2005.

Course Outcomes:

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

CO1: Understand the working of Hydro –electric, Thermal and Nuclear power plants

CO2: Apply the electric circuit theorems to DC and AC (single phase and three phase) circuits to determine current, voltage, and power in various branches

CO3: Analyze the working principle and construction to identify the suitable applications of DC generators, motors and transformers by identifying the specifications

CO4: Identify the safety aspects in different types of wiring mechanisms and evaluate the energy consumption in domestic loads

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	-	-	-	-	-	-	-	-	-	-	1
CO2	3	1	1	1	-	-	-	-	-	-	-	1
CO3	3	1	1	1	-	-	-	-	-	-	-	1
CO4	3	1	1	1	-	-	-	1	-	1	-	1

22UEC114N/22UEC214N	INTRODUCTION TO ELECTRONICS ENGINEERING	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives

6. Understand the operation of semiconductor devices and their applications.
7. Know transistor (BJT) as an amplifier.
8. Study Op-Amps and its applications.
9. Know logic circuits and their optimization.
10. Understand the principles of transducers and communication systems.

UNIT - I	10 Hrs

Power Supplies –Block diagram, PN Junction Diode Characteristics, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers.

BJT Characteristics and Biasing- Common Base and Common Emitter Configurations, Voltage Divider Biasing.

Self study component: Switched Mode Power Supply.

UNIT – II	10 Hrs

Amplifier and Oscillators – Single Stage CE Amplifier, Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator, Multi vibrators, Single-stage a stable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)

Operational amplifiers - Ideal op-amp; characteristics of ideal and practical op-amp; Practical op-amp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, integrator, differentiator.

Self study component: Op-Amp as zero crossing detector

UNIT - III	10 Hrs

Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates

Combinational logic: Introduction, Design procedure, Adders- Half adder, Full adder, Parallel Adder

Self study component: Half subtractor and full subtractor.

UNIT - IV	10 Hrs

Analog Communication Schemes – Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM, FM.

Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.

Sensors and Interfacing – Instrumentation and control systems, Transducers, Sensors.

Self study component: Opto-couplers

Reference Books:

4. Mike Tooley, "Electronic Circuits, Fundamentals & Applications", 4th Edition, Elsevier, 2015.
5. M. Morris Mano, "Digital Logic and Computer Design", PHI Learning, 2008.
6. D . P . Kothari, I . J . Nagrath, "Basic Electronics", 2nd edition, McGraw Hill Education (India), Private Limited, 2018.

Course Outcomes:

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

CO1: Differentiate semiconductor devices and their parameters based on V-I characteristics.

CO2: Analyze the applications of electronic devices and circuits.

CO3: Analyze logic circuits built with basic gates.

CO4: Solve numerical problems related to basic electronic circuits and systems.

CO5: Decide type of transducer, sensor and modulation for a given application.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	2	-	2	2	-	-	-	-	-	-
CO2	3	2	3	-	2	1	-	-	-	-	-	-
CO3	3	2	3	-	3	-	-	-	1	-	-	-
CO4	2	1	1	-	2	1	-	-	1	-	-	1
CO5	2	1	1	-	2	1	-	-	1	-	-	1

22UEC134B/22UEC234B	INTRODUCTION TO EMBEDDED SYSTEM	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

5. To provide knowledge of embeddedsystems, applications, purpose and processor architectures.
6. To provide background knowledge of communication interfaces, characteristics and quality attributes of embedded systems.
7. To study general purpose processors software and processor peripherals.
8. To impart knowledge of 8051 Microcontroller, features and its applications.

UNIT – I	10 Hrs

Introduction to embedded systems, Embedded system vs. general computing system, Classifications, Purpose of embedded system, Major application areas. The typical embedded system, Microcontrollers, Microprocessors, RISC, CISC, Harvard and Von-Neumann, Big Endian, Little Endian processors.

UNIT – II	10 Hrs

Memory, Sensors, Actuators, Communication interface: Inter Integrated Interface, Serial Peripheral interface, UART, Parallel interface, RS232 and Bluetooth. Characteristics and quality attributes of embedded systems.

UNIT - III	10 Hrs

General purpose processors software: Introduction, Basic architecture, Operation, Instruction set, program and data memory space, registers, I/O, interrupts, Operating System, ASIP's, Microcontrollers, DSP, Selecting Microprocessor.

Standard Single Purpose Processors peripherals: Introduction, Timers, Counters and watch dog timers, UART.

UNIT - IV	10 Hrs

8051 Microcontroller: Introduction, Features of 8051 Microcontroller, Block diagram, ALU, PC, ROM, RAM, Address line, Data line, Special function registers, RAM organization, Stack, Basicsof Serial Communication, Interrupts, Timers and counters, Input output ports, simple pseudo code.

Reference Books:

5. Shibu K V, "Introduction to embedded systems", Tata McGraw Hill private limited, 2010.
6. Frank Vahid, Tony Givargis, "Embedded system design: A unified hardware/software introduction", John Wiley and Sons, 2001.
7. Kenneth J Ayala, "The 8051 Microcontroller, Architecture programming and applications", West publishing company, college and school division, 1997.
8. Rajkamal, "Embedded systems: architecture, programming and design", Tata McGraw Hill private limited, second edition.

Course Outcomes:

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

CO1: Gain comprehensive knowledge about embedded systems, major application area of embedded systems and processor architectures.

CO2: Analyze communication interfaces, characteristics and quality attributes of embedded systems.

CO3: Identify general purpose processors software and processor peripherals necessary for embedded systems.

CO4: Explore 8051 Microcontroller capabilities and able to write pseudo codes.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	-	-	2	1	1	1	1	1	-	1
CO2	3	2	2	-	1	1	1	1	1	2	-	1
CO3	3	2	2	-	1	2	1	1	2	1	-	2
CO4	3	2	2	-	1	2	1	1	2	1	-	2

22UEC135B/22UEC235B	INTRODUCTION TO COMMUNICATION TECHNOLOGY	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

5. Know the fundamentals of different communication systems.
6. Understand modern communication techniques and their utility in modern cellular communication systems.
7. Know the design principles of cellular communication systems.
8. Understand the different communication standards.

UNIT – I	10 Hrs

Introduction to communication systems: Elements of communication systems, Need for modulation, Electromagnetic spectrum and applications, Terminologies in communication systems
Introduction to wireless .communication systems: Evolution of mobile radio communication, Beginning of Radio, Wireless mobile communication, Applications of wireless communication, Disadvantages of wireless communication systems, Examples of wireless communication systems, Difference between fixed telephone network and wireless telephone network, Development of wireless communication, Fixed network transmission hierarchy, Comparison of wireless communication systems.

UNIT – II	10 Hrs

Modern communication systems: Introduction, First generation (1G), Second generation (2G), Generation (2.5G), Third generation (3G), Evolution from 2G to 3Gt, Fourth generation (4G), Digital cellular parameters, Differences between analog cellular and digital cellular systems, wireless local loop (WLL), wireless local area networks (WLANs), Personal Area Networks (PANs), Bluetooth
Introduction to cellular mobile systems: Introduction, Spectrum allocation, International telecommunication union (ITU), Wireless communication system, Basic components of cellular systems, Cellular system architecture, GSM: Most popular cellular system, type of channels, Cell concept in wireless communication, shape selection of the cell.

