



BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institution Affiliated to VTU, Belagavi)

Scheme of Teaching and Examinations-2022

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2022-23)

I Semester (Electrical & Electronics Engineering Stream)			Dept ECE				(For Chemistry Group)						
Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	*ASC(IC)	BMATE101	Mathematics for EES-I	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	BCHEE102	Chemistry for EES	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	BCEDK103	Computer-Aided Engineering Drawing	Mechanical	2	0	2	0	03	50	50	100	03
4	ESC-I	BESCK104B	Introduction to Electrical Engineering	Respective Engg Dept	3	0	0	0	03	50	50	100	03
5	PLC-I	BPLCK105B	Introduction to Python Programming	Any Dept.	2	0	2	0	03	50	50	100	03
6	AEC	BENGK106	Communicative English	Humanities	1	0	0	0	01	50	50	100	01
7	HSMS	BICOK107	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	BSFHK158	Scientific Foundations of Health	Any Dept.	1	0	0	0	01	50	50	100	01
TOTAL					14	4	8	0	18	400	400	800	20

SDA-Skill Development Activities, TD/PSB- Teaching Department / Paper Setting Board, ASC-Applied Science Course, ESC- Engineering Science Courses, ETC- Emerging Technology Course, AEC- Ability Enhancement Course, HSMS-Humanity and Social Science and Management Course, SDC- Skill Development Course, CIE -Continuous Internal

<p>Evaluation, SEE- Semester End Examination, IC – Integrated Course (Theory Course Integrated with Practical Course)</p>	
<p>*-BMATE101 Shall have the 03 hours of theory examination(SEE), however, practical sessions question shall be included in the theory question papers. ** The mathematics subject should be taught by a single faculty member per division, with no sharing of the course(subject)module-wise by different faculty members.</p> <p>#-BCHEE102- SEE shall have the 03 hours of theory examination and 02-03 hours of practical examination</p> <p>ESC or ETC of 03 credits Courses shall have only a theory component (L:T :P:S=3:0:0:0) or if the nature the of course required practical learning syllabus shall be designed as an Integrated course (L:T:P:S= 2:0:2:0) All 01 Credit- courses shall have the SEE of 01 hours duration and the pattern of the question paper shall be MCQ</p>	
<p>Credit Definition:</p> <p>1- hour Lecture (L) per week=1Credit</p> <p>2-hoursTutorial(T) per week=1Credit</p> <p>2- hours Practical / Drawing (P) per week=1Credit</p> <p>2-hous Skill Development Actives (SDA) per week = 1 Credit</p>	<p>04-Credits courses are to be designed for 50 hours of Teaching-Learning Session</p> <p>04-Credits (IC) are to be designed for 40 hours’ theory and 12-14 hours of practical sessions</p> <p>03-Credits courses are to be designed for 40 hours of Teaching-Learning Session</p> <p>02- Credits courses are to be designed for 25 hours of Teaching-Learning Session</p> <p>01-Credit courses are to be designed for 12-15 hours of Teaching-Learning sessions</p>
<p>Student’s Induction Program: Motivating (Inspiring) Activities under the Induction program – The main aim of the induction program is to provide newly admitted students a broad understanding of society, relationships, and values. Along with the knowledge and skill of his/her study, students’ character needs to be nurtured as an essential quality by which he/she would understand and fulfill the responsibility as an engineer. The following activities are to be covered in 21 days. Physical Activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to Local areas, Familiarization with Department/Branch and Innovation, etc. For details, refer the ANNEXURE-I of Induction Programs notification of the University published at the beginning of the 1st semester.</p>	
<p>AICTE Activity Points to be earned by students admitted to BE/ B.Tech., / B. Plan day college program (For more details refer to Chapter 6, AICTE Activity Point Program, Model Internship Guidelines): Over and above the academic grades, every regular student admitted to the 4 years Degree program and every student entering 4 years Degree programs through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Program. Students transferred from other Universities to the fifth semester are required to earn 50 Activity Points from the year of entry to VTU. The Activity Points earned shall be reflected on the student’s eighth semester Grade Card. The activities can be spread over the years, any timeduring the semester weekends, and holidays, as per the liking and convenience of the student from the year of entry to the program. However, the minimumhours’ requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, an Eighth Semester Grade Card shall be issued only after earning the required activity points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.</p>	

(ESC-I) Engineering Science Courses-I					(ETC-I) Emerging Technology Courses-I				
Code	Title	L	T	P	Code	Title	L	T	P
BESCK104A	Introduction to Civil Engineering	3	0	0	BETCK105A	Smart Materials and Systems	3	0	0
BESCK104B	Introduction to Electrical Engineering	3	0	0	BETCK105B	Green Buildings	3	0	0
BESCK104C	Introduction to Electronics Engineering	3	0	0	BETCK105C	Introduction to Nano Technology	3	0	0
BESCK104D	Introduction to Mechanical Engineering	3	0	0	BETCK105D	Introduction to Sustainable Engineering	3	0	0
BESCK104E	Introduction to C Programming	2	0	2	BETCK105E	Renewable Energy Sources	3	0	0
					BETCK105F	Waste Management	3	0	0
					BETCK105G	Emerging Applications of Biosensors	3	0	0
					BETCK105H	Introduction to Internet of Things (IOT)	3	0	0
					BETCK105I	Introduction to Cyber Security	3	0	0
					BETCK105J	Introduction to Embedded System	3	0	0
(PLC-I) Programming Language Courses-I									
Code	Title	L	T	P					
BPLCK105A	Introduction to Web Programming	2	0	2					
BPLCK105B	Introduction to Python Programming	2	0	2					
BPLCK105C	Basics of JAVA programming	2	0	2					
BPLCK105D	Introduction to C++ Programming	2	0	2					
The course BESCK104E/204E, Introduction to C Programming, and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT									

- The student has to select one course from the ESC-I group.
- **EEE** Students shall opt for any one of the courses from the ESC-I group **except, BESCK104B-Introduction to Electrical Engineering and ECE/ETC/BM/ML** students shall opt any one of the courses from ESC-I **except BESCK104C Introduction to Electronics Engineering**
- The students have to opt for the courses from ESC group without repeating the course in either 1st or 2nd semester
- The students must select one course from either ETC-I or PLC-I group.
- If students study the subject from ETC-I in 1st semester he/she has to select the course from PLC-II in the 2nd semester and vice-versa



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(Effective from the academic year 2022-23)

