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 (CSE Stream) **Dept AI/ML** **(Physics 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)	BMATS101	Mathematics for CSE Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	BPHYS102	Physics for CSE stream	Physics	2	2	2	0	03	50	50	100	04
3	ESC	BPOPS103	Principles of Programming Using C	CSE	2	0	2	0	03	50	50	100	03
4	ESC-I	BESCK104C	Introduction to Electronics Engineering	Respective Engg Dept	3	0	0	0	03	50	50	100	03
5	ETC-I	BETCK105H	Introduction to Internet of Things (IoT)	Any Dept	3	0	0	0	03	50	50	100	03
6	AEC	BENGK106	Communicative English	Humanities	1	0	0	0	01	50	50	100	01
7	HSMC	BKSKK107/ BKBKK107	Samskrutika Kannada/ BalakeKannada	Humanities	1	0	0	0	01	50	50	100	01
8	AEC/SDC	BIDTK158	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**

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)

Credit Definition: 3- hour Lecture **(L)** per week=**1Credit** 2-hoursTutorial**(T)** per week=**1Credit** 4- hours Practical / Drawing (**P**) per week=**1Credit** **2-**hous Skill Development Actives **(SDA)** per week = **1 Credit**	04-Credits courses are to be designed for 50 hours of Teaching-Learning Session 04-Credits (IC) are to be designed for 40 hours' theory and 12-14 hours of practical sessions 03-Credits courses are to be designed for 40 hours of Teaching-Learning Session 02- Credits courses are to be designed for 25 hours of Teaching-Learning Session 01-Credit courses are to be designed for 12-15 hours of Teaching-Learning sessions
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.	
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 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 hours' 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.	
***-BMATS101** 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.** **#-BPHYS102** 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 then, 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-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 ANY DEPARTMENT									

- The student has to select one course from the ESC-I group.
- CSE/ISE and allied branches Students shall opt for any one of the courses from the ESC-I group **except,** BESCK104E**-Introduction to C Programming**
- 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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(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 (CSE Stream) **Dept AI/ML** **(For students attended 1st semester under Physics 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)	BMATS201	Mathematics for CSE Stream-II	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	BCHES202	Chemistry for CSE Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	BCEDK203	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-II	BESCK204D	Introduction to Mechanical Engineering	Respective Engg Dept	3	0	0	0	03	50	50	100	03
5	PLC-II	BPLCK205D	Introduction to C++ Programming	Any Dept	2	0	2	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	HSMS	BICOK207	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
8	HSMS	BSFHK258	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 Evaluation, **SEE**- Semester End Examination, **IC** – Integrated Course (Theory Course Integrated with Practical Course)
***-BMATS201** 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.** **#- BCHES202-** 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 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
					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					
The course BESCK204E, Introduction to C Programming, and all courses under PLC and ETC groups can be taught by ANY DEPARTMENT									

- The student has to select one course from the ESC-II group.
- CSE/ISE and allied branches Students shall opt for any one of the courses from the ESC-II group **except, BESCK2O4E-Introduction to C Programming**
- 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

BMS Institute of Technology & Management

(An Autonomous Institute under VTU, Belagavi, Karnataka - 590018)
Avalahalli, Doddaballapur Main Road, Bengaluru – 560064

I Semester

Course Title:	**Mathematics-I for Computer Science and Engineering stream**		
Course Code:	**BMATS101**	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, Modular arithmetic and Linear Algebra** (**22MATS11**) is to

- **Familiarize** the importance of calculus associated with one variable and multivariable for computer science and engineering.
- **Analyze** computer science and engineering problems applying Ordinary Differential Equations.
- **Apply** the knowledge of modular arithmetic to computer algorithms.
- **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).

Module-1 Calculus (8 hours)

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

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: Computer graphics, 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 Computer Science & 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 computer programming, Errors and approximations, calculators.

(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 for Computer Science & 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 & C-R circuits. Problems.

Non-linear differential equations: Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, **r**educible to Clairaut's equations. **Problems.**

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

Applications of ordinary differential equations: L-R & C-R circuits, Rate of Growth or Decay, Conduction of heat.

(RBT Levels: L1, L2 and L3)

Module-4 Modular Arithmetic (8 hours)

Introduction of modular arithmetic and its applications in Computer Science and Engineering.
Introduction to Congruences, Linear Congruences, The Chinese Remainder theorem, Solving Polynomials, Linear Diophantine Equation, System of Linear Congruences, Euler's Theorem, Wilson Theorem and Fermat's little theorem. Applications of Congruences-RSA algorithm.

Self-Study: Divisibility, GCD, Properties of Prime Numbers, Fundamental theorem of Arithmetic.
Applications: Cryptography, encoding and decoding, RSA applications in public key encryption.
(RBT Levels: L1, L2 and L3)

Module-5 Linear Algebra (8 hours)

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

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

Applications: Boolean matrix, 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	Finding GCD using Euclid's Algorithm
7	Applications of Wilson theorem
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	get Acquainted and to Apply modular arithmetic to computer algorithms.