UNIT – III	10 Hrs

Cellular system design fundamentals: Introduction, Frequency reuse, Cellular capacity increasing parameters, channel assignment strategies, Hand-off strategies, Hands-off Initiation, Type of hands-off on the basis of decision making process, channel assignment strategies for hands-off,Interference, Tracking, Trunking, Grade of service.

UNIT – IV	10 Hrs

Multiple access techniques for wireless communication: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Advanced TDMA, Multipath interference, Comparison between TDMA & FDMA, Space Division Multiple Access (SDMA), Spread spectrum, types of spread spectrum, Code Division Multiple Access (CDMA)
Radio wave propagation: Introduction, Doppler shift, parameters of multipath channels, fading, diversity techniques, free space propagation model, Phenomenon of propagation, Propagation Models.

Reference Books:

3. George Kennedy, Bernard Davis, S R M Prasanna, “Electronic Communication Systems”, Tata McGraw Hill Education Private Limited, New Delhi, 5th Edition.
4. Rajeshwar Dass, “Wireless Communication Systems”, I. K. international Publishing House Pvt. Ltd., New Delhi.

Course Outcomes:
After completion of this course the students are able to**,** **CO1:** Analyze different communication systems with respect to operation and utility. **CO2:** Choose suitable modulation technique for cellular mobile systems. **CO3:** Decide specific channel multiple access techniques for a communication application. **CO4:** Choose specific communication standards for a given communication application.

Course Outcomes:	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	**3**	**1**	**1**	**-**	**1**	**1**	**1**	**1**	**1**	**1**	**-**	**1**
CO2	**3**	**2**	**2**	**-**	**1**	**1**	**1**	**1**	**1**	**2**	**-**	**1**
CO3	**3**	**2**	**2**	**-**	**1**	**2**	**1**	**1**	**2**	**1**	**-**	**2**
CO4	**3**	**2**	**2**	**-**	**1**	**2**	**1**	**1**	**2**	**1**	**-**	**2**

22UEE136B/22UEE236B	RENEWABLE ENERGY SOURCES	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

5. To identify the parameters required for solar, wind, biomass, geothermal and ocean energy conversion systems.
6. To apply and analyze concepts and theory related to solar, wind, biomass, geothermal and ocean energy conversion systems.
7. To derive power output of solar and wind energy conversion systems based on the corresponding solar irradiation and wind speed respectively.
8. To analyze pros and cons of solar, wind, biomass, geothermal and ocean energy conversion systems.

UNIT – I	10 Hrs

Introduction to Energy Sources:

Classification of energy resources, conventional energy resources–availability and their limitations; non-conventional energy resources–classification, advantages, limitations; comparison of conventional and non-conventional energy resources.

Solar Energy Basics:

Introduction, solar constant, basic sun-earth angles – definitions and their representation; solar radiation geometry, solar radiation data measuring instruments–Pyranometer and Pyrheliometer.

UNIT – II	10 Hrs

Solar Thermal Systems:

Principle of conversion of solar radiation into heat, solar water heaters (Flat plate collectors); solar cookers – box type, concentrating dish type; solar driers, solar still.

Solar Electric Systems:

Solar thermal electric power generation – solar pond and concentrating solar collector (parabolic trough, parabolic dish, central tower collector), advantages and disadvantages; solar photovoltaic – solar cell fundamentals, module, panel and array; solar PV systems – street lighting, domestic lighting and solar water pumping systems.

UNIT – III	10 Hrs

Wind Energy:

Wind and its properties, history of wind energy, basic principles of Wind Energy Conversion Systems (WECS), wind data measuring instrument, classification of WECS, parts of a WECS, power in the wind; Vertical axis wind turbine generator - Savinous and Darrius types, advantages and limitations of WECS.

Biomass Energy:

Introduction, photosynthesis process, biomass conversion technologies, biomass gasification – principle and working of gasifiers; biogas - production of biogas, factors affecting biogas generation; types of biogas plants–KVIC and Janata model.

UNIT – IV	10 Hrs

Geothermal Energy:

Introduction, classification, conversion technologies, applications, advantages and limitations of geothermal resources.

Energy from Ocean:

Principle of tidal power, components of Tidal Power Plant (TPP), classification, advantages and limitations of TPP.

Ocean Thermal Energy Conversion (OTEC): Principle of OTEC system, types of OTEC power generation, block diagram, applications, advantages and limitations.

Reference Books:

8. B. H. Khan, "Conventional Energy Resources", Tata McGraw-Hill Education Private Limited, New Delhi, 3rd Edition, 2007.
9. G. D. Rai, "Non-conventional Energy sources", Khanna Publication, 4th Edition, 2015.
10. G. N. Tiwari and M K. Ghosal, "Fundamentals of Renewable Energy Resources", Alpha Science International Ltd, 1st Edition, 2007.
11. Shobh Nath Singh, "Non-Conventional Energy Resources", Pearson Education, 2nd Edition 2018.
12. Bent Sorensen, "Renewable Energy", Academic Press, 5th Edition, 2017 (e-book).
13. David Buchla, Thomas Kissell and Thomas Floyd, "Renewable Energy Systems", Pearson, 1st Edition, 2014 (e-book).
14. Roland Wengenmayr, Thomas Buhrke, "Renewable Energy: Sustainable Energy Concepts for the Future", Wiley-VCH, 2nd Edition, 2008 (e-book).

Course Outcomes:

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

CO1: Identify electrical and mechanical devices of solar, wind, biomass, geothermal and ocean Energy conversion systems.

CO2: Measure performance parameters related to solar, wind, biomass, geothermal and ocean energy conversion systems.

CO3: Compute the power generation of wind and solar energy correspond to variable data.

CO4: Compare the features of solar, wind, biomass, geothermal and ocean energy conversion systems.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	1	1	-	-	1	1	1	-	1	1	1
CO2	3	1	1	1	-	1	1	1	-	1	-	1
CO3	3	2	3	1	-	-	-	-	-	-	1	1
CO4	3	3	3	2	-	-	-	1	-	-	-	1

22UCV138B/22UCV238B	GREEN BUILDINGS	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

7. Understand the Definition, Concept & Objectives of the terms cost effective construction and green building.
8. Apply cost effective techniques in construction
9. Apply cost effective Technologies and Methods in Construction
10. Understand the Problems due to Global Warming
11. State the Concept of Green Buildings
12. Understand Green Buildings

UNIT – I	10 Hrs

Introduction to the concept of cost effective construction

Uses of different types of materials and their availability -Stone and Laterite blocks- Burned Bricks- Concrete Blocks- Stabilized Mud Blocks- Lime Poszolana Cement- Gypsum Board- Light Weight Beams- Fiber Reinforced Cement Components- Fiber Reinforced Polymer Composite- Bamboo- Availability of different materials- Recycling of building materials – Brick- Concrete- Steel- Plastics - Environmental issues related to quarrying of building materials

UNIT – II	10 Hrs

Environment friendly and cost effective Building Technologies

Different substitute for wall construction Flemish Bond - Rat Trap Bond – Arches – Panels - Cavity Wall - Ferro-Cement and Ferro-Concrete constructions – different pre-cast members using these materials - Wall and Roof Panels – Beams – columns - Door and Window frames - Water tanks - Septic Tanks - Alternate roofing systems - Filler Slab - Composite Beam and Panel Roof -Pre-engineered and ready to use building elements - wood products - steel and plastic - Contributions of agencies - Costford - Nirmithi Kendra – Habitat.

