



## 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 (Civil Engineering Stream)			Dept CV				(Chemistry Group )						
Sl. No	Course and CourseCode		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)	BMATC101	Mathematics for Civil Engg Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	BCHEC102	Chemistry for Civil Engg Stream-I	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	BCEDK103	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-I	BESCK104D	Introduction to Mechanical Engineering	Respective Dept	3	0	0	0	03	50	50	100	03
5	PLC-I	BPCK105B	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
<b>TOTAL</b>					<b>15</b>	<b>06</b>	<b>10</b>	<b>00</b>	<b>27</b>	<b>400</b>	<b>400</b>	<b>800</b>	<b>20</b>

**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,

<b>CIE</b> -Continuous Internal Evaluation, <b>SEE</b> - Semester End Examination, <b>IC</b> – Integrated Course (Theory Course Integrated with Practical Course)	
<p><b>*-BMATC101</b> Shall have the 03 hours of theory examination(SEE), however, practical sessions question shall be included in the theory question papers. <b>** The mathematics subject should be taught by single faculty member per division, with no sharing of the course(subject)module-wise by different faculty members.</b></p> <p><b>#-BCHEC102</b>- SEE shall have the 03 hours of theory examination and 02-03 hours of practical examination</p> <p><b>ESC or ETC of 03 credits Courses</b> 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 ).</p> <p><b>All 01 Credit-</b> courses shall have the SEE of 01 hours duration and the pattern of the question paper shall be MCQ</p>	
<p><b>Credit Definition:</b></p> <p>1- hour Lecture (<b>L</b>) per week=<b>1Credit</b></p> <p>2-hoursTutorial(<b>T</b>) per week=<b>1Credit</b></p> <p>2- hours Practical / Drawing (<b>P</b>) per week=<b>1Credit</b></p> <p>2-hous Skill Development Actives (<b>SDA</b>) per week = <b>1 Credit</b></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><b>Student's Induction Program:</b> 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 1<sup>st</sup> semester.</p>	
<p><b>AICTE Activity Points</b> 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 time during the semester weekends, and holidays, as per the liking and convenience of the student from the year of entry to the program. However, the minimum hour's 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>	



<b>(ESC-I) Engineering Science Courses-I</b>					<b>(ETC-I) Emerging Technology Courses-I</b>				
<b>Code</b>	<b>Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Code</b>	<b>Title</b>	<b>L</b>	<b>T</b>	<b>P</b>
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
<b>(PLC-I) Programming Language Courses-I</b>									
<b>Code</b>	<b>Title</b>	<b>L</b>	<b>T</b>	<b>P</b>					
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					
<b>The course BESCK104E, Introduction to C Programming, and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT</b>									

- The student has to select one course from the ESC-I group.
- Civil Engineering Students shall opt for any one of the courses from the ESC-I group **except, BESCK104A - Introduction to Civil Engineering**
- The students have to opt for the courses from ESC group without repeating the course in either 1<sup>st</sup> or 2<sup>nd</sup> semester
- The students must select one course from either ETC-I or PLC-I group.
- If students study the subject from ETC-I in 1<sup>st</sup> semester he/she has to select the course from PLC-II in the 2<sup>nd</sup> semester and vice-versa



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(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)