II Semester (Electrical & Electronics Engineering Stream)			Dept ECE	(For students who attended 1 st semester under Chemistry Group)									
Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	*ASC(IC)	BMATE201	Mathematics for EES-II	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	BPHYE202	Physics for EES	PHY	2	2	2	0	03	50	50	100	04
3	ESC	BBEE203	## Basic Electronics	EEE/ECE/ETE	3	0	0	0	03	50	50	100	03
4	ESC -II	BESCK204E	Introduction to C Programming	Respective Engg Dept.	2	0	2	0	03	50	50	100	03
5	ETC-II	BETCK205H	Introduction to Internet of Things (IoT)	Any Dept	3	0	0	0	03	50	50	100	03
6	AEC	BPWSK206	Professional Writing Skills in English	Humanities	1	0	0	0	01	50	50	100	01
7	HSMC	BKSKK207/ BKBKK207	Sanskritika Kannada/ Balake Kannada	Humanities	1	0	0	0	01	50	50	100	01
8	AEC/SDC	BIDTK258	Innovation and Design Thinking	Any Dept	0	2	0	0	02	50	50	100	01
TOTAL					14	6	6	0	19	400	400	800	20

Electrical & Electronics Engineering Students have to study BEEE203- Elements of Electrical Engineering compulsorily

Whereas Electronics and allied stream students have to study BBEE203 Basic Electronics compulsorily

SDA-Skill Development Activities, **TD/PSB**- Teaching Department / Paper Setting Board, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **ETC**- Emerging Technology Course, **AEC**- Ability Enhancement Course, **HSMS**-Humanity and Social Science and Management Course, **SDC**- Skill Development Course, **CIE**-Continuous Internal Evaluation, **SEE**- Semester End Examination, **IC** – Integrated Course (Theory Course Integrated with Practical Course)

-BMATE201** Shall have the 03 hours of theory examination(SEE), however, practical sessions question shall be included in the theory question papers. * The mathematics subject should be taught by a single faculty member per division, with no sharing of the course(subject)module-wise by different faculty members.**

#-BPHYE202 SEE shall have the 03 hours of theory examination and 02-03 hours of practical examination.

ESC or ETC of 03 credits Courses shall have only a theory component (L:T :P:S=3:0:0:0) or if the nature the of course required practical learning syllabus shall be designed as an Integrated course (L:T:P:S= 2:0:2:0),. **All 01 Credit-** courses shall have the SEE of 01 hours duration and the pattern of the question paper shall be MCQ

(ESC-II) Engineering Science Courses-II					(ETC-II) Emerging Technology Courses-II				
Code	Title	L	T	P	Code	Title	L	T	P
BESCK204A	Introduction to Civil Engineering	3	0	0	BETCK205A	Smart materials and Systems	3	0	0
BESCK204B	Introduction to Electrical Engineering	3	0	0	BETCK205B	Green Buildings	3	0	0
BESCK204C	Introduction to Electronics Engineering	3	0	0	BETCK205C	Introduction to Nano Technology	3	0	0
BESCK204D	Introduction to Mechanical Engineering	3	0	0	BETCK205D	Introduction to Sustainable Engineering	3	0	0
BESCK204E	Introduction to C Programming	2	0	2	BETCK205E	Renewable Energy Sources	3	0	0
					BETCK205F	Waste Management	3	0	0
					BETCK205G	Emerging Applications of Biosensors	3	0	0
					BETCK205H	Introduction to Internet of Things(IoT)	3	0	0
					BETC2K05I	Introduction to Cyber Security	3	0	0
					BETC2K05J	Introduction to Embedded System	3	0	0
(PLC-II) Programming Language Courses-II									
Code	Title	L	T	P					
BPLCK205A	Introduction to Web Programming	2	0	2					
BPLCK205B	Introduction to Python Programming	2	0	2					
BPLCK205C	Basics of JAVA programming	2	0	2					
BPLCK205D	Introduction to C++ Programming	2	0	2					
The course BESCK204E, Introduction to C Programming, and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT									

- The student has to select one course from the ESC-II group.
- **EEE** Students shall opt for any one of the courses from the ESC-I group **except**, BESCK204B-**Introduction to Electrical Engineering** and ECE/ETC/BM/ML students shall opt any one of the courses from ESC-I **except** BESCK204C **Introduction to Electronics Engineering**
- The students have to opt for the courses from ESC group without repeating the course in either 1st or 2nd semester
- The students must select one course from either ETC-II or PLC-II group.
- If students study the subject from ETC-I in 1st semester he/she has to select the course from PLC-II in the 2nd semester and vice-versa



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I Semester

Course Title:	Mathematics-I for Electrical & Electronics Engineering Stream		
Course Code:	BMATC101	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab slots	Credits	04

Course objectives: The goal of the course **Calculus, Differential Equations and Linear Algebra (22MATE11)** is to

- **Familiarize** the importance of calculus associated with one variable and multivariable for electrical and electronics engineering.
- **Analyze** electrical and electronics engineering problems by applying Ordinary Differential Equations.
- **Develop** the knowledge of Linear Algebra to solve the system of equations.

Teaching-Learning Process

Pedagogy (General Instructions):

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop student's 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 for group learning to improve their creative and analytical skills.
6. Show short related video lectures in the following ways:
 - As an introduction to new topics (pre-lecture activity).
 - As a revision of topics (post-lecture activity).
 - As additional examples (post-lecture activity).
 - As an additional material of challenging topics (pre-and post-lecture activity).
 - As a model solution of some exercises (post-lecture activity).



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Module-1 Calculus (8 hours)

Introduction to polar coordinates and curvature relating to EC & EE Engineering applications. Polar coordinates, Polar curves, angle between the radius vector and tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Problems.

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

Applications: Communication signals, Manufacturing of microphones, and Image processing.
(RBT Levels: L1, L2 and L3)

Module-2 Series Expansion and Multivariable Calculus (8 hours)

Introduction of series expansion and partial differentiation in EC & EE Engineering applications. Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms - L'Hospital's 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 communication signals, Errors and approximations, and vector calculus.
(RBT Levels: L1, L2 and L3)

Module-3 Ordinary Differential Equations (ODEs) of first order (8 hours)

Introduction to first order ordinary differential equations pertaining to the applications for EC& EE engineering.

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations - Integrating factors on $\frac{1}{N} \left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right)$ and $\frac{1}{M} \left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right)$ Applications of ODE's – Orthogonal Trajectories, L-R and C-R circuits.