Global Warming

Definition - Causes and Effects - Contribution of Buildings towards Global Warming - Carbon Footprint – Global Efforts to reduce carbon Emissions Green Buildings – Definition - Features- Necessity – Environmental benefit - Economical benefits - Health and Social benefits - Major Energy efficient areas for buildings – Embodied Energy in Materials Green Materials - Comparison of Initial cost of Green V/s Conventional Building - Life cycle cost of Buildings.

UNIT - III	10 Hrs

Green Building rating Systems

BREEAM – LEED - GREEN STAR -GRIHA (Green Rating for Integrated Habitat Assessment) for new buildings – Purpose - Key highlights - Point System with Differential weight age. Green Design – Definition - Principles of sustainable development in Building Design - Characteristics of Sustainable Buildings – Sustainably managed Materials - Integrated Life cycle design of Materials and Structures (Concepts only)

UNIT - IV	10 Hrs

Utility of Solar Energy in Buildings

Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings.

Green Composites for Buildings

Concepts of Green Composites. Water Utilisation in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment

Reference Books::

4. K. S Jagadish, B. V. Venkataramana Reddy, K. N Nanjundarao "Alternative Building Materials and Technologies", New Age International Publishers.
5. G Harihara Iyer, "Green Building Fundamentals", Notion Press.
6. Dr. Adv. Harshul Savla, "Green Building: Principles & Practices", Notion Press.

Course Outcomes::

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

CO1: Select different building materials for cost effective construction

CO2: Apply effective environmental friendly building technology to reduce global warming

CO3: Analyse buildings for green rating systems.

CO4: Use alternate source of energy and effective use of water.

Course Outcomes:	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	1	-	-	-	1	1	-	-	-	-	-
CO2	2	1	-	-	-	1	1	-	-	-	-	-
CO3	2	1	-	-	-	1	1	-	-	-	-	-
CO4	2	1	-	-	-	1	1	-	-	-	-	-

22UCV139B/22UCV239B	WASTE MANAGEMENT	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

4. To learn broader understandings on various aspects of solid waste management.
5. To learn collection, storage, transport, processing, and disposal of waste.
6. To learn identification, management and treatment of hazardous waste.

UNIT – I	10 Hrs

INTRODUCTION TO SOLID WASTE MANAGEMENT

Classification of solid wastes (source and type based), Solid Waste Management (SWM), elements of SWM, (ESSWM) Environmentally Sound Solid Waste Management and (EST) Environmentally Sound Technologies, factors affecting SWM, Indian scenario, progress in (MSW) Municipal Solid Waste management in India.

UNIT – II	10 Hrs

WASTE GENERATION ASPECTS

Waste Stream Assessment (WSA), waste generation and composition, waste characteristics (physical and chemical), health and environmental effects (public health and environmental), comparative assessment of waste generation and composition of developing and developed nations, a case study results from an Indian city, handouts on solid waste compositions.

UNIT – III	10 Hrs

COLLECTION, STORAGE, TRANSPORT, PROCESSING TECHNIQUES ANDDISPOSAL OF WASTES

Waste Collection, Storage and Transport: Collection components, storage-containers/collection vehicles, collection operation, transfer station, waste collection system design, record keeping, control, inventory and monitoring, implementing collection and transfer system, a case study.

Waste Disposal: key issues in waste disposal, disposal options and selection criteria, sanitary landfill, landfill gas emission, leachate formation, environmental effects of landfill, landfill operation issues.

Waste Processing Techniques: Purpose of processing, mechanical volume and size reduction, component separation, drying and dewatering.

UNIT – IV	10 Hrs

SOURCE REDUCTION, REUSE, PRODUCT RECOVERY & RECYCLING

Refuse, Source Reduction, Reuse, Product Recovery and Recycling (SR's): basics, purpose, implementation monitoring and evaluation of source reduction, reuse, significance of recycling, planning of a recycling programme, recycling programme elements, commonly recycled materials and processes, recovery of waste materials, a case study.

HAZARDOUS WASTE MANAGEMENT AND TREATMENT

Identification and classification of hazardous waste, hazardous waste treatment, pollution prevention and waste minimization, hazardous wastes management in India.

Reference Books:

5. Tchobaanoglous, G., Theisen, H., and Samuel A Vigil, "Integrated Solid Waste Management", McGraw-Hill Publishers, 1993.
6. Bilitewski B., Hard He G., Marek K., Weissbach A., and Boeddicker H., " Waste Management", Springer, 1994.
7. White, F. R., Franke P. R. & Hindle M., "Integrated solid waste management: a life cycle inventory", Mc Dougall, P. John Wiley & Sons, 2001.
8. Nicholas, P., & Cheremisinoff, P. D., "Handbook of solid waste management and waste minimization technologies", Imprint of Elsevier Science, 2005.

Course Outcomes:
CO1: Apply the basics of solid waste management towards sustainable development **CO2:** Study the composition and characteristics of the waste and its affect on the environment **CO3:** Apply technologies to process waste and dispose the same. **CO4:** Study the 5Rs, management and treatment of the hazardous waste.

Course Outcomes:	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	-	-	-	-	1	3	-	-	-	-	-
CO2	3	1	-	-	-	3	2	-	2	-	-	1
CO3	3	1	-	-	2	2	3	-	-	-	1	1
CO4	3	-	-	-	-	3	2	-	-	-	1	2

22UCS140B/22UCS240B	INTRODUCTION TO INTERNET OF THINGS (IoT)	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

1. Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics. Understand the recent application domains of IoT in everyday life.
2. Gain insights about the current trends of associated IOT technologies and IOT Analytics.

UNIT - I	10 Hrs

Basics of Networking: Introduction, Network Types, Layered network models

Emergence of IoT: Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components

UNIT – II	10 Hrs

IoT Sensing and Actuation: Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics.

IoT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading.

UNIT - III	10 Hrs

Associated IoT Technologies

Cloud Computing: Introduction, Virtualization, Cloud Models, Service-Level Agreement in Cloud Computing, Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.

IoT Case Studies

Agricultural IoT – Introduction and Case Studies

UNIT - IV	10 Hrs

IoT Case Studies and Future Trends

Vehicular IoT – Introduction

Healthcare IoT – Introduction, Case Studies

IoT Analytics – Introduction

Reference Books:

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, “Introduction to IoT”, Cambridge University Press, 2021.
2. S. Misra, C. Roy, and A. Mukherjee, “Introduction to Industrial Internet of things and industry 4.0”. CRC Press, 2020.
3. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014.
4. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, A press Publications, 2013.

Course Outcomes:

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

CO1: Describe the evolution of IoT, IoT networking components and addressing strategies in IoT.

CO2: Classify various sensing devices and actuator types.

CO3: Demonstrate the processing in IoT.

CO4: Explain associated IoT Technologies.

CO5: Illustrate the architectures of IoT application.