II Semester (Civil Engineering Stream)			Dept CV	(For the students who attended I semester under Chemistry Group)									
Sl. No	Course and CourseCode		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)	BMATC201	Mathematics for Civil Engineering-II	Maths	2	2	2	0	03	50	50	100	04
2	#ASC (IC)	BPHYC202	Physics for Civil Engineering	PHY	2	2	2	0	03	50	50	100	04
3	ESC	BCIVC203	Engineering Mechanics	Civil Engineering Dept	2	2	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	BETCK205B / BETCK205D	Green Building/ Introduction to Sustainable Engineering	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/ BalakeKannada	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
<b>TOTAL</b>					<b>13</b>	<b>8</b>	<b>6</b>	<b>0</b>	<b>19</b>	<b>400</b>	<b>400</b>	<b>800</b>	<b>20</b>
<p><b>SDA</b>-Skill Development Activities, <b>TD/PSB</b>- Teaching Department / Paper Setting Board, <b>ASC</b>-Applied Science Course, <b>ESC</b>- Engineering Science Courses, <b>ETC</b>- Emerging Technology Course, <b>AEC</b>- Ability Enhancement Course, <b>HSMC</b>-Humanity and Social Science and management Course, <b>SDC</b>- Skill Development Course, <b>CIE</b> -Continuous Internal Evaluation, <b>SEE</b>- Semester End Examination, <b>IC</b> - Integrated Course (Theory Course Integrated with Practical Course)</p>													
<p>BMATC201 Shall have the 03 hours of theory examination(SEE), however, practical sessions question shall be included in the theory question papers. <b>** The mathematics subject should be taught by single faculty member per division, with no sharing of the course(subject)module-wise by different faculty</b></p>													

members.

#- BPHYC202 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 experimental learning then the syllabus shall be designed as an **Integrated course (L:T:P:S= 2:0:2:0 )**. However, there is no SEE for the practical component.

**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
					BETCK205I	Introduction to Cyber Security	3	0	0
					BETCK205J	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					
<b>The course BESCK204E, Introduction to C Programming, and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT</b>									

- The student has to select one course from the ESC-II group.
- Civil Engineering Students shall opt for any one of the courses from the ESC-II group **except**, BESCK204A- Introduction to **Civil Engineering**
- The students have to opt for the courses from ESC group without repeating the course in either 1<sup>st</sup> or 2<sup>nd</sup> semester
- The students must select one course from either ETC-II or PLC-II group.
- If students study the subject from ETC-I in 1<sup>st</sup> semester he/she has to select the course from PLC-II in the 2<sup>nd</sup> semester and vice-versa



**BMS Institute of Technology & Management**  
 (An Autonomous Institute under VTU, Belagavi, Karnataka - 590018)  
 Avalahalli, Doddaballapur Main Road, Bengaluru – 560064

**I Semester**

Course Title:	<b>Mathematics-I for Civil Engineering stream</b>		
Course Code:	<b>BMATC101</b>	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 (22MATC11)** is to

- **Familiarize** the importance of calculus associated with one variable and two variables for civil engineering.
- **Analyze** Civil engineering problems applying Ordinary Differential Equations.
- **Develop** the knowledge of Linear Algebra refereeing to matrices.

**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).

**Module-1 Calculus (8 hours)**

**Introduction to polar coordinates and curvature relating to Civil engineering.**

Polar coordinates, Polar curves, angle between the radius vector and the 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:** Structural design and paths, Strength of materials, Elasticity.

**(RBT Levels: L1, L2 and L3)**

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

### Introduction to series expansion and partial differentiation in the field of Civil 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:** Computation of stress and strain, Errors and approximations, Estimating the critical points and extreme values.

(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 the Civil 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, Newton's law of cooling.

**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:** Rate of Growth or Decay, Conduction of heat.

(RBT Levels: L1, L2 and L3)

## Module-4 Ordinary Differential Equations of higher order (8 hours)

### Importance of higher-order ordinary differential equations in Civil Engineering applications.

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

**Self-Study:** Formulation and solution of Cantilever beam. Finding the solution by the method of undetermined coefficients.

**Applications:** Oscillations of a spring, Transmission lines, highway engineering.

(RBT Levels: L1, L2 and L3)

## Module-5 Linear Algebra (8 hours)

### Introduction of linear algebra related to Civil Engineering applications.

Elementary row transformation of a matrix, Rank of a matrix. Consistency and solution of a 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:** Solution of a system of linear equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem.