CO4	make use of matrix theory for solving for system of linear equations and compute 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 – Hill Book Co., Newyork, 6th 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, 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.
10. **William Stallings:** "Cryptography and Network Security" Pearson Prentice Hall, 6th Ed., 2013.

Web links and Video Lectures (e-Resources):

- http://nptel.ac.in/courses.php?disciplineID=111
- 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

DEPARTMENT OF PHYSICS
Choice Based Credit System (CBCS)
SEMESTER - I/II

PHYSICS FOR CSE STREAM (2:2:2) 4
(SPECIFIC TO CSE STREAM BRANCHES)
(Effective from the academic year 2022 -2023)

Course Code	**BPHYS102/202**	**CIE Marks**	**50**
Teaching Hours/Week (L:T:P:S)	**2:2:2:0**	**SEE Marks**	**50**
Total Number of contact Hours Theory/lab sessions	**40 hrs./12 lab sessions**	**Exam Hours**	**3**
Course type	**Integrated**	**Credit**	**4**

Course Objectives:
This course will enable students to:

- Identify the fundamental concepts related to conductivity in materials and photonics, theory of quantum mechanics and Quantum computing.
- Elucidate the significance of principles of quantum mechanics in quantum computing.
- Apply the knowledge in solving the problems on photonics, conductivity, and quantum mechanics.
- Study the essentials of physics for computational aspects like design and data analysis.
- Apply the concepts required for the measurement of physical parameters related to engineering.
- Demonstrate and construct the electrical and optical experiments.
- Compare and analyze the results of the experiments.
- Build simple experimental set up and estimate the physical parameters related to engineering.

Preamble: Introduction to photonics, Quantum Mechanics, Superconductivity, Quantum computation, Physics of animation.

Module – 1

Laser and Optical Fibers

Self-study topics: Properties of light, basic principle of laser, data storage and CD writing, total internal reflection, optical fibre - construction, optical fibre sensors.

LASER: Introduction, Interaction of Radiation with Matter, Einstein's A and B Coefficients, expression for energy density of the radiation in terms of Einstein's Coefficients, condition for Laser Action: Population Inversion, Metastable State, Requisites of a laser system, construction and working of Semiconductor Diode Laser, Applications: Bar code scanner, Laser Printer, Numerical Problems.

Optical Fiber: Propagation mechanism, Acceptance angle, Numerical Aperture (derivation), condition for ray propagation, Classification of Optical Fibers, Attenuation and causes for attenuation and expression attenuation coefficient, Applications: Fiber Optic networking, Fiber Optic Communication. Numerical Problems.

(8 Hours)

Module – 2

Quantum Mechanics

Self-study topics: de Broglie Hypothesis, wave-particle dualism.

Introduction, Matter Waves, de Broglie wavelength and derivation of expression by analogy, representation of matter waves: Phase Velocity and Group Velocity(qualitative), Heisenberg's Uncertainty Principle and its significance, Application: Non-existence of electron inside the nucleus (Relativistic condition), Principle of Complementarity, Wave Function and its properties, Schrodinger wave equation: Time independent Schrodinger wave equation (derivation) and time dependent equation, Physical Significance of a wave function and Born's Interpretation, Expectation value, Eigen functions and Eigen Values, Applications of Schrodinger wave equation: Eigen Values and Eigen functions of a particle in a one dimensional potential well of infinite depth and extend to a free particle case. Waveforms and Probabilities and its mapping. Numerical Problems.

(8 Hours)

Module – 3

Quantum Computing

Self-study topics: Basics of quantum mechanics, Matrices.

Wave Function in Ket Notation: Matrix form of wave function, Identity Operator, Determination of I|0> and I|1>, Pauli Matrices and its operations on 0 and 1 states, Mention of Conjugate and Transpose, Unitary Matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product), Probability, Orthogonality

Principles of Quantum Information & Quantum Computing: Introduction to Quantum Computing, Moore's law & its end. Single particle quantum interference, quantum superposition and the concept of qubit. Classical & quantum information comparison. Differences between classical & quantum computing.

Properties of a qubit: Mathematical representation. Summation of probabilities, Representation of qubit by Bloch sphere.

Quantum Gates: Single Qubit Gates: Quantum Not Gate, Pauli -Z Gate Hadamard Gate, Pauli Matrices, Phase Gate (or S Gate), T Gate.

Multiple Qubit Gates: Controlled gate, CNOT Gate, (Discussion for 4 different input states). Representation of, Swap gate, Controlled -Z gate, Toffoli gate, Accounting for the extra-ordinary capability of quantum computing, Model Realizations.

(8 Hours)

Module – 4

Application of Physics in computing

Self-study topics: Motion in one dimension, Frames, Frames per second.

Physics of Animation: Taxonomy of physics based animation methods, Frames, Frames per Second, Size and Scale, Motion and Timing in Animations, Constant Force and Acceleration, The Odd rule, Motion Graphs, Numerical Calculations based on Odd Rule, Examples of Character Animation: Jumping, Walking. Numerical Problems.