Course Outcomes:	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	3	2	-	-	-	-	-	-	-	-
CO3	-	2	3	-	-	-	-	-	-	-	-	-
CO4	1	2	3	-	-	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	-	-	-	-	-	-

22UCS141B/22UCS241B	INTRODUCTION TO CYBER SECURITY	CREDITS: 03
L:T:P: 3:0:0		CIE Marks:50
TOTAL HOURS: 40HRS		SEE Marks:50

Course Objectives:

1. To familiarize cybercrime terminologies and perspectives
2. To understand Cyber Offenses and Botnets
3. To gain knowledge on tools and methods used in cybercrimes
4. To understand phishing and computer forensics

UNIT – I	10 Hrs

Introduction to Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, An Indian Perspective, Hacking and Indian Laws.

UNIT – II	10 Hrs

How Criminals Plan Them: Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercafe & cybercrimes.

Botnets: The fuel for cybercrime, Attack Vector.

Tools and Methods used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key Loggers and Spywares

UNIT – III	10 Hrs

Different Forms of attacks in Cybercrime: Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attackers, Attacks on Wireless networks.

Phishing and Identity Theft: Introduction, phishing, methods of phishing, phishing techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft

UNIT – IV	10 Hrs

Understanding Computer Forensics: Introduction, Historical Background of Cyber forensics, Digital Forensics Science, Need for Computer Forensics, Cyber Forensics and Digital Evidence, Digital Forensic Life cycle, Chain of Custody Concepts, network forensics.

Reference Books:

5. Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt. Ltd, First Edition, 2011.
6. Rajkumar Singh Rathore, Mayank Bhushan, "Fundamentals of Cyber Security", BPB; First Edition, 2017.
7. Anand Shinde, "Introduction to Cyber Security", Notion Press, First Edition, 2020.
8. Nilakshi Jain and Dhananjay R. Kalbande, "Cyber Security and Cyber Laws", Wiley India Pvt. Ltd., 2020.

Course Outcomes:

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

CO1: Explain the cybercrime terminologies and laws.

CO2: Illustrate tools and methods used on Cybercrime

CO3: Describe the different forms of attacks, Phishing and Identity Theft

CO4: Comprehend cyber offences and Botnets

CO5: Justify the need of computer forensics

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	1	-	-	-	-	-	-	2	-	-	-	-
CO2	-	2	-	3	3	-	-	-	-	-	-	-
CO3	-	-	-	-	2	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	2

22UME142B/22UME242B	COMPOSITE MATERIALS	CREDITS: 03
L:T:P: 3:0:0		CIEMARKS:50
TOTAL HOURS: 40HRS		SEEMARKS:50

Corse Objectives:

5. Explain the behavior of constituents in the composite materials
6. Enlighten the students in different types of reinforcement
7. Develop the student's skills in understanding the different manufacturing methods available for composite material.
8. Illuminate the knowledge of macro mechanical analysis and cutting and joining of the composite materials

UNIT-I	10 Hrs

Introduction to composite materials

Definition and classification of composites based on matrix and reinforcement, Characteristics of composite materials, Fibrous composites, Laminate composites and particulate composites.

Factors which determine the properties of composites, Benefits of composites, properties and types of reinforcements and matrices, Reinforcement-matrix interface.

UNIT–II	10 Hrs

Polymer matrix composites

Introduction, Polymer matrices, Processing methods like Layup and curing, open and closed mold process- hand layup techniques, laminate bag molding.

Production procedures for bag molding, filament winding, pultrusion, pulforming, thermo-forming, molding methods, properties of PMCs and applications, Some commercial PMCs.

UNIT–III	10 Hrs

Metal matrix composites

Introduction, Metallic matrices, Classification of MMCs, Need for production of MMCs, Interface reactions, processing methods like Powder metallurgy, diffusion bonding.

Melt stirring, Compo/Rheo casting, Squeeze casting, Liquid melt infiltration, Spray deposition and In situ Processes, Properties of metal matrix composites, Applications, Some commercial MMCs.

UNIT–IV	10 Hrs

Cutting, Machining and Joining of Composites

Continuous fibers, Iso-stress condition, Iso-strain condition, critical volume fraction of fiber and minimum volume fraction of fiber, Numericals on modulus of rigidity, and mechanics of discontinuous fibers.

Cutting and machining of composites: Reciprocating knife cutting, cutting of cured composite, Joining of composites: Mechanical fastening, Adhesive bonding.

Reference Books:

8. K. K. Chawla, "Composite Science and Engineering", , Springer Verlag, 1998.
9. Hull and Clyne, "Introduction to composite materials" Cambridge University Press, 2nd Edition, 1990.
10. F. L. Mathew and R. D. Rawlings, Composite Materials: Engineering and Science Woodhead Publishing Limited, 1999.
11. MeingSchwaitz, "Composite materials handbook", McGraw Hill Book Company, 1984.
12. Robert M. Jones, "Mechanics of Composite Materials", McGraw Hill Kogakusha Ltd, 1998.
13. S. C. Sharma, "Composite materials", Narosa Publishing House, 2000.
14. ArtarKaw, "Mechanics of composites", CEC Press, 2002.

Course Outcomes:
After completion of the course student will be able to **CO1:** Solve the numerical problems on modulus of elasticity of the FRP composites. **CO2:** Analyse the critical volume fraction of fibres in the FRP composites. **CO3:** Synthesize polymer matrix and metal matrix composites. **CO4:** Use the abrasive water jet machining of composites.

Course Outcomes:	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**
CO2	**1**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**
CO3	**-**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**
CO4	**-**	**-**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**1**

21UME143B/21UME243B	INTRODUCTIONS TO ROBOTICS	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS: 50
TOTAL HOURS: 40HRS		SEE MARKS: 50

Course Objectives:

5. Understand robot configuration, structures, basic components, workspace and generations of robots.
6. Get acquainted with performing spatial transformations and solve kinematics of the robot.
7. Learn about various sensors, actuators, robot programming.
8. Understand the present &future applications of a robot.

UNIT - I	10 Hrs

Robot Basics

Robot-Basic concepts, Need, Law, History, Anatomy, specifications. Robot configurations-cartesian, cylinder, polar and articulate. Robot wrist mechanism, Precision and accuracy of robot.

Robot Elements

End effectors-Classification, Types of Mechanical actuation, Gripper design, Robot drive system Types, Position and velocity feedback devices-Robot joints and links-Types, Motion interpolation

UNIT – II	10 Hrs

Robot Kinematics and Control

Robot kinematics – Basics of direct and inverse kinematics, Robot trajectories, 2D and 3D Transformation-Scaling, Rotation, Translation Homogeneous transformation.

Control of robot manipulators – Point to point, Continuous Path Control, Robot programming

UNIT – III	10 Hrs

Robot Sensors

Sensors in robot – Touch sensors-Tactile sensor – Proximity and range sensors. Force sensor-Light sensors, Pressure sensors, Introduction to Machine Vision and Artificial Intelligence.

UNIT – IV	10 Hrs

Robot Applications

Industrial applications of robots, Medical, Household, Entertainment, Space, Underwater, Defense, Disaster management. Applications, Micro and Nano-robots, Future Applications.