**Applications:** Structural Analysis, Balancing equations.

(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	Solutions of Second order ordinary differential equations with initial/boundary conditions
7	Solution of a differential equation of oscillations of a spring/deflection of a beam with different loads
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	Analyze the solution of linear and non linear ordinary differential equations.
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, 44<sup>th</sup> Ed., 2021.
2. **E. Kreyszig:** "Advanced Engineering Mathematics", John Wiley & Sons, 10<sup>th</sup> Ed., 2018.

**Reference Books**

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11<sup>th</sup> Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia:** "Engineering Mathematics" Oxford University Press, 3<sup>rd</sup> Ed., 2016.
3. **N.P Bali and Manish Goyal:** "A textbook of Engineering Mathematics" Laxmi Publications, 10<sup>th</sup> Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., Newyork, 6<sup>th</sup> Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.



6. **H. K. Dass and Er. Rajnish Verma:** “Higher Engineering Mathematics” S. Chand Publication, 3<sup>rd</sup> Ed., 2014.
7. **James Stewart:** “Calculus” Cengage Publications, 7<sup>th</sup> Ed., 2019.
8. **David C Lay:** “Linear Algebra and its Applications”, Pearson Publishers, 4<sup>th</sup> Ed., 2018.  
**Gareth Williams:** “Linear Algebra with applications”, Jones Bartlett Publishers Inc., 6<sup>th</sup>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

**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**

<b>DEPARTMENT OF CHEMISTRY</b> Choice Based Credit System (CBCS) CVE Stream SEMESTER – I/II			
<b>Engineering Chemistry (2:2:2:0) 4</b> (Effective from the academic year 2022-23)			
Course Title	Chemistry for CV Stream		
Course Code	<b>BCHE102/202</b>	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
<b>Course Objectives:</b> This course will enable students to: <ol style="list-style-type: none"> <li>To identify various sustainable technologies in engineering applications.</li> <li>To develop problem solving, critical thinking and analytical reasoning towards scientific problems.</li> <li>To distinguish the use of smart materials for latest development in material research.</li> <li>To appraise the significance of engineering chemistry for industrial and domestic applications.</li> </ol>			
<b>Module – 1</b>			
<p><b>Preamble:</b> 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><b>Electrochemistry:</b> Introduction, Single electrode potential &amp; EMF, derivation of Nernst equation for single electrode potential, numerical problems on <math>E_{cell}</math>. Concentration cell and numerical problems. Types of Electrodes: Primary and Secondary reference electrodes with example. Construction and working principle of Calomel electrode. Ion-selective electrode: Definition and example. Glass electrode: Construction, working and determination of pH using glass electrode.</p> <p><b>Storage devices:</b> Introduction, Construction, working and applications of Li-ion Battery.</p> <p><b>Self-study:</b> Concept of Electrochemical Cell and more numericals on <math>E_{cell}</math>. SHE Electrode. Characteristics of a battery: cell potential, current, capacity, electricity storage density, energy efficiency, cycle life and shelf life.</p>			
(8Hours)			
<b>Module – 2</b>			
<p><b>Corrosion Science:</b> Introduction to corrosion. Consequences of corrosion, Types of Corrosion: Chemical and electrochemical corrosion, differential metal corrosion, differential aeration corrosion (waterline and pitting corrosion). Factors affecting corrosion: Nature of metal, nature of corrosion product, ratio of anodic area to cathodic area, nature of environment (pH, temperature, conductivity). Corrosion control: Cathodic protection- Sacrificial anode method and Impressed current method. Protective metal coatings – Cathodic and Anodic coatings- Galvanization and Tinning.</p> <p><b>Electroplating:</b> Principle. Electroplating of Chromium- Hard and Decorative Cr plating. Electroless plating: Principle. Electroless plating of copper.</p>			