Statistical Physics for Computing: Descriptive statistics and inferential statistics, Poisson distribution and Normal Distributions (Bell Curves), Monte Carlo Method. Numerical Problems.

(8 Hours)

Module – 5

Superconductivity and its applications

Self-study topics: Electrical Conductivity in metals, Resistivity and Mobility, Matheissen's rule.

Introduction to Super Conductors, properties of superconductors: Meissner Effect, Critical Current,

critical temperature and critical field. Temperature dependence of Critical field, Types of Super Conductors, Concept of Phonon, BCS theory (Qualitative), superconducting Tunneling, High Temperature superconductivity, Josephson Junction, DC and AC SQUIDs (Qualitative), Applications in Quantum Computing. Numerical Problems.

(8 Hours)

Laboratory Component

(10 experiments have to be completed from the list of experiments)

Title of the experiment

1. Transistor Characteristics
2. Photo-Diode Characteristics
3. Magnetic Field at any point along the axis of a circular coil
4. Fermi Energy
5. Four Probe Method
6. Black Box
7. Energy gap of a given semiconductor
8. Plank's Constant using LEDs
9. Wavelength of LASER using Grating
10. Numerical Aperture using optical fiber
11. Charging and Discharging of a Capacitor
12. Series & Parallel LCR
13. GNU Step Interactive Simulations.
14. Study of motion using spread Sheets
15. Application of Statistic using Spread Sheets
16. PHET Interactive Simulations
17. Design a LCR series or parallel circuits. (To determine different resonant frequency)
18 Design a circuit to determination of Wavelength of LEDs using Planck's law.

Course outcomes (CO s):

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

CO1: Apply the principles of Lasers and Optical fibres in engineering applications.

CO2: Apply the basic principles of the quantum Mechanics and its application in Quantum Computing.

CO3: Analyse significant properties of superconductors and its different applications in engineering.

CO4: Illustrate the application of physics in design and data analysis in animation.

CO5: Practice working in groups to conduct experiments in physics and perform precise and honest measurement.

Continuous Internal Evaluation (CIE)

PHYSICS (L:T:P/Credit = 2:2:2/4) **Duration: 03**

		Internal Assessment	Max-marks	Average marks	Marks after Scale-Down	Final Marks
Theory Component	IA	IA-1 (1.5 hrs.)	40	30	**30 Marks** **Passing standard** (40% i.e., 12 marks)	30+20 = 50
		IA-2 (1.5 hrs.)	40			
		IA-3 (1.5 hrs.)	40			
	Assignment	A1 (1 hr)	10	10		
	AAT	AAT-1 (1 hr)	10			
Practical 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	05		

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	**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: 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 %.**

books: Suggested Learning Resources(Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Solid State Physics, S O Pillai, New Age International Private Limited, 8th Edition, 2018.
2. Engineering Physics by Gupta and Gour, Dhanpat Rai Publications, 2016 (Reprint).
3. Concepts of Modern Physics, Arthur Beiser, McGraw-Hill, 6th Edition, 2009.
4. Lasers and Non-Linear Optics, B B Loud, New age international, 2011 edition.
5. A textbook of Engineering Physics by M.N. Avadhanulu, P G. Kshirsagar and T V S Arun Murthy, Eleventh edition, S Chand and Company Ltd. New Delhi-110055.
6. Quantum Computation and Quantum Information, Michael A. Nielsen & Isaac L. Chuang, Cambridge Universities Press, 2010 Edition.
7. Quantum Computing, Vishal Sahani, McGraw Hill Education, 2007 Edition. 14.11.2022 4
8. Engineering Physics, S P Basavaraj, 2005 Edition,
9. Physics for Animators, Michele Bousquet with Alejandro Garcia, CRC Press, Taylor & Francis, 2016.

10. Quantum Computation and Logic: How Quantum Computers Have Inspired Logical Investigations, Maria Luisa Dalla Chiara, Roberto Giuntini, Roberto Leporini, Giuseppe Sergioli, Trendsin Logic, Volume 48, Springer.
11. Statistical Physics: Berkely Physics Course, Volume 5, F. Reif, McGraw Hill.
12. Introduction to Superconductivity, Michael Tinkham, McGraww Hill, INC, II Edition.
13. David Jeffery Griffiths, "Introduction to Electrodynamics", Pearson New International Edition, 4th edition, 2017.
14. Resnick, Walker and Halliday "Principles of Physics, Wiley publisher, 10th edition, 2015.
15. Ben G. Streetman, Sanjay Banerjee, "Solid State Electronic Devices" Pearson Prentice Hall, 6th edition, 2010.
16. S. K. Dwivedi, A Textbook of Engineering Physics, I K International Publishing House Pvt. Ltd., 1st edition 2010.