Reference Books:

6. Mikell P. Groover, Mitchell Weiss, Roger N Nagel, Nicholas G Odrey, “Industrial Robotics Technology, Programming and Applications”, Tata –McGraw Hill Pub. Co., 2008.
7. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw Hill Publishing Company Limited, 2010.
8. Klafter.R.D, Chmielewski.T.A, and Noggin’s., “Robot Engineering: An Integrated Approach”, Prentice Hall of India Pvt. Ltd., 1994.
9. Fu.K.S, Gonzalez.R.C &Lee.C.S.G, “Robotics control, sensing, vision and intelligence”, Tata-McGraw Hill Pub. Co., 2008
10. Yu. “Industrial Robotics”, MIR Publishers Moscow, 1985.

Course Outcomes:

After completion of the course student will be able to

CO1: Comprehend the basic elements of industrial robots

CO2: Analyse robot kinematics and its control methods.

CO3: Classify the various sensors used in robots for better performance.

CO4: Summarize various industrial and non-industrial applications of robots.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	1	1	-	-	-	-	1	-	1	-	-
CO2	1	2	1	-	-	-	-	1	-	1	-	-
CO3	-	1	1	2	-	-	-	1	-	1	-	-
CO4	-	-	1	1	2	-	-	1	-	1	-	-

22UBT148B/22UBT248B	BIOMASS AND BIOENERGY	CREDITS: 03
L:T:P: 3:0:0		CIE MARKS:50
TOTAL HOURS: 40HRS		SEE MARKS:50

Course Objectives:

4. To understand the basic concepts of biomass and bioenergy.
5. To gain the knowledge about different biomass conversion technologies.
6. To know about innovative bioenergy plants and bio refinery concept.

UNIT - I	10 Hrs

Biomass

Definition, constituents and energy properties. Biomass as an energy core and its differentmode of utilization. Biomass typologies: lignocellulosic, starchy, sugary, oilseeds, MSW, sewage sludge.

Introduction to Biofuels - definition (liquid -biodiesel, bioethanol; gaseous -syngas, biogas; solid - charcoal and biochar), advantages and disadvantages. Biofuel life cycle. Conventional fuels and their environmental impacts. Renewable energy sources. Modern fuels and their environmental
impacts.

UNIT – II	10 Hrs

Types of Bioenergies:

First generation, Second generation, third generation and next/future generation fuels Biomass Conversions Technologies:

Physical conversion: Dewatering, drying, size reduction, steam explosion, densification, pelleting, chipping, oil extraction.

Thermochemical conversion: Oil trans-esterification

Chemical conversion: Lignocellulosic conversion (2G technology)

Biochemical conversion: Anaerobic digestion (biogas production from organic waste and Waste water), CBG. Fermentation (bioethanol production)

UNIT - III	10 Hrs

Thermal conversion:

Combustion plants for heat generation: wood andpellet burning stoves; wood, pellet and wood chipsboiler. Gasification plants, Pyrolysis plants.

Innovative bioenergy plants: biomass to synthetic natural gas; biomass to liquid biofuels through
Fisher-Tropsch; absorption enhanced reforming. Hydrothermal processes: carbonization, Liquefaction,gasification.

UNIT - IV	10 Hrs

Bio-Energy and Bio-Refinery

Overview of Integrated biorefinery concept, value-added processing of bioenergy residues. Economic feasibility of producing bioenergy (with one example), Issues with bioenergy production & use. Impact of bioenergy in global climate change & food production. Strategies for new vehicle technologies. Current research on biomass & bioenergy production. Market barriers of bioenergy.

Reference Books:

6. Samir K. Khanal,Anaerobic Biotechnology for Bioenergy Production: Principles andApplications. Wiley-Blackwell Publishing, 2008.
7. E.J. Dasilva, C Ratledge & A Sasson, Biotechnology, Economic & Social Aspects:, Cambridge Univ. Press, Cambridge, 2000.
8. Pradipta Kumar Mahopatra, Environmental Biotechnology 2007.
9. Caye M. Drapcho, Nghiem Phu Nhuan, Terry H. Walker, Biofuel Engineering Processtechnology Mc Grow Hill company, 2008.
10. Dominik Rutz & Rainer Janssen, Biofuel Technology Handbook 2008.

Course Outcomes:
After completion of the course student will be able to **CO1:** Emphasize on the basic aspects of Biomass and Bio-Energy. **CO2:** Interpret and describe biomass conversion technologies. **CO3**: Acquire knowledge of innovative bioenergy plants. **CO4**: Interpret and describe of Bio-Refinery concept.

Course Outcomes:	**Programme Outcomes**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	**3**	**1**	**2**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**2**
CO2	**1**	**3**	**3**	**2**	**3**	**1**	**3**	**-**	**-**	**-**	**-**	**1**
CO3	**1**	**1**	**3**	**2**	**3**	**1**	**3**	**-**	**-**	**-**	**-**	**1**
CO4	**1**	**-**	**2**	**-**	**2**	**1**	**2**	**-**	**-**	**-**	**-**	**2**

22UCS130B/22UCS230B	INTRODUCTION TO WEB PROGRAMMING (INTEGRATED)	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS:50
TOTAL HOURS: 46HRS (26T+20P)		SEE MARKS:50

Course objectives

5. To use the syntax and semantics of HTML and XHTML
6. To develop different parts of a web page
7. To understand how CSS can enhance the design of a webpage.
8. To create and apply CSS styling to a webpage

UNIT-I	08 Hrs.

Fundamentals of WEB: Introduction to Internet, World Wide Web, Web Browsers, Web Servers, Uniform Resource-Locators, MIME, HTTP. Traditional HTML and XHTML: First Look at HTML and XHTML, Hello HTML and XHTML World, HTML and XHTML: Version History, HTML and XHTML DTDs: Document Type Statements and Language Versions, (X) HTML Document Structure, Browsers and (X) HTML, The Rules of (X) HTML, Major Themes of (X) HTML.

UNIT–II	06 Hrs.

HTML5: Hello HTML5, Loose Syntax Returns, XHTML5, HTML5: Embracing the Reality of Web Markup, Presentational Markup Removed and Redefined, HTML5 Document Structure Changes, Adding Semantics: HTML5's Open Media Effort, HTML5 Form Changes.

UNIT–III	06 Hrs.

Cascading Style Sheets (CSS): Introduction, CSS Overview , CSS Rules, Example with Type Selectors and the Universal Selector, CSS Syntax and Style, Class Selectors, ID Selectors, span and div Elements, Cascading, style Attribute, style Container, External CSS Files, CSS Properties, Color Properties, RGB Values for Color, , Font Properties, line-height Property, Text Properties, Border Properties, Element Box, padding Property, margin Property .

UNIT–IV	06 Hrs.

Tables and CSS, Links and Images: Table Elements, Formatting a Data Table: Borders, Alignment, and Padding, CSS Structural Pseudo- Class Selectors, thead and tbody Elements, Cell Spanning. CSS display Property with Table Values, **Links and Images**:a Element, Relative URLs, Navigation Within a Web Page, CSS for Links, Bitmap Image Formats: GIF, JPEG, PNG.