Nonlinear differential equations: Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations. **Problems.**

Self-Study: Applications of ODE's: Solvable for x and y.

Applications of ordinary differential equations: L-R and C-R circuits, Rate of Growth or Decay, Conduction of heat.
(RBT Levels: L1, L2 and L3)

Module-4 Integral Calculus (8 hours)

Introduction to Integral Calculus in EC & EE engineering applications.

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.



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

Self-Study: Volume by triple integration, Center of gravity.

Applications: Antenna and wave propagation, Calculation of optimum power in electrical circuits, field theory.

(RBT Levels: L1, L2 and L3)

Module-5 Linear Algebra (8 hours)

Introduction of linear algebra related to EC & EE engineering applications.

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. Problems

Self-Study: Solution of system of equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

Applications of Linear Algebra: Network Analysis, Markov Analysis, Critical point of a network system. Optimum solution.

(RBT Levels: L1, L2 and L3)

List of Laboratory experiments (2 hours/week per batch/ batch strength 15)

10 lab sessions + 1 repetition class + 1 Lab Assessment

1	2D plots for Cartesian and polar curves	
2	Finding angle between polar curves, curvature and radius of curvature of a given curve	
3	Finding partial derivatives, Jacobian and plotting the graph	
4	Applications to Maxima and Minima of two variables	
5	Solution of first order differential equation and plotting the graphs	
6	Program to compute area, volume and centre of gravity	
7	Evaluation of improper integrals	
8	Numerical solution of system of linear equations, test for consistency and graphical representation	
9	Solution of system of linear equations using Gauss-Seidel iteration	
10	Compute eigenvalues and eigenvectors and find the largest and smallest eigenvalue by Rayleigh power method.	

Suggested software's : Mathematica/MatLab/Python/Scilab

Course outcome (Course Skill Set)

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.	
CO2	learn the notion of partial differentiation to compute rate of change multivariate functions	
CO3	apply the concept of change of order of integration and variables to evaluate multiple integral and their usage in computing area and volume.	



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CO4	make use of matrix theory for solving for system of linear equations and compute eigenvalues and eigenvectors
CO5	familiarize with modern mathematical tools namely SCILAB/PYTHON/MATLAB

Question paper pattern:

- **SEE** will be conducted for 100 marks.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 marks. The students have to answer 5 full questions, selecting one full question from each module.
- There will be three tests and 2 assignments for theory and 1 test for lab under **CIE**.
- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The CIE marks distribution for theory is 20 marks from the three tests and 10 marks from two assignments. There will be 20 marks allocated for lab test.

CIE test will be announced prior to the commencement of the course.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

Text Books

1. **B. S. Grewal:** “Higher Engineering Mathematics”, Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig:** “Advanced Engineering Mathematics”, John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** “Higher Engineering Mathematics” McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia:** “Engineering Mathematics” Oxford University Press, 3rd Ed., 2016.
3. **N.P Bali and Manish Goyal:** “A textbook of Engineering Mathematics” LaxmiPublications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** “Advanced Engineering Mathematics” McGraw – HillBook Co., Newyork, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** “Engineering Mathematic for Semester I andII”, McGraw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** “Higher Engineering Mathematics” S. ChandPublication, 3rd Ed., 2014.
7. **James Stewart:** “Calculus” Cengage Publications, 7th Ed., 2019.
8. **David C Lay:** “Linear Algebra and its Applications”, Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** “Linear Algebra with applications”, Jones Bartlett Publishers Inc., 6th Ed., 2017.

Web links and Video Lectures (e-Resources):

- <http://nptel.ac.in/courses.php?disciplineID=111>
- [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
- <http://academicearth.org/>
- VTU e-Shikshana Program
- VTU EDUSAT Program



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Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quizzes
- Assignments
- Seminar

COs and POs Mapping (Individual teacher has to fill up)

COs	POs						
	1	2	3	4	5	6	7
CO1	3	2					
CO2	3	2					
CO3	3	2					
CO4	3	2					
CO5					3		

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped

DEPARTMENT OF CHEMISTRY Choice Based Credit System (CBCS) SEMESTER – I/II			
Engineering Chemistry (2:2:2:0) 4 ECE Stream (Effective from the academic year 2022-23)			
Course Title	Chemistry for ECE, ETE and EEE Stream		
Course Code	BCHEC102	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:2:2:0	SEE Marks	50
Total Number of Contact Hours	40 hours theory + 10 hours lab	Exam Hours	3
Course Objectives: This course will enable students to:			
<ol style="list-style-type: none"> 1. To identify various sustainable technologies in engineering applications. 2. To develop problem solving, critical thinking and analytical reasoning towards scientific problems. 3. To distinguish the use of smart materials for latest development in material research. 4. To appraise the significance of engineering chemistry for industrial and domestic applications. 			
Module – 1			
<p>Preamble: Relevance of chemistry in day today activities, Importance of materials in industrial, defence and research application and its economic implications. Influence of new materials for the technological development, study and use of environment friendly materials for healthier society.</p> <p>Conversion of Energy and Storage devices:</p> <p>Batteries- Introduction, components, classification of batteries – Primary, secondary and reserve batteries. Construction, working and applications of metal - air (Zn- air) battery and Li-ion Battery.</p> <p>Fuel Cells: Introduction, difference between conventional cell and fuel cell, limitations & advantages. Construction & working of H₂-O₂ fuel cell. Construction, working and applications of solid oxide fuel cell.</p> <p>Supercapacitors: Definition, classification and characteristics: Electrostatic Double Layer Capacitors, Pseudo Capacitors and Hybrid Capacitors.</p> <p>Self- Study: Characteristics of a battery: cell potential, current, capacity, electricity storage density, energy efficiency, cycle life and shelf life. Solid state battery (Li-polymer battery), Na-ion battery and Mg-ion batteries.</p>			
(8 Hours)			
Module – 2			
<p>Corrosion science and E-waste management:</p> <p>Corrosion Science: Introduction to corrosion, Electrochemical theory of corrosion, Types of Corrosion: differential metal corrosion, differential aeration corrosion (waterline and pitting corrosion). Corrosion testing by weight loss method and numericals. Corrosion control: Cathodic protection- Sacrificial anode method and Impressed current method. Protective metal coatings – Cathodic and Anodic coatings- Galvanization and Anodization.</p>			

* NOTE: Wherever the contact hours are not sufficient, tutorial hours can be converted to theory hours.