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

<p><b>Self-study:</b> Corrosion Inhibitors</p> <p style="text-align: right;">(8 Hours)</p>
<p><b>Module – 3</b></p>
<p><b>Water technology:</b> Introduction, water parameters, hardness of water, determination of temporary, permanent and total hardness by EDTA method, numerical problems, softening of water by ion exchange method, Reverse osmosis, desalination of water by electrodialysis, determination of COD, numerical problems.</p> <p><b>Nanotechnology:</b> Introduction, classification and properties of nanomaterials (surface area and catalytic). Synthesis of nanomaterials by Sol-gel method, Chemical Vapour Deposition.</p> <p><b>Nanomaterials:</b> Introduction, properties and applications –graphene, carbon nanotubes, and nanomaterials for water treatment.</p> <p><b>Self-study:</b> Applications of nanomaterials in various industries. Carbon nanowires, and nanocomposites. Sewage treatment (Primary, secondary and tertiary)</p> <p style="text-align: right;">(8 Hours)</p>
<p><b>Module – 4</b></p>
<p><b>Construction Binders and Refractories:</b></p> <p><b>Inorganic construction Binders:</b> Introduction and Classification of binders</p> <p><b>Hydraulic binders:</b> Cement, Types – Portland and Aluminate Cement, General composition, Properties: Physical and chemical, Manufacture of Portland cement, Setting and hardening of cement, Factors influencing the binding of cement: Degree of grain finesse, Temperature, Admixtures/additive, Transformation processes in the hardened cement. Properties of a good cement and uses of cement.</p> <p><b>Non hydraulic binders:</b> Lime and Gypsum, Production of Lime, Gypsum and their applications.</p> <p><b>Refractories:</b> Definition, Classification with Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material.</p> <p><b>Self-study:</b> Composite materials in construction</p> <p style="text-align: right;">(8 Hours)</p>
<p><b>Module – 5</b></p>
<p><b>Lubricants &amp; Polymers:</b></p> <p><b>Lubricants:</b> Introduction, Classification of Lubricants: Liquid, Solid and Semi solid lubricants, Properties of lubricants, Mechanism of Lubricants: Fluid or Hydrodynamic Lubrication, Thin film or Boundary lubrication &amp; Extreme pressure lubrication. Application of lubricants.</p> <p><b>Polymers:</b> Types of Polymerization. Thermoplastics &amp; thermosetting polymers.</p> <p>Conducting polymers: Introduction, mechanism of conduction in Poly aniline and applications of conducting polyaniline.</p> <p><b>Geo polymer concrete:</b> Introduction, synthesis, constituents, properties and applications.</p> <p><b>Self-study:</b> Composite materials in polymer applications</p> <p style="text-align: right;">(8 Hours)</p>
<p><b>Course outcomes:</b></p> <p>The students will be able to:</p> <p>CO1: To identify various sustainable technologies in engineering applications.</p> <p>CO2: To develop problem solving, critical thinking and analytical reasoning towards scientific problems.</p> <p>CO3: To distinguish the use of smart materials for latest development in material research</p>

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

CO4: To Solve for the problems in chemistry that are pertinent in engineering applications.

**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
<b>Theory Component</b>	IA	IA-1 (1.5 hrs.)	40	<b>30</b>	<b>30 Marks</b>	<b>30+20 = 50</b>
		IA-2 (1.5 hrs.)	40			
		IA-3 (1.5 hrs.)	40			
	Assignment	A1 (1 hr)	10	<b>10</b>	<b>Passing standard</b> (40% i.e., 12 marks)	
AAT	AAT-1 (1 hr)	10				
<b>Lab Component</b>	Cumulative marks of experiments	30 marks per experiment (conduction, calculation, viva, report, record submission, 2hrs/per week, batch strength: 18)	-	<b>15</b>	<b>20 Marks</b>	<b>Passing standard</b> (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	100	<b>50</b> <b>Passing standard</b> (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:** 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  $\geq 40$  %**.