Web links and Video Lectures (e-Resources):

LASER: https://www.youtube.com/watch?v=WgzynezPiyc
Superconductivity: https://www.youtube.com/watch?v=MT5Xl5ppn48 Optical Fiber: https://www.youtube.com/watch?v=N_kA8EpCUQo
Quantum Mechanics: https://www.youtube.com/watch?v=p7bzE1E5PMY&t=136s
Quantum Computing: https://www.youtube.com/watch?v=jHoEjvuPoB8
Physics of Animation: https://www.youtube.com/watch?v=kj1kaA_8Fu4
Statistical Physics Simulation:
https://phet.colorado.edu/sims/html/plinkoprobability/latest/plinkoprobability_en.html NPTEL
Supercoductivity:https://archive.nptel.ac.in/courses/115/103/115103108/ NPTEL
Quantum Computing: https://archive.nptel.ac.in/courses/115/101/115101092
Virtual LAB:https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham
Virtual LAB: https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1 Activity-Based Learning (Suggested Activities in Class)/
Practical-Based Learning http://nptel.ac.in https://swayam.gov.in
https://virtuallabs.merlot.org/vl_physics.html https://phet.colorado.edu
https://www.myphysicslab.com

B.E COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I / II

Principles of Programming using C (2:0:2)
(Effective from the academic year 2022-2023)

Course Code	**BPOPS103/203**	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:0:2	SEE Marks	50
Total Number of Contact Hours	32(L) + 14(P)	Exam Hours	03

Course Objectives:
This course will enable students to:

1. Elucidate the basic architecture and functionalities of a Computer
2. Apply programming constructs of C language to solve the real-world problems
3. Explore user-defined data structures like arrays, structures and pointers in implementing solutions to problems
4. Design and Develop Solutions to problems using structured programming constructs such as functions and procedures

Module – I

Introduction to C: Introduction to computers, input and output devices, designing efficient programs. Introduction to C, Structure of C program, Files used in a C program, Compilers, Compiling and executing C programs, variables, constants, Input/output statements in C.

(6 Hours)

Module – II

Operators in C, Type conversion and typecasting.

Decision control and Looping statements: Introduction to decision control, Conditional branching statements, iterative statements, nested loops, break and continue statements, goto statement. **(6 Hours)**

Module – III

Functions: Introduction using functions, Function definition, function declaration, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive functions.

Arrays: Declaration of arrays, accessing the elements of an array, storing values in arrays, Operations on arrays, Passing arrays to functions, two dimensional arrays, operations on two-dimensional arrays, two-dimensional arrays to functions, multidimensional arrays, applications of arrays.

(8 Hours)

Module – IV

Strings and Pointers: Introduction, string taxonomy, operations on strings, Miscellaneous string and character functions, arrays of strings. Pointers: Introduction to pointers, declaring pointer variables, Types of pointers, Passing arguments to functions using pointers

(6 Hours)

Module – V

Structure, Union, and Enumerated Data Type: Introduction, structures and functions, Unions, unions inside structures, Enumerated data type.

Files: Introduction to files, using files in C, reading and writing data files. , Detecting end of file.

(6 Hours)

List of Laboratory experiments (2 hours/week per batch/ batch strength 36)
12 lab sessions + 3 repetition class + 1 Lab Assessment

1	Simulation of a Simple Calculator.
2	Compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages.
3	An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs. 100 as meter charge. If the total amount is more than Rs 400, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges.
4	Write a C Program to display the following by reading the number of rows as input, 1 1 2 1 1 2 3 2 1 1 2 3 4 3 2 1 --- Nth row
5	Implement Binary Search on Integers.
6	Implement Matrix multiplication and validate the rules of multiplication.
7	Compute sin(x)/cos(x) using Taylor series approximation. Compare your result with the built-in library function. Print both the results with appropriate inferences.
8	Sort the given set of N numbers using Bubble sort.
9	Write functions to implement string operations such as compare, concatenate, and find string length. Use the parameter passing techniques.
10	Implement structures to read, write and compute average- marks of the students, list the students scoring above and below the average marks for a class of N students.
11	Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.
12	Write a C program to copy a text file to another, read both the input file name and target file name.

Course Outcomes:

The students will be able to:

CO1 : Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts.

CO2 : Apply programming constructs of C language to solve the real world problem

CO3 : Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting

CO4 : Explore user-defined data structures like structures, unions and pointers in implementing solutions

CO5: Design and Develop Solutions to problems using modular programming constructs

CONTINUOUS INTERNAL EVALUATION (CIE)

		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 **Passing Standard** (40% i. e 12 Marks)	**30 +20 = 50**
		IA-2 (1.5 hr)	40			
		IA-3 (1.5 hr)	40			
	Assignment	A-1 (1 hr)	10	10		
	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: 36)	-	15	20 Marks **Passing Standard** (40% i. e 08 Marks)	
	IA	IA-1 (02/03 hrs)	50	5		

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	100	50 **Passing Standard** (35% i.e 18 Marks)
	No. of 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 ≥ 40 %**, **SEE Score ≥ 35 %,** and a sum total of **CIE + SEE Score ≥ 40%**

Text books:

1. Computer fundamentals and programming in c, "Reema Thareja", Oxford University, Second edition, 2017.

References:

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGraw-Hill.

2. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, Prentice Hall

BMS Institute of Technology & Management

(An Autonomous Institute under VTU, Belagavi, Karnataka - 590018)
Avalahalli, Doddaballapur Main Road, Bengaluru – 560064

B.E ELECTRONICS AND COMMUNICATION ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I / II

Introduction to Electronics Engineering (3:0:0:0) 3
ESC – I
(Common to: CSE/ME/EEE/CIV/ISE/AIML)
(Effective from the academic year 2022-23)

Course Code	BESCK104C/204C	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	3:0:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:

This course will enable students to:

1. To prepare students with fundamental knowledge/overview in the field of Electronics and Communication Engineering.
2. To equip students with a foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
3. Professionalism & Learning Environment: To include in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career.

Teaching-Learning Process

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

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Arrange visits to nearby PSUs such as BHEL, BEL, ISRO, etc., and small-scale hardware Industries to give brief information about the electronics manufacturing industry.
3. Show Video/animation films to explain the functioning of various analog and digital circuits.
4. Encourage collaborative (Group) Learning the class
5. Ask at least three HOTS (Higher-order Thinking) question in the class, which promotes critical thinking
6. Adopt Problem Based Learning (PBL), which fosters students Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
7. Topics will be introduced in multiple representations.
8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.

9. Discuss how every concept can be applied to the real world – and when that's possible, it helps improve the student's understanding.

Module – 1

Power Supplies: Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Ouput resistance and voltage regulation, Voltage multipliers.

Amplifiers: CE amplifier with and without feedback, Multi-stage amplifier, BJT as a switch, Cut-off and saturation modes. (Text 1)

(8 Hours)

Module – 2

Oscillators: Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillators, Wein bridge oscillator, Multivibrtaors, Single-stage astable oscillator, Crystal controlled oscillator (Only Concepts ,working and waveforms. No mathematical derivations).

Operational amplifiers: Ideal op-amp: characteristics of ideal and practical op-amp; Practical op-amp circuits: Inverting and non -inverting amplifiers, voltage follower, summer, subtractor, integrator, differentiator. (Text 1)

(8 Hours)

Module – 3

Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion octal & Hexa Decimal Numbers, Complements , Basic definitions, Axiomatic definition of Boolean algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, other logic operations, Digital Logic Gates(Text2: 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7)
Combinational logic: Instruction, Design procedure, Adders-Half adders, Full adder (text 2: 4.1, 4.2, 4.3)

(8 Hours)

Module – 4

Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major applications areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC Vs CISC

Sensors and Interfacing Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7- Segment LED Display. (Text- 1).

(8 Hours)

Module – 5

Applications of Electronic systems

1. Green tech application: Wind turbine for small power application
2. Liquid level control system.
3. pH neutralization system for wastewater treatment.
4. RFID system.

Recap/Summary of the Course

Question paper pattern:

- SEE will be conducted for 100 marks.
- Each full question is for 20 marks.
- There will be two full questions from each module.
- Answer five full questions out of 10 questions with intra modular choice.

Continuous Internal Evaluation (CIE): Max. Marks = 50

- Each CIE will be conducted for 40 marks
- Average of three Internal assessment tests for 40 marks and scaled down to 30 Marks.
- Assignment - 20 marks
- Alternate Assessment Tools (AAT) – 20 Marks
- (Assignment + AAT) will be reduced to 20 Marks.
- CIE+Assignment+AAT = 30+20 = 50 Marks
- Student has to obtain 40% of the CIE marks (i.e., 20 Marks) to become eligible for SEE.

Passing Standard

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%.**

Textbooks:

1. Mike Tooley, 'Elcetronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015. DOI http://doi.org/10.4324/9781315737980. eBook ISBN9781315737980
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81203-0417-84
3. D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, MC Graw Hill Education (India), Private Limited, 2018.

B.E COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – I / II

ETC- 1Introduction to Internet of Things (IOT) (3:0:0)
(Effective from the academic year 2022 -2023)

Course Code	BETCK105H/205H	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. Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics.
2. Understand the recent application domains of IoT in everyday life.
3. Gain insights about the current trends of Associated IOT technologies and IOT analytics.

Module – I

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

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

(8 Hours)

Module – II

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

(8 Hours)

Module – III

IoT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading. **(8 Hours)**

Module – IV

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

IOT Case Studies
Agricultural IoT – Introduction and Case Studies **(8 Hours)**

Module – V

IOT Case Studies and Future Trends: Vehicular IoT – Introduction, Healthcare IoT – Introduction, Case Studies IoT Analytics – Introduction.