Reference Books *

4. Thomas A. Powell,**The Complete Reference HTML & CSS (**Fifth Edition), Tata McGraw Hill.
5. John Dean,**WEB PROGRAMMING with HTML5**CSS and JavaScript(First Edition), Jones & Bartlett Learning.
6. Chris Bates,**WEB PROGRAMMING (**Second Edition), Wiley.

Programming Assignments:

2. To create a simple html file to demonstrate the use of different tags.

   Create an html page named as "Basic_Html_Tags.html" and add the following tags

   a) Different heading tags (h1 to h6)
   b) Paragraph
   c) Horizontal line

d) Line Break
e) Pre tag
f) Different Logical Style (<b>,<u>,<Sup>,<sub>)

2. Create a HTML code to display the following web page using list.

Learning Web Development

I. Background Skills
  A. Unix Commands
  B. Vim Text Editor
II. HTML
  A. Minimal Page
  B. Headings
  C. Tags
  D. Lists
    i. Unordered
    ii. Ordered
    iii. Definition
    iv. Nested
  E. Links
    i. Absolute
    ii. Relative
  F. Images

3. Create an html page named as "Table.html" to display the following table.

NAME	SUBJECT	MARKS
Hillary	Advanced Web	75
	Operating Syatem	60
Lary	Advanced Web	80
	Operating Syatem	75
	Total Average: 72.5	

11. Create an internal style sheet to define the following CSS properties for element(s) on your page:
    a. text-decoration
    b. text-align
    c. font-size
    d. font-family
    e. font-weight

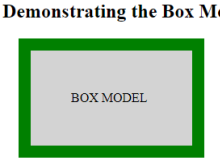
12. Create an external style sheet to define the following CSS properties for element(s) on your page:
    a. background-color
    b. color
    c. margin-xxx (left, right, top, or bottom)
    d. padding
    e. border-style , border-color , border-width

13. To create HTML code to insert image and to add a link to a web page.

14. Write a HTML code to perform the following CSS properties
    a. Text Properties
        - text-color
        - text-align
        - text-decoration
        - text-transformation
    b. Font Properties

- font-style
- font-size
- font-family

15. Create a HTML code to display following output(using box properties)



16. Create the following table using CSS properties.

Roll No	Name	Team
1001	John	Red
1002	Peter	Blue
1003	Henry	Green

17. Create a HTML code for simple registration form which include
    i. Firstname ii. Middlename iii.Lastname iv.Course with option button v.Gender with radio button vi.Phone No vii.Address viii.Submit and reset button

Course Outcomes:

After completion of the course student will be able to,

CO1: Analyze historical context and justification for HTML over XHTML.

CO2: Develop HTML5 documents and adding various semantic markup tags.

CO3: Learn various attributes, values and types of CSS.

CO4: Build a web page using links and images.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	3	-	-	-	-	-	-	-	-	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3
CO3	3	2	3	-	-	-	-	-	-	-	-	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3

22UCS131B/22UCS231B	INTRODUCTION TO PYTHON PROGRAMMING	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS: 50
TOTAL HOURS: 46HRS (26T+20P)		SEE MARKS: 50

Course objectives

4. Learn the syntax and semantics of the python programming languages
5. Illustrate the process of structuring the data using list, tuples, string and dictionaries
6. Demonstrate the use of built-in function to navigate the file system

UNIT – I	07 Hrs

Python Basics

Our first python script, Comments, Basic data types, Identifiers, Keywords, variables, basic input and output: printing using the print function, Taking input using the input function

Python control structures:

Getting started with programs, decisions, loops, terminating control

UNIT – II	06 Hrs

Lists:

Creating lists, Accessing list elements, counting list elements, Iterating through list elements, searching elements within lists, list slices, adding and deleting elements, adding multiplying and copying lists, simple programs on lists, nested lists

Tuples: Creating Tuples, accessing tuple elements, counting tuple elements, Iterating through tuple elements, searching elements within tuples, tuple slices, adding multiplying and copying tuples, comparison of tuples and lists, simple programs

Introduction to sets: Creating sets, Accessing set elements, Iterating through set elements

UNIT – III	06 Hrs

Strings:

Conversion from and to strings, searching in strings, splitting strings, joining strings, modifying strings,padding strings

Dictionaries:

Creating Dictionaries, accessing Dictionary elements, counting Dictionary elements, Iterating through

Dictionary elements, searching elements within Dictionaries, adding and deleting Dictionary, comparison simple programs

UNIT – IV	07 Hrs

Functions:

Introduction to functions, function definitions, function call, positional arguments, default arguments, keyword arguments, variable arguments, returning from functions,

Files:

Introduction to file handling, opening and closing files, reading from text files, writing to text files, seeking within files, reading to binary files, wring to binary files

Programming Exercises:

16. Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages.
17. Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.
    - Develop a program to generate Fibonacci sequence of length (N). Read N from the console.
    - Write a function to calculate factorial of a number. Develop a program to compute binomial coefficient (Given N and R).
18. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.
19. Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.
20. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use
21. Dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display dictionary slice of first 10 items]
22. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip (), len (), list methods sort (), append (), and file methods open (), read lines (), and write ()].
23. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods.
24. Write a function named DivExp which takes TWO parameters a, b and returns a value c (c=a/b). Write suitable assertion for a>0 in function DivExp and raise an exception for when b=0. Develop a suitable program which reads two values from the console and calls a function DivExp.
25. Write python program to implement simple library system using dictionary: Library = { ISBN1 : [No of copies, title, author] . . . } to support i) add new look ii) issue book iii) Return book operations
26. Given price list: {item1: amt, item2: amt . . .} and list of items purchased, write python program to find amount to be paid for purchased items.
27. Ex: pricelist ; { “pen”:10, “Notebook”:50, “book”:100} Items_purchased = [“pen”, “book”]
28. o/p: amt_to_be_paid = 110

Reference Books:

5. B. Nagesh Rao, “Learning Python”, Cyberplus publication, 2nd edition
6. Gaowrishankar S., Veena A, “Introduction to python programming”, CRC press
7. Al Sweigart, “Automate the boring stuff with Python”, No Starch press, 1st Edition, 2015.
8. Allen B. Downey, “Think Python: How to Thik Like a Computer Scientist”, Green Tea Press, 2nd Edition, 2015.

Course Outcomes:

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

CO 1: Explain the syntax and semantics of different statements and functions.

CO 2: Demonstrate the use of strings, files, lists, tuples, dictionaries and exceptions

CO 3: Develop the solution to a given problem by selecting appropriate data types and modules

CO 4: Able to create, read data from and write data to files

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12

CO1	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	**-**	**2**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO3	**-**	**3**	**3**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**
CO4	**-**	**3**	**3**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

22UCS132B /22UCS232B	BASICS OF JAVA PROGRAMMING	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS: 50
TOTAL HOURS: 46HRS (26 T+20 P)		SEE MARKS: 50

Course Objectives:

5. Learn fundamental features of object oriented language and JAVA
6. Set up Java JDK environment to create, debug and run simple Java programs.
7. Learn object oriented concepts using programming examples.
8. Study the concepts of importing of packages and exception handling mechanism.