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

## **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-9IbHrDMjHWWWh>
- <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>

<b>DEPARTMENT OF MECHANICAL ENGINEERING</b>			
<b>Choice Based Credit System (CBCS)</b>			
<b>SEMESTER – I/II</b>			
<b>COMPUTER AIDED ENGINEERING DRAWING (2:0:1) 3</b>			
B.E.(Common to all branches)			
(Effective from the academic year 2022-23)			
Course Code	<b>BCEDK103/203</b>	CIE Marks	50
Teaching Hours/Week (L:T:P)	2: 0: 2	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3
<b>Course Objectives:</b>			
This course will enable students to:			
<ol style="list-style-type: none"> <li>1. Illustrate skills of visualizing points and lines to represent the same in two dimensions as per international standards, by manual and computational methods.</li> <li>2. Apply orthographic projections of planes and simple three-dimensional objects.</li> <li>3. Construct isometric projections of solids and development of lateral surfaces</li> </ol>			
<b>Module – 1</b>			
<b>Preamble:</b> Importance of Engineering Drawing, Industrial /defence application, research in the field of ME, Impact of the course on societal and sustainable solutions.			
<b>Introduction to Engineering drawing</b>			
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.			
<b>Projections of points</b> in all the four quadrants.			
<b>Projections of straight lines</b>			
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)			
<b>Module – 2</b>			
<b>Projections of plane surfaces</b>			
Introduction to projection of plane surfaces, Projection of Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes inclined to horizontal and vertical planes.			
(8 Hours)			
<b>Module – 3</b>			
<b>Projections of solids</b>			
Introduction to projections of Solids, Projections of right regular Prisms, Pyramids, Cones, Tetrahedron and Hexahedron (cube) inclined to both the planes.			
(12 Hours)			



<b>Module – 4</b>			
<b>Isometric Projection</b>			
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.			
<b>Development of lateral surfaces</b>			
Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.			
(8 Hours)			
<b>Module – 5</b>			
<b>Application problems and Multidisciplinary exercises (CIE only)</b>			
Application of projection of lines, planes, solids; Problems on application of isometric projections and development of lateral surfaces.			
<b>Free hand sketching:</b> True free hand, guided free hand, roads, buildings, utensils, hand tools and furniture etc.			
<b>Graphs and charts:</b> Column chart, Pie chart, Line chart, Gantt chart etc using Microsoft excel or suitable software.			
(4 Hours)			
<b>Course Outcomes (COs):</b>			
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.			
<b>Continuous Internal Evaluation (CIE)</b>			
<ul style="list-style-type: none"> <li>• CIE shall be evaluated for max. marks of 100 and later the same shall be scaled-down to 50 marks as detailed below:</li> <li>• CIE component should comprise of Continuous evaluation of Drawing work of students based on below detailed weightage.</li> </ul>			
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)
<b>Total</b>		<b>80</b>	<b>20</b>
Module 5	10	5	5
<b>Consideration of Class work</b>	<b>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</b>		

	<b>marks</b>
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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>DEPARTMENT OF MECHANICAL ENGINEERING</b>			
<b>Choice Based Credit System (CBCS)</b>			
SEMESTER – I/II			
<b>INTRODUCTION TO MECHANICAL ENGINEERING (3:0:0) 3</b>			
<b>ESC-1 (Common to all Branches)</b>			
(Effective from the academic year 2022-23)			
Course Code	<b>BESCK104D</b>	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3
<b>Course Objectives:</b>			
This course will enable students to:			
<ol style="list-style-type: none"> <li>1. Identify different sources of energy and their conversion process.</li> <li>2. Explain the working principle of IC engines, EV's, Hybrid electric vehicles, refrigerator and air conditioner.</li> <li>3. Recognize various metal joining processes and power transmission elements.</li> <li>4. Discuss the working of advanced machine tools and automation.</li> <li>5. Describe the functions of robotics and concepts of IoT.</li> </ol>			
<b>Module – 1</b>			
<b>Preamble:</b> Importance of Mechanical Engineering in the current scenario, impact of Mechanical Engineering on societal and sustainable solutions.			
<b>Energy sources:</b> Fossil Fuels: Solid, liquid and gaseous fuels; Solar power: principle of conversion, flat plate collector; wind energy: conversion, wind mill and Hydro power: hydro power station.			
<b>Refrigeration and air-conditioner:</b> Refrigerants and its properties, parts of refrigerator, terminology, principle of vapour compression refrigeration, concept of air conditioning, working of room air conditioner.			
(8 Hours)			
<b>Self- Study:</b> Environmental issues.			
<b>Module – 2</b>			
<b>Internal Combustion Engines:</b> Parts, terminology, working of 4 stroke petrol and diesel engine, comparison between petrol and diesel engine			
<b>Electric vehicles (EV) and Hybrid Electric vehicles (HEV):</b> Basic principles of EV and HEV. Components of EV and HEV. Power transmission in EV and HEV.			
(7 Hours)			
<b>Self- Study:</b> Autonomous vehicles.			
<b>Module – 3</b>			
<b>Metal Joining Processes:</b> Types of joining processes: Permanent and temporary joining, Soldering: method, types, advantages; Welding: Principle of Arc, TIG and MIG welding.			