<p>E-waste Management: Introduction, sources, types and effects of e-waste on environment and human health. Methods of disposal, advantages of recycling, extraction of copper and gold from e-waste.</p> <p>Self-study: Nature of metal, nature of corrosion product, ratio of anodic area to cathodic area, nature of environment (pH, temperature, conductivity). Technological importance of metal plating. Differences between electroplating and electroless plating.</p> <p style="text-align: right;">(8 Hours)</p>
Module – 3
<p>Chemistry of electronic materials:</p> <p>Conductors and Insulators: Introduction, principle with examples, semiconductors - synthesis of solar grade silicon using Union Carbide Method and its application in solar cells.</p> <p>Polymers: Introduction, Molecular weight – Number average, weight average and numerical problems. Conducting polymers – synthesis, mechanism of conduction in poly-acetylene, applications.</p> <p>PCB: Electroless plating – Introduction, principle of electroless plating – copper in the manufacture of double-sided PCB</p> <p>Self-Study: Technological importance of metal finishing and distinction between electroplating and electroless plating.</p> <p style="text-align: right;">(8 Hours)</p>
Module – 4
<p>Nanomaterials and Optoelectronic devices:</p> <p>Nanomaterials: Introduction to Nanomaterials, classification and properties. Chemical synthesis of nanomaterials: top-down and bottom-up approach. Synthesis techniques: Sol-gel method, Chemical Vapour Deposition. Introduction, properties and applications – nanofibers and graphene.</p> <p>Optoelectronic systems: Liquid crystals – Introduction, classification, properties and application in Liquid Crystal Displays (LCD's), properties and application in Organic light emitting diodes (OLED's), Quantum Light emitting diodes (QLED's).</p> <p>Self- Study: Applications of nanomaterials in various industries. Perovskite material and its application in optoelectronic devices.</p> <p style="text-align: right;">(8 Hours)</p>
Module – 5
<p>Sensor based Analytical Techniques:</p> <p>Electrode system: Introduction, types of electrodes. Construction and working of calomel electrode. Ion selective electrode – definition, construction and application of glass electrode. Determination of pH using glass electrode. Concentration cell – Definition, construction and numerical problems.</p> <p>Sensors: Definition, broad classification of electrochemical sensors and its applications.</p> <p>Analytical Techniques: Introduction, working principle and instrumentation: Calorimetric sensors – estimation of copper, Potentiometric sensors – estimation of iron, Conductometric sensors – estimation of mixture of acids.</p> <p>Self-study: Electrochemical and bio-sensors applications.</p> <p style="text-align: right;">(8 Hours)</p>

* NOTE: Wherever the contact hours are not sufficient, tutorial hours can be converted to theory hours.

Course outcomes:

The students will be able to:

C01: To identify various sustainable technologies in engineering applications.

C02: To develop problem solving, critical thinking and analytical reasoning towards scientific problems.

C03: To distinguish the use of engineering materials for latest development in material research

C04: Quantitative and qualitative analysis of materials by using different instruments.

Continuous Internal Evaluation (CIE)**CHEMISTRY (L:T:P/Credit = 2:2:2/4)****Duration: 03**

	Internal Assessment	Max- marks	Max-marks	Average marks	Marks after Scale-Down	Final Marks
Theory Component	IA	IA-1 (1.5 hrs.)	40	30	30 Marks	30+20 = 50
		IA-2 (1.5 hrs.)	40			
		IA-3 (1.5 hrs.)	40			
	Assignment	A1 (1 hr)	10	10	Passing standard (40% i.e., 12 marks)	
AAT	AAT-1 (1 hr)	10				
Lab Component	Cumulative marks of experiments	30 marks per experiment (conduction, calculation, viva, report, record submission, 2hrs/per week, batch strength: 18)	-	15	20 Marks	Passing standard (40% i.e., 08 marks)
	IA	IA (02/03 hrs.)	50			

Semester End Examination (SEE)**Examination Duration:** 3 hrs.**Max. Marks: 100**

Note: The maximum of 04/05 questions to be set from the practical component of the integrated course, the total marks of all question should not be more than 30 marks.

		Max. Marks	Max. Marks	Final marks
Theory Component	No. of modules	05	200	50 Passing standard (35 % i.e., 18 marks)
	Questions/Module	02	40	
	Marks/Question	20	20	
	No. of Question to be answered/module	01	20	
	No. of Questions to be answered /course	05	100	

* NOTE: Wherever the contact hours are not sufficient, tutorial hours can be converted to theory hours.

Note: A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if **CIE score ≥ 40 %**, **SEE score ≥ 35 %**, and a sum total of **CIE+SEE ≥ 40 %**.

PRACTICAL MODULE

A- Demonstration (any two) offline/virtual:

- A1. Synthesis of metal oxide nanoparticle.
- A2. Estimation of sulphate using precipitation method.
- A3. Estimation of hardness of water by EDTA method.
- A4. Determination of COD of waste water sample.

B- Exercise (compulsorily any 3 to be conducted):

- B1. Conductometric estimation of acid mixture.
- B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$.
- B3. Determination of pK_a of vinegar using pH meter.
- B4. Determination of rate of corrosion of mild steel by weight loss method.

C- Structured Enquiry (compulsorily any 3 to be conducted):

- C1. Estimation of Copper present in electroplating effluent by colorimeter.
- C2. Determination of viscosity of oil sample by Ostwald's viscometer.
- C3. Determination of percentage of iron in steel using external indicator method.
- C4. Estimation of Fluoride content using SPADNS by colorimetric estimation.

D- Open ended Experiments (any two):

- D1. Determination of percentage of CaO in cement.
- D2. Determination chloride content of water in Argentometry.
- D3. Analysis of mineral content and acidity of soil.
- D4. Determination of percentage of copper in Brass using redox titration.

Books:

1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
2. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
5. Applied Chemistry, Sunita Rattan, Kataria
5. Engineering Chemistry, Baskar, Wiley
6. Engineering Chemistry – I, D. Grouer Krishana, Vikas Publishing
7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.
8. A Text Book of Engineering Chemistry, R.V. Gadag and Nitthyananda Shetty, I.K. International Publishing house. 2nd Edition, 2016.
9. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSC Publishing, 2005.
11. Corrosion Engineering, M.G. Fontana, N.D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.