(8 Hours)

<table>
<tr><th colspan="7">CONTINUOUS INTERNAL EVALUATION (CIE)</th></tr>
<tr><th colspan="2"></th><th>Internal Assessments (IAs)</th><th>Max. Marks</th><th>Average Marks</th><th>Marks after scale-down</th><th>Final Marks</th></tr>
<tr><td rowspan="5">Theory Component</td><td rowspan="3">IA</td><td>IA-1 (1.5 hr)</td><td>20</td><td rowspan="3">60</td><td rowspan="4">(60+40=100) scale down to 50 Marks

Passing Standard (40% i. e 20 Marks)</td><td rowspan="4">50 marks</td></tr>
<tr><td>IA-2 (1.5 hr)</td><td>20</td></tr>
<tr><td>IA-3 (1.5 hr)</td><td>20</td></tr>
<tr><td>Assignment 1</td><td>A-1 (1 hr)</td><td>20</td><td rowspan="2">40</td></tr>
<tr><td>AAT</td><td>AAT-1 (1 hr)</td><td>20</td></tr>
<tr><td colspan="7">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.</td></tr>
<tr><th colspan="3"></th><th>Max. Marks</th><th>Max. Marks</th><th colspan="2">Final Marks</th></tr>
<tr><td rowspan="5">Theory Component</td><td colspan="2">No. of Modules</td><td>05</td><td>200</td><td rowspan="5">100</td><td colspan="2" rowspan="5">50

Passing Standard

(35% i.e 18 Marks)</td></tr>
<tr><td colspan="2">No. of Questions/ Module</td><td>02</td><td>40</td></tr>
<tr><td colspan="2">Marks/Question</td><td>20</td><td>20</td></tr>
<tr><td colspan="2">No. of Questions to be answered/ module</td><td>01</td><td>20</td></tr>
<tr><td colspan="2">No. of Questions to be answered/ course</td><td>05</td><td>100</td></tr>
</table>

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%**

Textbooks

1. Sudip Misra, Anandarup Mukherjee, Arijit Roy, "Introduction to IoT", Cambridge University Press 2021.

References

2. S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press.
3. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)",1st Edition, VPT, 2014.
4. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.

1. Computer fundamentals and programming in c, “Reema Thareja”, Oxford University, Second edition, 2017.

References:

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGowan-Hill.

2. Brian W. Kernighan and Dennis M. Ritchie, The ‘C’ Programming Language, Prentice Hall of India.

Web links and Video Lectures (e-Resources):

1.Elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html

2.https://nptel.ac.in/courses/106/105/106105171/ MOOC courses can be adopted for more clarity inunderstanding the topics and verities of problem solving methods.

Version 1

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	**BENGK106**	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

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. **3 hours**

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. **3 hours**

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 **3 hours**

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) **3 hours**

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. **3 hours**

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

Version 1

Department of Humanities and Social Sciences
Choice Based Credit System (CBCS)
SEMESTER – I/II

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ Samskrutika Kannada (1:0:0):1

(Effective from the academic year 2022-2023)

ವಿಷಯ ಸಂಕೇತ Course Code	BKSKK107/207	ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಅಂಕಗಳು CIE Marks	**50**
ಒಂದು ವಾರಕ್ಕೆ ಬೋಧನಾ ಅವಧಿ Teaching hours/Week (L: T:P)	**1:0:0**	ಸೆಮಿಸ್ಟರ್ ಅಂತ್ಯದ ಪರೀಕ್ಷೆಯ ಅಂಕಗಳು SEE Marks	**50**
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ Total Number of contact hours	**15**	ಪರೀಕ್ಷೆಯ ಅವಧಿ Exam Hours	**01**

Course Objectives: ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪತ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

1. **ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.**
2. **ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.**
3. **ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.**
4. **ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.**
5. **ಸಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.**

ಘಟಕ–1

ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು:

ಕರ್ನಾಟ ಸಂಸ್ಕೃತಿ – ಹಂಪ ನಾಗರಜಯ್ಯ

ಕರ್ನಾಟಕ ವಿಕೀಕರಣ: ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ–ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ–ಡಾ.ಎಲ್.ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ.ವಿ.ಕೇಶವಮೂರ್ತಿ **3 ಗಂಟೆಗಳು**

ಘಟಕ–2

ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ:

ವಚನಗಳು–ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ

ಕೀರ್ತನೆಗಳು–ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ–ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ–ಕನಕದಾಸರು

ತತ್ವಪದಗಳು: ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು – ಶಿಶುನಾಳ ಶರೀಫ **3 ಗಂಟೆಗಳು**

ಘಟಕ–3

ಆಧುನಿಕ ಕಾವ್ಯ ಭಾಗ: **ಡಿ.ವಿ.ಜಿ.ಯವರ ಮಂಕು ತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು.** ಕುರುಡು ಕಾಂಚಾಣ: ದಾ. ರಾ. ಬೇಂದ್ರೆ **ಹೊಸ ಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು** **3 ಗಂಟೆಗಳು**
ಘಟಕ–4
ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ: **ಡಾ.ಸರ್.ಎಂ.ವಿಶ್ವೇಶ್ವರಯ್ಯ:ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ–ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್** **ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ–ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ** **3 ಗಂಟೆಗಳು**
ಘಟಕ–5
ಸಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ: ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ **ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ** **3 ಗಂಟೆಗಳು**
Course outcome (course skills set) **ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ** (BKSKK107/207) **ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ:** 1. **ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.** 2. **ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕುರಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡುತ್ತದೆ.** 3. **ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯತ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗಡೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.** 4. **ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.** 5. **ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.**
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