<p><b>Power Transmission:</b> Types of belts, Open and cross belt-drives, pulleys and its types; Types of gear drives, advantages and disadvantages of gear drives over belt drives.</p> <p><b>Hands on Training:</b> Soldering, arc, gas, MIG and TIG welding (9 hours)</p> <p><b>Self- Study:</b> Application of drive systems.</p>	
<b>Module – 4</b>	
<p><b>Computer Numerical Control (CNC) machines:</b> Elements of a CNC system, salient features of CNC controls, advantages and disadvantages of CNC.</p> <p><b>Industrial Automation:</b> Types of automation: Fixed, programmable and flexible automation; basic elements with block diagrams.</p> <p><b>Lab Visit:</b> Demonstration of CNC machine tool. (8 hours)</p> <p><b>Self- Study:</b> 3D printing technologies and applications.</p>	
<b>Module – 5</b>	
<p><b>Robotics:</b> Elements of robotic system, type of robotic joints; robotics configuration: polar, cylindrical, cartesian; applications of robots: material handling, process operation and assembly and inspection; advantages and disadvantages of industrial robotics.</p> <p><b>Internet of Things (IoT):</b> Fundamental concept, definition and characteristics, things in IoT, IoT functional blocks and IoT communication models.</p> <p><b>Lab Visit:</b> Demonstration of pick and place robot. (8 hours)</p> <p><b>Self- Study:</b> IoT in industry.</p>	
<p><b>Course Outcomes:</b> The students will be able to:</p>	
CO1:	Summarize various energy conversions, refrigeration system and air conditioners.
CO2:	Describe working principles of power transmission systems and advanced mobility systems.
CO3:	Identify suitable conventional and advanced manufacturing processes for real world applications.
CO4:	Demonstrate ability to work as an individual and a team member to investigate the recent technologies by self-learning.

**Assessment Methods:**

CONTINUOUS INTERNAL EVALUATION (CIE)						
		Internal Assessments	Max. Marks	Average Marks	Marks after scale-down	Final Marks
Theory Component	IA	IA-1 (1.5 hrs)	40	40	30	50 <b>Passing Standard</b> (40% i. e 20 Marks)
		IA-2 (1.5 hrs)	40			
		IA-3 (1.5 hrs)	40			
	Assignment	A-1 (1hr)	20	20	20	
	AAT	AAT-1 (1 hr)	20			
SEMESTER END EXAMINATION (SEE)						
Examination Duration: 03 hrs			Max. Marks: 100			
			Max. Marks		Max. Marks	Final Marks
Theory Component	No. of Modules	05	200	100	100	50 <b>Passing Standard</b> (40% i. e 20 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 <b>CIE Score <math>\geq 40\%</math>, SEE Score <math>\geq 35\%</math>, and a sum total of CIE + SEE Score <math>\geq 40\%</math></b>						

**Textbooks:**

1. K. R. Gopalakrishna, "Elements of Mechanical Engineering", Subhas Publications, 38<sup>th</sup> Edition, 2019.
2. K. P Roy, "Elements of Mechanical Engineering", Media Promoters & Publishing Pvt. Ltd, 7<sup>th</sup> Edition, 2014.