12. Kirby W. Beard, Linden's Handbook of Batteries, Fifth Edition, McGraw Hill, 2019.
13. Takatoshi Tsujimura, OLED Display Fundamentals and Applications, Wiley-Blackwell , 2012
14. Max Lu, Francois Beguin, Elzbieta Frackowiak, Supercapacitors: Materials, Systems, and Applications, Wiley-VCH; 1st edition, 2013.
15. Dr. H. Panda, "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017.
16. National Research Council 1995. Expanding the Vision of Sensor Materials.
17. Washington, DC: The National Academies Press. <https://doi.org/10.17226/4782>.
18. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher (2022) Bengaluru, ISBN 978-93-85155-70-3
19. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. 2010
20. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyarayanan.
21. Polymer Science, V R Gowariker, 3rd Edition
22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press 2002- 1st Edition.
24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 2014-3rd Edition.
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2010-2nd Edition.
26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa Iyengar., Subash Publications, Bangalore.5th Edition, 2014
27. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,
28. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

Web links and Video Lectures (e-Resources):

- Electrochemistry: <https://nptel.ac.in/downloads/122101001/>
- Chemistry of materials: <https://nptel.ac.in/courses/104/103/104103019/>
- <https://www.youtube.com/watch?v=faESCxAWR9k>
- <https://www.youtube.com/watch?v=TBqXMWaxZYM&list=PLyhmwFtznRhuz8L1bb3X-9IbHrDMjHWWH>
- <https://www.youtube.com/watch?v=j5Hml6KN4TI>
- <https://www.youtube.com/watch?v=X9GHBdyYcyo>
- <https://www.youtube.com/watch?v=1xWBPZnEJk8>
- <https://www.youtube.com/watch?v=wRAo-M8xBHM>.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning:

- <https://www.vlab.co.in/broad-area-chemical-sciences>
- <https://demonstrations.wolfram.com/topics.php>
- <https://interestingengineering.com/science>

DEPARTMENT OF MECHANICAL ENGINEERING			
Choice Based Credit System (CBCS)			
SEMESTER – I/II			
COMPUTER AIDED ENGINEERING DRAWING (2:0:1) 3			
B.E(Common to all branches)			
(Effective from the academic year 2022-23)			
Course Code	BCEDK103	CIE Marks	50
Teaching Hours/Week (L:T:P)	2: 0: 2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3
Course Objectives:			
This course will enable students to:			
<ol style="list-style-type: none"> 1. Illustrate skills of visualizing points and lines to represent the same in two dimensions as per international standards, by manual and computational methods. 2. Apply orthographic projections of planes and simple three-dimensional objects. 3. Construct isometric projections of solids and development of lateral surfaces 			
Module – 1			
Preamble: Importance of Engineering Drawing, Industrial /defence application, research in the field of ME, Impact of the course on societal and sustainable solutions.			
Introduction to Engineering drawing			
Drawing Instruments and their uses, relevant BIS conventions and standards. Lettering, line conventions, dimensioning, material conventions, and free hand practicing. Coordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz., tangency, parallelism, inclination and perpendicularity.			
Orthographic Projections: Planes of projection.			
Projections of points in all the four quadrants.			
Projections of straight lines			
True length and True inclinations of a line, Apparent length and apparent inclinations of a line. Projection of straight line inclined to both the planes			
(8 Hours)			
Module – 2			
Projections of plane surfaces			
Introduction to projection of plane surfaces, Projection of Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes inclined to horizontal and vertical planes.			
(8 Hours)			
Module – 3			
Projections of solids			
Introduction to projections of Solids, Projections of right regular Prisms, Pyramids, Cones, Tetrahedron and Hexahedron (cube) inclined to both the planes.			
(12 Hours)			

Module - 4			
Isometric Projection Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones, Hemisphere and spheres. Isometric projection of combination of two solids.			
Development of lateral surfaces Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only. (8 Hours)			
Module - 5			
Application problems and Multidisciplinary exercises (CIE only) Application of projection of lines, planes, solids; Problems on application of isometric projections and development of lateral surfaces.			
Free hand sketching: True free hand, guided free hand, roads, buildings, utensils, hand tools and furniture etc.			
Graphs and charts: Column chart, Pie chart, Line chart, Gantt chart etc using Microsoft excel or suitable software. (4 Hours)			
Course Outcomes (COs): The students will be able to: CO1: Illustrate competence in orthographic projections of points and lines. CO2: Apply the concepts of orthographic projections of planes and solids pertaining to industrial drawings. CO3: Construct isometric drawings of objects and development of lateral surfaces.			
Continuous Internal Evaluation (CIE) <ul style="list-style-type: none"> • CIE shall be evaluated for max. marks of 100 and later the same shall be scaled-down to 50 marks as detailed below: • CIE component should comprise of Continuous evaluation of Drawing work of students based on below detailed weightage. 			
Module	Max. Marks Weightage	Evaluation Weightage in marks	
		Computer display and print out (a)	Sketching (b)
Module 1	35	15	20
Module 2	35	15	20
Module 3	60	20	40
Module 4	70	30	40
	200	80	120 (Scaled down to 20 Marks)
Total		80	20
Module 5	10	5	5
Consideration of Class work		Total of Modules 1 to 4 [(a) + (b)] = 100 marks will be scaled down to 20 Marks + 10 marks for AAT from Module 5 = 30	

	marks
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- Two tests covering all the modules is to be conducted and evaluation to be based on SEE pattern, and average marks is to be scaled down to **20 Marks**.
- The final CIE (50) = Class work marks (30) + Test marks (20)

Question paper pattern:

- Module 1 and Module 2 will have ONE question each. Student required to answer any ONE question.
- Module 3 will have TWO questions. Student required to answer any ONE question.
- Module 4 will have TWO questions. Student required to answer any ONE question.
- Module 5 is for understanding the application concepts and for practice using the necessary software. This module is not considered for SEE.

Scheme of Evaluation:

Each of the question will be distributed in to TWO segments. The first being **SKETCHING** to its actual scale in the sketch book followed by the second segment being **DRAFTING** using a relevant Graphics Software.

Q. No	Question Paper Pattern	Marks for SKETCHING	Marks for DRAFTING	TOTAL MARKS
1	Module 1 and Module 2	5	25	30
2	Module 3	10	30	40
3	Module 4	5	25	30
Total		20	80	100

Textbooks:

1. K.R. Gopalakrishna, *Engineering Graphics*, 32nd ed. Bangalore: Subhas Publications, 2013.
2. N.D. Bhatt, *Engineering Drawing*, 48th ed. Gujarat: V. M. Panchal Charutha Publishing House, 2005.