UNIT – I	07 Hrs

An Overview of Java: Object-Oriented Programming, A First Simple Program, A Second Short Program, Two Control Statements, Using Blocks of Code, Lexical Issues, The Java Class Libraries,
Data Types, Variables, and Arrays: Java Is a Strongly Typed Language, The Primitive Types, Integers, Floating-Point Types, Characters, Booleans, A Closer Look at Literals, Variables, Type Conversion and Casting, Automatic Type Promotion in Expressions, Arrays, A Few Words About Strings

UNIT – II	06 Hrs

Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The? Operator, Operator Precedence, Using Parentheses, Control Statements: Java‟s Selection Statements, Iteration Statements, Jump Statements.

UNIT – III	06 Hrs

Introducing Classes: Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The finalize Method, A Stack Class, A Closer Look at Methods and Classes: Overloading Methods, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Recursion, Introducing Access Control, Understanding static, Introducing final, Arrays Revisited.

UNIT – IV	07 Hrs

Inheritance: Inheritance, Using super, Creating a Multilevel Hierarchy, When Constructors Are Called, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with Inheritance, The Object Class.
Text book 1: Ch 8.

Reference Books:

2. Herbert Schildt, Java the Complete Reference, 7th Edition, Tata McGraw Hill, 2007.

Web links and Video Lectures (e-Resources):

- https://onlinecourses.nptel.ac.in/noc22_cs47/preview

Programming Exercises

11. Develop simple java programs to demonstrate the use of conditional statements
12. Develop simple java programs to demonstrate the use
    iii. loop statements
    iv. Reading & printing different data types in java
13. Develop simple java programs on arrays(single & multidimensional) & recursion
14. Develop simple java programs to demonstrate Interfaces concept
15. Develop simple java programs to demonstrate Polymorphism mechanisms
16. Develop simple java programs to demonstrate Inheritance concept
17. Develop simple java programs to demonstrate Package concept
18. Develop simple java programs to demonstrate exception handling

19. Develop simple java programs to demonstrate use of Constructors
20. Develop simple java programs to demonstrate Method overloading & overriding

Course Outcomes:

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

CO1: Explain features of JAVA.

CO2: Analyse the problem statement and Identify the requirement.

CO3: Design and develop standalone applications using Java.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-

22UCS133B /22UCS233B	INTRODUCTION TO C++ PROGRAMMING	CREDITS: 03
L:T:P: 2:0:2		CIE MARKS:50
TOTAL HOURS: 46HRS (28T+20P)		SEE MARKS:50

Course Objectives:

6. Understanding about object oriented programming and Gain knowledge about the capability to store information together in an object.
7. Understand the concept of structure and functions
8. Understand the capability of a class to relay upon another class and functions.
9. Understand about constructors which are special type of functions.
10. Understand the concept of polymorphism and inheritance.

UNIT – I	08 Hrs

Introduction: Features of object oriented programming, C++ and C , C++ overview, Layout of C++ Program, Cin and Cout statements, Preprocessor directives, Comments, Manipulators, Data types,variables, constants, Arithmetical operators, Logical operators, Relational operators, Conditional operators, Loops and Decisions: for- loop, while loop, do-while loop, if statement, if-else statement, else-if statement, switch statement.

UNIT – II	06 Hrs

Structures: A simple structure, defining a structure, defining structure variables, accessing structure members, Functions: Simple functions, passing arguments to functions, returning value to a function, overloaded functions.

UNIT – III	06 Hrs

Class and Objects: Class specification, Access Specifiers, Defining Member Function, Objects Declaration, Accessing Data members and Member Function, Constructors, parameterized constructor, Destructors.

UNIT – IV	08 Hrs

Inheritance& Polymorphism: Derived class Constructors, destructors-Types o inheritance-Defining Derived classes, Single Inheritance, Multiple, Hierarchical Inheritance, Hybrid Inheritance.

Reference Books:

3. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publishing
4. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd , Fourth Edition 2010.

Web links and Video Lectures (e-Resources):

3. Basics of C++ - https://www.youtube.com/watch?v=BCIS40yzssA
4. Functions of C++ - https://www.youtube.com/watch?v=p8ehAjZWjPw Tutorial Link: https://www.w3schools.com/cpp/cpp_intro.asp
2. https://www.edx.org/course/introduction-to-c-

Programming Assignments

16. a. Write a C++program to find the sum of all the natural numbers from 1to n.
    b. Write a C++ program to find the factorial of a given number
    c. Write a C++ program to find the given number is prime or not
17. Write a C++ program to make a simple calculator.
18. Write a C++ program to declare Strut. initialize and display contents of member variables
19. Write a C++program to demonstrate function overloading for the following prototypes. Add (int a, int b) Add (double a , double b)
20. Write a C++ program to find Area of square, rectangle ,circle and triangle using Function Overloading
21. Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents..
22. Given that an EMPLOYEE class contains following members: data members: Employeenumber, Employee

name, Basic, DA, IT, Net Salary and print data member

23. Program to illustrate default constructor, parameterized constructor
24. Develop simple C++ programs to demonstrate Inheritance concept
25. Suppose we have three classes Vehicle, Four Wheeler, and Car. The class Vehicle is the base class, the class Four Wheeler is derived from it and the class Car is derived from the class Four Wheeler. Class Vehicle has a method' vehicle 'that prints I am a vehicle, class Four Wheeler has a method four Wheeler' that prints I have four wheels, and class Car has a method car that prints Iam a car .So, as this is a multi- inheritance; we can have access to all the other classes methods from the object of the class Car.
26. We invoke all the methods from a Car object and printthe corresponding outputs of the methods.
27. So, if we invoke the methods in this order, car(), four Wheeler(), and vehicle(), then the outputwill be
28. I am a car
29. I have four
30. wheels I am a vehicle

Course Outcomes:

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

CO1: Demonstrate the basic concept of programming.

CO2: Able to understand and design the solution to a problem using struct, function and function overloading concepts.

CO3: Able to understand and design the solution to a problem using object-oriented programming concepts.

CO4: Develop programs using inheritance and polymorphism.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	-	-	2	-	-	-	-	-	-	-
CO2	-	1	-	-	2	-	-	-	-	-	-	2
CO3	-	1	-	-	-	-	-	-	-	-	-	2
CO4	-	2	-	-	-	-	-	-	-	-	-	2

22UHS224C	PROFESSIONAL WRITING SKILLS IN ENGLISH	CREDIT: 01
L:T:P: 1:0:0		CIE MARKS:50
TOTAL HOURS:15HRS		SEE MARKS:50

Course Objectives:

1. To identify the Common Errors in Writing and Speaking of English.
2. To achieve better Technical writing and Presentation skills for employment.
3. To read and write technical proposals properly and make them to write good technical reports.
4. To acquire Employment and Workplace communication skills.
5. To learn about Techniques of Information Transfer through presentation in different level.

UNIT - I	3 Hrs

Identifying Common Error in Writing and Speaking of English: Common error identification in parts of speech, Use of verbs and Phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement. Noun-pronoun agreement, Sequence of Tenses and errors identification in Tenses.

Advanced English Vocabulary and its types –Words often Confused, Misplaced modifiers, Contractions, Collocations, Word Order.