**References:**

1. S. Trymbaka Murthy, "Text book of Elements of Mechanical Engineering", MEDTECH, Scientific International Pvt Ltd, 1<sup>st</sup> Edition, 2019.
2. Husain, Iqbal, "Electric and Hybrid Vehicles: Design Fundamentals", CRC Press, 3<sup>rd</sup> Edition, 2021.
3. Arshdeep Bahga, Vijay Madiseti, "Internet of Things a Hands on Approach", Hyderabad Universities Press, 2020.
4. Dr. A. S. Ravindra, "Elements of Mechanical Engineering", Best Publications, 7<sup>th</sup> Edition, 2009.



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**I Semester**

Course Title:	<b>Introduction to Python Programming</b>		
<b>PLC-1 (Common to all Branches)</b>			
Effective from the academic year 2022-2023			
Course Code:	<b>BPLCK105B</b>	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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<b>Module-4 (8 hours)</b>
<b>Debugging:</b> Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE's Debugger. <b>Textbook 1: Chapters 9-10</b>
<b>Module-5 (8 hours)</b>
<b>Classes and objects:</b> Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying, <b>Classes and functions:</b> Time, Pure functions, Modifiers, Prototyping versus planning, <b>Classes and methods:</b> 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,  <b>Textbook 2: Chapters 15 – 17</b>
<b>Course outcome (Course Skill Set)</b> 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><b>Programming Exercises:</b></p> <ol style="list-style-type: none"><li><ol style="list-style-type: none"><li>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.</li><li>Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.</li></ol></li><li><ol style="list-style-type: none"><li>Develop a program to generate Fibonacci sequence of length (N). Read N from the console.</li><li>Write a function to calculate factorial of a number. Develop a program to compute binomial coefficient (Given N and R).</li></ol></li><li>Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.</li><li>Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.</li><li>Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary]</li><li>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()].</li><li>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.</li><li>Write a function named DivExp which takes TWO parameters a, b and returns a value c (<math>c=a/b</math>). Write suitable assertion for <math>a&gt;0</math> in function DivExp and raise an exception for when <math>b=0</math>. Develop a suitable program which reads two values from the console and calls a function DivExp.</li><li>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 (<math>N \geq 2</math>) complex numbers and to compute the addition of N complex numbers.</li><li>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.</li></ol>



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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	<b>Passing Standard</b> (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 <b>Passing Standard</b> (40% i. e 08 Marks)	
	IA	IA-1 (02/03 hrs)	50	05		
SEMESTER END EXAMINATION (SEE) Examination Duration: 03 hrs Max. Marks: 100						
<b>Note:</b> 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 <b>Passing Standard</b> (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 <b>CIE Score</b> $\geq 40\%$ , <b>SEE Score</b> $\geq 35\%$ , and a sum total of <b>CIE + SEE Score</b> $\geq 40\%$						



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**Suggested Learning Resources:**

**Text Books**

1. Al Sweigart, “Automate the Boring Stuff with Python”, 1<sup>st</sup> 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”, 2<sup>nd</sup> 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%203%20%20400%20exercises%20and%20solutions%20for%20beginners.pdf>