References:

1. A Primer on Computer Aided Engineering Drawing, 2nd edition, Published by VTU, Belagavi.
2. Luzadder Warren J., Duff John M Eastern, 2009, Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, 7th edition, Best Publications.
3. Parthasarathy N. S., Vela Murali, Engineering Drawing, Oxford University Press, 2015.

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – I

ESC- 1 Introduction to Electrical Engineering (3:0:0) 3

(Effective from the academic year 2022-23)

Course Code	BESCK104B/204B	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:

This course will enable students to:

1. To explain the sources of electric energy and its generation.
2. To explain the behaviour of circuit elements in single-phase circuits.
3. To explain the construction and operation of transformers, DC generators and motors and induction motors.
4. To introduce concepts of circuit protecting devices and earthing.
5. To explain electric power generation, transmission and distribution, electricity billing, equipment and personal safety measures.

Module – I

Introduction: Conventional and non-conventional energy resources; General structure of electrical power systems using single line diagram approach.

Power Generation: Hydel, Nuclear, Solar & wind power generation (Block Diagram approach).

DC Circuits:

Ohm's Law and its limitations. KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical.

Hands-on: Verification of KCL or KVL for a given circuit

(08 Hours)

Module – II

A.C. 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).

Hands-on: Measurement of circuit parameters (R, L, power factor) in a choke coil

(08 Hours)

Module – III

DC Machines:

DC Generator: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical.

DC Motor: Principle of operation, back emf and its significance. Torque equation, types of motors, characteristics and applications. Simple numerical.

Hands-on: Demonstration of speed control of DC motors

(08 Hours)

Module – IV

Transformers: Necessity of transformer, principle of operation, Types and construction of single-phase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical.

Three-phase induction Motors: Concept of rotating magnetic field, Principle of operation, constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance. simple numerical.

(08 Hours)

Module – V

Domestic Wiring: Requirements, Types of wiring: casing, capping. Two-way and three-way control of load.

Equipment Safety measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.

Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

Electricity Bill: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Definition of “unit” used for consumption of electrical energy, calculation of electricity bill for domestic consumers.

Hands-on: Demonstration of two-way and three-way control of lamp and earthing

(08 Hours)

Course Outcomes:

The students will be able to:

CO1: Understand the concepts of various energy sources and power generation

CO2: Apply the basic electrical laws to solve DC circuits.

CO3: Apply the basic electrical laws to solve AC circuits..

CO4: Understand the working and types electrical machine for practical implementation.

CO5: Explain the concepts of domestic wiring, circuit protective devices and personal safety measures.

Continuous Internal Evaluation (CIE)

		Internal Assessment	Max-marks	Average marks	Marks after Scale-Down	Final Marks
Theory Component	IA	IA-1 (1.5 hrs)	40	40	30	50 (Passing standard 40% i.e., 20 marks)
		IA-2 (1.5 hrs)	40			
		IA-3 (1.5 hrs)	40			

Semester End Examination (SEE)

Examination Duration- 3 Hrs

Max. Marks 100

		Max. Marks	Max. Marks	Final marks
No. of modules	05	200		

Theory Component	Questions/Module	02	40	100	50 (Passing standard 40% i.e., 20 marks)
	Marks/Question	20	20		
	No. of Question to be answered/module	01	20		
	No. of Questions to be answered /course	05	100		

Textbooks:

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. A text book of Electrical Technology by B.L. Theraja, S Chand and Company, reprint edition 2014

References:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill 4th edition, 2019.
2. Principles of Electrical Engineering & Electronics by V. K. Mehta, Rohit Mehta, S. Chand and Company Publications, 2nd edition, 2015.
3. Electrical Technology by E. Hughes, Pearson, 12th Edition, 2016.
4. Electrical and electronic measurements and instrumentation by A K Sawhney, Dhanapat Rai and Co. edition, January 2015



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I Semester

Course Title:	Introduction to Python Programming		
	PLC-1 (Common to all Branches)		
	Effective from the academic year 2022-2023		
Course Code:	BPLCK105/205B	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Course objectives:

- Learn the syntax and semantics of the Python programming language.
- Illustrate the process of structuring the data using lists, tuples
- Appraise the need for working with various documents like Excel, PDF, Word and Others.
- Demonstrate the use of built-in functions to navigate the file system.
- Implement the Object Oriented Programming concepts in Python.

Teaching-Learning Process

Pedagogy (General Instructions):

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective

1. Use <https://pythontutor.com/visualize.html#mode=edit> in order to visualize the python code
2. Demonstrate and visualize basic data types (list, tuple, dictionary).
3. Chalk and talk online and videos



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Module-1 (8 hours)

Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program, **Flow control:** Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys.exit(), **Functions:** def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number

Textbook 1: Chapters 1 – 3

Module-2 (8 hours)

Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References,

Dictionaries and Structuring Data: The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things,

Textbook 1: Chapters 4 – 5

Module-3 (8 hours)

Manipulating Strings: Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup

Reading and Writing Files: Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the print.format() Function, Project: Generating Random Quiz Files, Project: Multiclipboard,

Textbook 1: Chapters 6 , 8

Organizing Files: The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File,



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Module-4 (8 hours)

Debugging: Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE's Debugger.

Textbook 1: Chapters 9-10

Module-5 (8 hours)

Classes and objects: Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying,

Classes and functions: Time, Pure functions, Modifiers, Prototyping versus planning,

Classes and methods: Object-oriented features, Printing objects, Another example, A more complicated example, The init method, The str method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,

Textbook 2: Chapters 15 – 17

Course outcome (Course Skill Set)

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



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CO1	Demonstrate proficiency in handling loops and creation of functions.
CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
CO3	Develop programs for string processing and file organization
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
CO5	Apply the python concepts in real-time applications.
	<p>Programming Exercises:</p> <ol style="list-style-type: none"><ol style="list-style-type: none">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.Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.<ol style="list-style-type: none">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).Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary]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(), readlines(), and write()].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.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.Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N ($N \geq 2$) complex numbers and to compute the addition of N complex numbers.Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use_init () method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display the score card details.