UNIT – II	4 Hrs

Nature and Style of sensible writing: Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion in a paragraph. Importance of Proper Punctuation, The Art of Condensation (Precise writing) and Techniques in Essay writing, Common Errors due to Indianism in English Communication, Creating Coherence and Cohesion, Sentence arrangements exercises. Importance of Summarizing and Paraphrasing.

Grammar – Voice and Speech (Active and Passive Voices) and Reported Speech, Spotting Error Exercises, Sentence Improvement Exercises.

UNIT - III	4 Hrs

Technical Reading and Writing Practices: Introduction, Effective Technical Reading and Writing, Technical Reports and proposal writing-Introduction, types, types of technical proposals. Effective reading and writing of technical reports and proposals. Scientific Writing & It'sProcess. The Listening Comprehension, Types of Listening, Barriers of listening, Improving Listening Skills.

Attribute of a good and poor listener. Reading Skills and Reading Comprehension, Active and Passive Reading.

UNIT - IV	4 Hrs

Professional Communication for Employment: Preparation of Job Application, Components of Letter Writing, Formats and Types of official employment Business Letters, Resume. Types of Resume. Resume vs Bio Data, Profile & CV. Writing effective resume for employement, Model Letter of Application, Cover Letter with Resume, Emails, Blog Writing, Memos. Presentation skills and Formal Presentations by Students.

Professional Communication at Workplace: Group Discussion – Importance, Characteristics, Strategies of Group Discussions. Employment/ Job Interviews. Non-Verbal Communication Skills.

Reference Books:

1. Professional Writing Skills in English, Infinite Learning Solutions – (Revised Edition) 2022.
2. Functional English (As per AICTE 2018 Model Curriculum) Cengage learning India Pvt. Ltd. - 2020.
3. A Course in Technical English, Cambridge University Press – 2020.
4. Sanjay Kumar and Pushplata, 'Communication Skills', Oxford University Press - 2018.
5. "Communication Skills – I (A Workbook)" Oxford University Press – 2018.
6. Meenakshi Raman and Sangeetha Sharma, 'Technical Communication – Principles and Practice', 3rd edition, Oxford University Press 2017.

Course Outcomes:

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

CO1: Identify the Common Errors in Writing and Speaking

CO2: Present technical proposals properly and write good technical reports.

CO3: Build Professional and Workplace communication skills.

CO4: Apply Techniques of Information Transfer through presentation in different levels.

CO5: Utilize basic Professional English writing, reading and speaking with fluency.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	3

22UHS125C/22UHS225C	CONSTITUTION OF INDIA	CREDIT: 01
L:T:P: 1:0:0		CIE MARKS:50
TOTAL HOURS: 15HRS		SEE MARKS:50

Course Objectives:

1. To realize the significance of constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution.
2. To identify the importance of fundamental rights as well as fundamental duties.
3. To understand the functioning of Union and State Governments in Indian federalsystem.
4. To review procedure and effects of emergency, composition and activities ofelection commission.

UNIT – I	04 Hrs

Introduction to Indian constitution: The Salient Features of the Indian Constitution. Preamble to the Constitution of India. Fundamental Rights, Directive Principles of State policy and Fundamental Duties**.**

UNIT – II	04 Hrs

The Union Government: The Union Executive, The Union Legislature and The Union Judiciary - The Supreme Court of India.

UNIT – III	04 Hrs

The State Government: The State Executive, The State legislature and The State Judiciary

UNIT – IV	03 Hrs

Election provisions, Emergency provisions and Amendment of the constitution**.**

Reference Books:

1. M. V. Pylee, "Introduction to the Constitution of India", 4th Edition, Vikas publication, 2005.
2. Durga Das Basu (D. D. Basu), "Introduction to the constitution of India", (Student Edition), 19th edition, Prentice-Hall EEE, 2008.
3. Venkatesh B. R. and Merunandan K. B, 'An introduction to the constitution of India and Profession Ethics', Idea International Publication, Bangalore, 2010.
4. K. R. Phaneesh, 'The Constitution of India and Profession of Ethics', Sudha Publication, Bangalore, 2010.

Course Outcomes:

After completion of the course student will be able to

CO1: Analyse the significance of Indian Constitution as the fundamental law of the land.

CO2: Exercise his/her fundamental rights in proper sense at the same time identifies his/her responsibilities in national building.

CO3: Asses the Indian political system, the powers and functions of the Union and State Governments.

CO4: Elaborate Electoral Process, Emergency provisions and Amendment procedure.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	1	1	-	-	-	-	1
CO2	-	-	-	-	-	3	1	-	-	-	-	2
CO3	-	-	-	-	-	1	1	-	-	-	-	1
CO4	-	-	-	-	-	-	-	-	-	-	-	1

22UHS128C/22UHS228C	SCIENTIFIC FOUNDATIONS OF HEALTH	CREDIT: 01
L:T:P: 1:0:0		CIE MARKS:50
TOTAL HOURS:15 HRS		SEE MARKS:50

Course Objectives:

1. To know about health and wellness (and its Beliefs) & It's balance for positive mindset.
2. To build the healthy lifestyles for good health for their better future.
3. To create a healthy and caring relationships to meet the requirements of good/ social/ positive life.
4. To learn about avoiding risks and harmful habits in their campus and outside the campus for their bright future.
5. To prevent and fight against harmful diseases for good health through positive mindset.

UNIT – I	4Hrs

Good Health and Its balance for positive mindset: What is Health? Health and Behaviour.
Health and Personality - Profession: Disparities of health in different vulnerable groups. Stress and Health - Stress management.

UNIT – II	4Hrs

Building of healthy lifestyles for better future: Developing a healthy diet for good health, Fitness components for health, Wellness and physical function, How to avoid exercise injuries?
Creation of Healthy and caring relationships: Building communication skills (Listening and speaking), Changing health behaviours through social engineering.

UNIT – III	4Hrs

Avoiding risks and harmful habits: Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, Effects and health hazards from addictions Such as how to recovery from addictions.

UNIT – IV	3Hrs

Preventing and fighting against diseases for good health: Process of infections and reasons for it, Management of chronic illness for Quality of life, Health and Wellness of youth.

Reference Books:

1. Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor, Health Psychology (Second edition) Published by Routledge 711 Third Avenue, New York, NY 10017.
2. Health Psychology - A Textbook, 4th edition by Jane Ogden McGraw Hill Education (India) Pvt. Ltd. - Open University Press
3. Scientific Foundations of Health (Health & Wellness) - General Books published for university and colleges references by popular authors and published by the reputed publisher.
4. Shelley E. Taylor, Health Psychology (Ninth Edition),University of California, Los Angeles, McGraw Hill Education (India) Private Limited - Open University Press
5. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes

Course Outcomes:

After completion of the course student will be able to
CO1: Understand concepts of Good Health and wellness (and its Beliefs).
CO2: Demonstrate the abilities to build healthy, caring relationships and life style
CO3: Adopt the innovative & positive methods to avoid risks from harmful habits in their campus & outside the campus.
CO4: Exhibit the abilities to fight against harmful diseases.

Course Outcomes:	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	-	-	-	-	-	1	-	-	-	-	-	-
CO2	-	-	-	-	-	2	-	-	-	-	-	-
CO3	-	-	-	-	-	3	-	-	-	-	-	-
CO4	-	-	-	-	-	3	-	-	-	-	-	-