Textbook:

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,

ಪ್ರಸಾರಾಂಗ ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ

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Department of Humanities and Social Sciences
Choice Based Credit System (CBCS)
SEMESTER – I/II

ಬಳಕೆ ಕನ್ನಡ Balake Kannada (Kannada for Usage) (1:0:0):1

(Common to all Branches)
(Effective from the academic year 2022-2023)

Course Code	BKBKK107/207	CIE Marks	50
Teaching Hours/Week (L: T:P)	1:0:0	SEE Marks	50
Total Number of Lecture Hours	15	Exam Hours	01

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು (Course Learning Objectives):

- **To Create awareness regarding the necessity of learning local language for comfortable and healthy life.**
- **To enable learners to Listen and understand the Kannada language properly.**
- **To speak, read and write Kannada language as per requirement.**
- **To train the learners for correct and polite conservation.**

Module – 1

Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
Easy learning of a Kannada Language: A few tips. Hints for correct and polite conversation, Listening and Speaking Activities.Key to Transcription.**ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು.** Personal Pronouns, Possessive Forms, Interrogative words. **3 hours**

Module – 2

ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು Possessive forms of of nouns, dubitive question and Relative noun. **ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು** Qualitative, Quantitative and Colour Adjectives, Numerals. **ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು – ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ (ಅ, ಅದು, ಅವು, ಅಲ್ಲಿ)** Predictive Forms, Locative Case. **3 hours**

Module – 3

ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು Dative cases and Numerals. **ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು** Ordinal numerals and Plural makers. **ನ್ಯೂನ/ನಿಷೇದಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ವ ಸ್ತು ವರ್ಣ ಗುಣವಾಚಕಗಳು** Defective /Negative Verbs and Colour Adjectives**.** **3 hours**

Module – 4

ಅಪ್ಪಣೆ/ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು Permission, Commands, encouraging and urging words (Imperative words and sentences). **ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು** Accusative Cases and Potential Forms used in General Communication. **"ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು** Helping verbs "iru and iralla" Corresponding Future and Negation Verbs. **ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧಸೂಚಕ ಮತ್ತು ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇದಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ** Comparitive, Relationship, Identification and Negation words. **3 hours**

Module – 5

ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾ ಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು, Different types of tense, time and verbs.
ದ್, ತ್, –ತು, –ಇತು, –ಆಗಿ, –ಅಲ್ಲ, –ಗ್, –ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ Formation of Past, Future and Present Tense Sentences with Verb Forms. **ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮತ್ತು**

ರಾಜ್ಯದ ಬಗ್ಗೆ ಕುರಿತಾದ ಇತರೆ ಮಾಹಿತಿಗಳು Karnataka state and general information about the state. ಕನ್ನಡ ಭಾಷೆ ಮತ್ತು ಸಾಹಿತ್ಯ Kannada Language and Literature. ಭಾಷೆ ಕಲಿಯಲು ಏನನ್ನು ಮಾಡಬೇಕು ಮತ್ತು ಮಾಡಬಾರದು Do's and Dont's in Learning a Language **3 hours**

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು: **Course outcomes:**

At the end of the Course, The Students will be able to

1. Understand the necessity of learning of local language for comfortable life.
2. Listen and understand the Kannada language properly.
3. Speak, read and write Kannada language as per requirement.
4. Communicate (converse) in Kannada language in their daily life with Kannada speakers.
5. Speak in polite conservation

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

Textbook:

ಬಳಕೆ ಕನ್ನಡ
ಲೇಖಕರು: ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ
ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ

All Engineering Departments
Choice Based Credit System (CBCS)
SEMESTER - I/II

Innovation and Design Thinking (0:2:0)1
(Common to all Branches)
(Effective from the academic year 2022 -2023)

Course Code	BIDTK158/258	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:2:0	SEE Marks	50
Total Number of Lecture Hours	25	Exam. Hours	01

Course objectives:

This course will enable students to:

1. Demonstrate the fundamental concept of design thinking for product and service development.
2. Illustrate empathetic design for potential customers.
3. Develop and examine the problem solving techniques for innovative products and services.
4. Demonstrate the fundamental concept of innovation for product and service development.
5. To discuss the methods of implementing design thinking in the real world.

Module – 1

Introduction to Design Thinking: Introduction, Importance of design thinking, what is design thinking**:** principles of design thinking, the process of design thinking**,** double-diamond model. The Philosophy of Design thinking, rules of design thinking.

Frame work of Design Thinking: Aesthetics and creativity as design thinking mechanisms, Psychological and neural bases of creativity, a definition and framework of design thinking.

How to understand the problem: How to analyse problems, Search field determination.

Understanding of the problem: The blind spot of knowledge and awareness, Problem analysis: PESTEL-Analysis.