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CONTINUOUS INTERNAL EVALUATION (CIE) PROGRAMMING LANGUAGE COURSES (PLC -I/II) L:T:P:: 2:0:2/ Credit: 03 Duration : 03						
		Internal Assessments (IAs)	Max. Marks	Average Marks	Marks after scale-down	Final Marks
Theory Component	IA	IA-1 (1.5 hr)	40	40	30 Marks	30+20 = 50
		IA-2 (1.5 hr)	40			
		IA-3 (1.5 hr)	40			
	Assignment	A-1 (1 hr)	10	10	Passing Standard (40% i. e 12 Marks)	
AAT	AAT-1(1 hr)	10				
Practical Component	Cumulative Marks of Experiments	10 Marks/ Expt. (Write-up, Conduction, Viva-voce, Report, etc.) (2 hrs /Week /batch (Strength:15)		15	20 Marks Passing Standard (40% i. e 08 Marks)	
	IA	IA-1 (02/03 hrs)	50	05		
SEMESTER END EXAMINATION (SEE) Examination Duration: 03 hrs Max. Marks: 100						
Note: The maximum of 04/05 questions to be set from the practical component of integrated course, the total marks of all questions should not be more than 30 marks.						
			Max. Marks	Max. Marks	Final Marks	
Theory Component	No. of Modules	05	200	30	50 Passing Standard (35% i.e 18 Marks)	
	Questions/Module	02	40			
	Marks/Question	20	20			
	No. of Questions to be answered/ module	01	20			
	No. of Questions to be answered/ course	05	100			
A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if CIE Score \geq 40 %, SEE Score \geq 35 %, and a sum total of CIE + SEE Score \geq 40%						



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Suggested Learning Resources:

Text Books

1. Al Sweigart, “**Automate the Boring Stuff with Python**”, 1st Edition, No Starch Press, 2015.
(Available under CC-BY-NC-SA license at <https://automatetheboringstuff.com/>)
(Chapters 1 to 18, except 12) for lambda functions use this link:
<https://www.learnbyexample.org/python-lambda-function/>
2. Allen B. Downey, “**Think Python: How to Think Like a Computer Scientist**”, 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at <http://greenteapress.com/thinkpython2/thinkpython2.pdf>)
(Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

Web links and Video Lectures (e-Resources):

- <https://www.learnbyexample.org/python/>
- <https://www.learnpython.org/>
- <https://pythontutor.com/visualize.html#mode=edit>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Quizzes for list, tuple, string dictionary slicing operations using below link

<https://github.com/sushantkhara/Data-Structures-And-Algorithms-with-Python/raw/main/Python%20%20%20400%20exercises%20and%20solutions%20for%20beginners.pdf>

Department of Humanities and Social Sciences Choice Based Credit System (CBCS) SEMESTER – I			
Communicative English (1:0:0) 1 (Common to all Branches) (Effective from the academic year 2022-2023)			
Course Code	BENGGK106	CIE Marks	50
Teaching Hours/Week (L: T:P)	1:0:0	SEE Marks	50
Total Number of Lecture Hours	15	Exam Hours	01
Course objectives: This course will enable students to <ol style="list-style-type: none"> 1. Familiarise with basic English Grammar and Communication Skills in general. 2. Identify the nuances of phonetics, intonation and enhance pronunciation skills 3. Enhance English vocabulary and language proficiency for better communication skills. 4. Learn about Techniques of Information Transfer through presentation. 			
Module – 1			
Preamble: Importance of English grammar, Vocabulary and Communication skills enhancing the employability skills of Engineering graduates.			
Introduction to Communicative English: Communicative English: Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different Styles and levels in Communicative English, Intrapersonal and Interpersonal Communication Skills. <p style="text-align: right;">3 hours</p>			
Module – 2			
Introduction to Phonetics: Phonetic Transcription, Sounds in Phonetics (44 sounds), Diphthongs, Consonants and Vowels, Pronunciation, Common errors in pronunciation, Word accent, Voice modulation, Tone and pitch, Mother Tongue Influence, Various Techniques for Neutralization of Mother Tongue Influence. <p style="text-align: right;">3 hours</p>			
Module – 3			
Introduction to English Grammar: Basic English Grammar: Parts of Speech, Use of Articles and Prepositions. Word Formation, One Word Substitution, Question Tags, Strong and weak forms of Words, Affixes (prefix and Suffix)- Exercises <p style="text-align: right;">3 hours</p>			
Module – 4			
Basic English Communicative Grammar and Vocabulary: Introduction to Vocabulary, All types of Vocabulary -Exercises, Tense and Types of Tenses, The Sequence of Tenses (rules in use) Exercises on Tenses, Abbreviations, Contractions, Word Pairs (Minimal Pairs) <p style="text-align: right;">3 hours</p>			
Module – 5			
Communication Skills for Employment: Information Transfer: Oral Presentation and its Practices. Difference between Extempore\ Public Speaking, Communication Guidelines, Reading and Listing Comprehension-Exercises. <p style="text-align: right;">3 hours</p>			

Course outcomes: The students will be able to:

1. Understand and apply basic English grammar for effective communication.
2. Identify the nuances of phonetics, intonation and enhance pronunciation skills.
3. Understand and use all types of English vocabulary and language proficiency.
4. Enhance their knowledge about techniques of information transfer through presentations.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE):

Two Unit Tests each of 30 Marks (duration 01 hour)

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

Two assignments each of 20 Marks

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others. The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and Pos (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks Semester End Examinations (SEE)

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour**. The student must secure a minimum of 35% of the maximum marks for SEE

Textbooks

1. Meenakshi Raman and Sangeeta Sharma, Technical Communication Principles and Practice, Oxford Publications, 3rd Edition, 2015
2. Sanjay Kumar and Pushpa Lata, Communication Skills, Oxford University Press,
3. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

References

1. Gajendra Singh Chauhan, Technical Communication Cengage Learning India Pvt Limited, Latest Revised Edition, 2019
2. Michael Swan, Practical English Usage, Oxford University Press, 2016
3. N.P.Sudharshana and C.Savitha, English for Engineers, Cambridge University Press ,2018