<b>Department of Humanities and Social Sciences</b> <b>Choice Based Credit System (CBCS)</b> <b>SEMESTER – I</b>			
<b>Communicative English (1:0:0) 1</b> (Common to all Branches) (Effective from the academic year 2022-2023)			
Course Code	<b>BENGGK106</b>	CIE Marks	50
Teaching Hours/Week (L: T:P)	1:0:0	SEE Marks	50
Total Number of Lecture Hours	15	Exam Hours	01
<b>Course objectives:</b> This course will enable students to <ol style="list-style-type: none"> <li>1. Familiarise with basic English Grammar and Communication Skills in general.</li> <li>2. Identify the nuances of phonetics, intonation and enhance pronunciation skills</li> <li>3. Enhance English vocabulary and language proficiency for better communication skills.</li> <li>4. Learn about Techniques of Information Transfer through presentation.</li> </ol>			
Module – 1			
<b>Preamble: Importance of English grammar, Vocabulary and Communication skills enhancing the employability skills of Engineering graduates.</b>			
<b>Introduction to Communicative English:</b> 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. <span style="float: right;"><b>3 hours</b></span>			
Module – 2			
<b>Introduction to Phonetics:</b> 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. <span style="float: right;"><b>3 hours</b></span>			
Module – 3			
<b>Introduction to English Grammar:</b> 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 <span style="float: right;"><b>3 hours</b></span>			
Module – 4			
<b>Basic English Communicative Grammar and Vocabulary:</b> 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) <span style="float: right;"><b>3 hours</b></span>			
Module – 5			
<b>Communication Skills for Employment:</b> Information Transfer: Oral Presentation and its Practices. Difference between Extempore\ Public Speaking, Communication Guidelines, Reading and Listing Comprehension-Exercises. <span style="float: right;"><b>3 hours</b></span>			

**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, 3<sup>rd</sup> 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



<b>Department of Humanities and Social Sciences</b> <b>Choice Based Credit System (CBCS)</b> <b>SEMESTER – I/II</b>			
<b>Indian Constitution (1:0:0) 1</b> (Common to all Branches) (Effective from the academic year 2022-2023)			
Course Code	<b>BICOK107/207</b>	CIE Marks	50
Teaching Hours/Week (L: T:P)	1:0:0	SEE Marks	50
Total Number of Lecture Hours	15	Exam Hours	01
<b>Course objectives:</b> 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.			
<b>Module – 1</b>			
<b>Preamble:</b> Significance and Scope of the course, Importance of the course in societal, political and economic growth of the nation. <b>Introduction and Basic information about the Indian Constitution:</b> 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. <b>3 Hours</b>			
<b>Module – 2</b>			
<b>Preamble and Fundamental Rights:</b> 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 <b>3 Hours</b>			
<b>Module – 3</b>			
<b>Directive Principles of State Policy and Fundamental Duties:</b> 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. <b>3 Hours</b>			
<b>Module – 4</b>			
<b>Union and State Administration:</b> 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. <b>3 Hours</b>			
<b>Module – 5</b>			
<b>Elections, Constitutional Amendments and Emergency Provisions:</b> Elections-Electoral Process in India, Election Commission of India: Powers & Functions, Constitutional Amendments- methods and Important Constitutional Amendments ie 42 <sup>nd</sup> , 44 <sup>th</sup> , 61 <sup>st</sup> , 74 <sup>th</sup> , 76 <sup>th</sup> , 77 <sup>th</sup> , 86 <sup>th</sup> , 91 <sup>st</sup> , 100, 101 <sup>st</sup> , 118 <sup>th</sup> , Emergency Provisions-types and its effect. <b>3 Hours</b>			

**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
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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.



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**I Semester**

Course Title:	<b>Scientific Foundations of Health</b>		
Course Code:	<b>BSFHK158</b>	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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<b>Module-1 (03 hours )</b>
<b>Good Health &amp; It's balance for positive mindset:</b> 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.
<b>Module-2 (3 hours)</b>
<b>Building of healthy lifestyles for better future:</b> 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.
<b>Module-3 (3 hours)</b>
<b>Creation of Healthy and caring relationships :</b> 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.
<b>Module-4 (3 hours)</b>
<b>Avoiding risks and harmful habits :</b> 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.
<b>Module-5 (3 hours)</b>
<b>Preventing &amp; fighting against diseases for good health:</b> 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 Thimmesha, 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