Case studies on PESTEL-Analysis. (5 Hours)

Module – 2

How to Observe: Observation Phase, Empathetic design, Tips for observing, Method for Empathetic Design: Behavioural Mapping and Tracking, Empathy Map, Heuristic Evaluation, Customer Journey**.**

How to Define the Problem: Point-of-view phase, Characteristics of target group, Persona, Jobs-to-be done, Means-end approach.

Ideate Phase: The creative process, success factor for creative process. brainstorming: rules and tips for brain storming, mind mapping, rules for mind mapping, synectics.

Case studies on Empathetic design. (5 Hours)

Module – 3

Evaluation of ideas: Checklists/Proc-Cons lists, assessment areas of innovations, PPCO method, SWOT analysis for ideas, theory of inventive problem solving(TRIZ), principle of evolution, innovation checklist, resource analysis.

Real-Time Design Interaction: Introduction, improving design process instrumentation, real-time design research instrument.

Collaboration in digital space: Creativity across distances, analysing design thinking working modes, evaluating existing tool for remote collaboration and digital whiteboard.

Case studies on SWOT analysis. (5 Hours)

Module – 4

Innovation Process: Model Unified innovation process model for engineering designers and managers, Feedback pathways and gates: designer and reviewer initiated.

Strategic innovations: Design thinking approach: - Growth, predictability, strategic foresight, change, sense making, value redefinition, extreme competition, experience design standardization, creative culture, rapid prototyping, strategy and organization and business model design.

Innovation Culture*:* Nested view of design thinking and practice, national culture and design practice, method, Insights: culture and design, methodological insights.

(5 Hours)

Module – 5

Prototype and Testing: Prototype phase, storyboarding, storytelling, test phase, tips for prototype testing, tips for interviews, tips for survey, requirements for space and materials, Agility for design thinking, the Scrum guide, How to conduct workshop, MVP and prototyping.

Efficacy of prototyping*:* The efficacy of prototyping under time constraints, introduction, method, materials and design task, participants, procedure, results, participant creations. interviews.

Business process modelling: Introduction, process models mediate communication, research question and iterating ideas.

(5 Hours)

Course Outcomes: The students will be able to:

1. Demonstrate the concept of design thinking for real world problems.
2. Illustrate empathetic design for potential customers.
3: Describe define and ideate phase in design thinking based on user's requirements.
4: Discuss innovation principle and culture for products and services.
5: Illustrate prototype and testing phase for products and services.

Assessment Methods

CIE Components (50 Marks)

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

Internal Assessments Tests (Two tests X 30Marks)	: 60 Marks
Assignments	: 20 Marks
Course project	: 20 Marks

The sum of two test, two assignments, will be out of 100 marks and will be scaled down to 50 marks

Semester-End Examination

- SEE question paper will be set for 50 questions of each of 01 marks
- The pattern of the question paper is MCQ.

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.

1. Textbooks:
2. Christian Mueller-Roterberg, Handbook of Design Thinking, Tips & Tools for how to design thinking, Kindle Direct Publishing, 2018.
3. A Nil Hasso Plattner, Christoph Meinel and Larry Leifer, Design Thinking: Understand – Improve – Apply, Springer, 2011.
4. References:
5. Idris Mootee, Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School, John Wiley & Sons 2013.
6. Jeanne Liedtka , Andrew King , Kevin Bennett, Solving Problems with Design Thinking - Ten Stories of What Works ,Columbia Business School Publishing, 2013.
7. Gavin Ambrose Paul Harris, Basics of Design Thinking, AVA Publishing, Switzerland, 2009.

Web links and Video Lectures (e-Resources):

1. www.tutor2u.net/business/presentations/. /productlifecycle/default.html
2. https://docs.oracle.com/cd/E11108_02/otn/pdf/. /E11087_01.pdf
3. www.bizfilings.com › Home › Marketing › Product Developmen
4. https://www.mindtools.com/brainstm.html
5. https://www.quicksprout.com/. /how-to-reverse-engineer-your-competit
6. www.vertabelo.com/blog/documentation/reverse-engineering

8. https://support.microsoft.com/en-us/kb/273814

7. https://support.google.com/docs/answer/179740?hl=en

8. https://www.youtube.com/watch?v=2mjSDIBaUlM

9. thevirtualinstructor.com/foreshortening.html

10. https://dschool.stanford.edu/.../designresources/.../ModeGuideBOOTCAMP2010L.pdf

11. https://dschool.stanford.edu/use-our-methods/ 6.
https://www.interactiondesign.org/literature/article/5-stages-in-the-design-thinking-process

12. http://www.creativityatwork.com/design-thinking-strategy-for-innovation/ 49 8.

13. https://www.nngroup.com/articles/design-thinking/ 9.

14. https://designthinkingforeducators.com/design-thinking/ 10.

15. www.designthinkingformobility.org/wp-content/.../10/NapkinPitch_Worksheet.pdf

16. NPTL : Design Thinking - A Primer - Course (nptel.ac.in)

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

http://dschool.stanford.edu/dgift/