Department of Humanities and Social Sciences Choice Based Credit System (CBCS) SEMESTER – I/II			
Indian Constitution (1:0:0) 1 (Common to all Branches) (Effective from the academic year 2022-2023)			
Course Code	BICOK107/207	CIE Marks	50
Teaching Hours/Week (L: T:P)	1:0:0	SEE Marks	50
Total Number of Lecture Hours	15	Exam Hours	01
Course objectives: This course will enable students to Familiarize with the basic structure of our Indian Constitution. Understand the Concept of Fundamental Rights, Directive Principles of State Policy and Fundamental Duties. Enhance their knowledge on administrative mechanism at the Union and State government. Learn about elections, emergency provisions, amendments and Special constitutional provisions.			
Module – 1			
Preamble: Significance and Scope of the course, Importance of the course in societal, political and economic growth of the nation.			
Introduction and Basic information about the Indian Constitution: Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly. Salient Features. 3 Hours			
Module – 2			
Preamble and Fundamental Rights: Preamble of the Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its restriction and limitations in different Complex Situations. Case studies 3 Hours			
Module – 3			
Directive Principles of State Policy and Fundamental Duties: Directive Principles of State Policy- Importance and its relevance. Fundamental Duties and their significance. Special Constitutional Provisions for Schedule Castes, Schedule Tribes & Other Backward Classes and Women & Children. 3 Hours			
Module – 4			
Union and State Administration: The Union Executive-The President and The Vice President, The Prime Minister and The Council of Ministers, The Union Legislature -Lok Sabha & Rajya Sabha, Parliamentary Committees, Important Parliamentary Terminologies. The Union Judiciary- The Supreme Court of India and its jurisdiction. Judicial Review and Judicial Activism. The State Executive-The Governors, The Chief Ministers and The Council of Ministers, The State Legislature- Legislative Assembly and Legislative Council, The State Judiciary- The State High Courts and its jurisdiction. 3 Hours			
Module – 5			
Elections, Constitutional Amendments and Emergency Provisions: Elections-Electoral Process in India, Election Commission of India: Powers & Functions, Constitutional Amendments- methods and Important Constitutional Amendments ie 42 nd , 44 th , 61 st , 74 th , 76 th , 77 th , 86 th , 91 st , 100, 101 st , 118 th , Emergency Provisions-types and its effect. 3 Hours			

Course outcomes: The students will be able to:

1. Understand the basic structure of our Indian Constitution.
2. Analyse the Concept of Fundamental Rights, Directive Principles of State Policy and Fundamental Duties
3. Have knowledge on administrative mechanism at the Union and State government.
4. Understand the system of elections, emergency provisions, amendments and Special constitutional provisions.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE):

Two Unit Tests each of 30 Marks (duration 01 hour)

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

Two assignments each of 20 Marks

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others. The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and Pos (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks Semester End Examinations (SEE)

SEE paper shall be set for **50 questions, each of the 01 mark**. The pattern of the **question paper is MCQ** (multiple choice questions). The time allotted for SEE is **01 hour**. The student must secure a minimum of 35% of the maximum marks for SEE

Textbooks

1. “Constitution of India” (for Competitive Exams), Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2. Durga Das Basu (DD Basu): “Introduction to the Constitution of India” (Students Edition.) Prentice –Hall, 2008.

Reference Books:

1. Shubham Singles, Charles E. Haries, and et al, “Constitution of India, Professional Ethics and Human Rights”, Cengage Learning India, Latest Edition – 2019.
2. Merunandan K B, “The Constitution of India”, Merugu Publication, Second Edition, Bengaluru.
3. Justice H N Nagamohan Dhas “Samvidhana Odu” - for Students & Youths, Sahayana, kerekon.



BMS Institute of Technology & Management
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I Semester

Course Title:	Scientific Foundations of Health		
Course Code:	BSFHK158	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

Course objectives:

The course Scientific Foundations of Health (22SFH18/28) will enable the students,

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

Teaching-Learning Process These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective: Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools.

- (i) Direct instructional method (Low/Old Technology),
- (ii) Flipped classrooms (High/advanced Technological tools),
- (iii) Blended learning (Combination of both),
- (iv) Enquiry and evaluation based learning,
- (v) Personalized learning,
- (vi) Problems based learning through discussion,
- (vii) Following the method of expeditionary learning Tools and techniques,
- (viii) Use of audio visual methods. Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students. In theoretical applied and practical skills.



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Module-1 (03 hours)
Good Health & It's balance for positive mindset: Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.
Module-2 (3 hours)
Building of healthy lifestyles for better future: Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components for health, Wellness and physical function, How to avoid exercise injuries.
Module-3 (3 hours)
Creation of Healthy and caring relationships : Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviors through social engineering.
Module-4 (3 hours)
Avoiding risks and harmful habits : Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictive people and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.
Module-5 (3 hours)
Preventing & fighting against diseases for good health: How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.



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Course outcome (Course Skill Set)

At the end of the course Scientific Foundations of Health (22SFH18/28) the student will be able to:

CO1	Understand about Health and wellness (and its Beliefs) & It's balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	Study about avoiding risks and harmful habits in their campus and outside the campus for their bright future
CO5	Learn to fight against harmful diseases for good health through positive mindset.

CONTINUOUS INTERNAL EVALUATION (CIE)

SAMKRUTIKA KANNADA/BALAKE KANNADA/INDIAN CONSTITUTION /INNOVATION AND DESIGN THINKING /SCIENTIFIC FOUNDATIONS OF HEALTH

L:T:P:: 1:0:0/ Credit: 01

Duration: 01 hrs

		Internal Assessments (IAs)	Max. Marks	Average Marks	Marks after scale-down	Final Marks
Continuous Internal Evaluation Component	IA (MCQs)	IA-1 (1hr)	40	40	30	50
		IA-2 (1hr)	40			Passing Standard (40% i. e 20 Marks)
	Assignment	A-1 (1hr)	20	20	20	
	AAT	AAT-1(1 hr)	20			

SEMESTER END EXAMINATION (SEE)

Examination Duration: 01 hr

Max. Marks: 50

		Max. Marks	Final Marks
Theory Component (MCQs)	Marks/Question	1	50
	No. of Questions to be answered/course	50	50

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if **CIE Score ≥ 40 %**, **SEE Score ≥ 35 %**, and a sum total of **CIE + SEE Score ≥ 40%**



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Suggested Learning Resources:

Textbook:

1. **“Scientific Foundations of Health”** – Study Material Prepared by Dr. L Thimmesh, Published in VTU - University Website.
2. **“Scientific Foundations of Health”**- (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
3. **Health Psychology - A Textbook, FOURTH EDITION** by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

Reference Books:

1. **Health Psychology (Second edition)** by Charles Abraham, Mark Conner, Fiona Jones and Daryl O’Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
2. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles, McGraw Hill Education (India) Private Limited - Open University Press.
3. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
4. **Scientific Foundations of Health (Health & Wellness) - General Books** published for university and colleges references by popular authors and published by the reputed publisher.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments