K. S. INSTITUTE OF TECHNOLOGY, BENGALURU

An Autonomous Institution under VTU, Approved by AICTE

Scheme of Teachingandexaminations-2025

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

(Effective from the academic year2025-26)

I Semester **(For students attending under Physics Group)**

Sl.No	Course and course code		Course title	Course category	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	25BMAXX101	Applied Mathematics -I	CORE	Maths Dept.	3	2	0	0	03	50	50	100	04
2	#ASC(IC)	25BPHXX102	Applied Physics	IPCC	Physics Dept.	3	0	2	0	03	50	50	100	04
3	ESC	25BCED103X	Computer-Aided Engineering Drawing	IPCC	Mechanical Engg. Dept.	3	0	0	0	03	50	50	100	03
4	ESC-I	25BESC104X	Engineering Science Course-I	CORE	Respective Engg. Dept.	3	0	0	0	03	50	50	100	03
5	PSC	25BPSC105X	Program Specific Courses	CORE	Any Dept.	3	0	0	0	03	50	50	100	03
6	AEC (NCMC)	25BSDAK106	Soft Skills	AEC	Humanities Dept.	0	0	0	2	02	100	--	100	PP
7	PSC	25BPSL107X	Program Specific Course Lab	PSC-Lab	Respective Engg. Dept.	0	0	2	0	02	50	50	100	01
8	AEC/SDC	25BIDTK108	Interdisciplinary Project-Based Learning	AEC	Any Dept.	0	0	0	2	01	50	50	100	01
9	HSMS	25BKSKK109/ 25BKBKK109	Samskrutika Kannada/ Balake Kannada	HSMC	Humanities Dept.	1	0	0	0	01	50	50	100	01
					TOTAL						500	400	900	20

10. AICTE Activity Points : Students have to must earn 100 activity points between 1st to 8th Semester for the Award of Degree

SDA stands for Skill Development Activities, while TD/PSB refers to the Teaching Department or Paper Setting Board. **ASC** denotes Applied Science Courses, and **ESC** represents Engineering Science Courses. **ETC** stands for Emerging Technology Courses, and **AEC** refers to Ability Enhancement Courses. **HSMS** includes Humanity and Social Science and Management Courses, whereas SDC stands for Skill Development Courses. **C**IE means Continuous Internal Evaluation, and **SEE** is the abbreviation for Semester End Examination. **IC** refers to an Integrated Course, which is a theory course integrated with a practical component. **NCMC**: Non Credit mandatory course, **PP**: Pass/Pass for **NCMC** if student have successfully completed the CIE requirement, otherwise **NP** (not Pass) shall be awarded. PP is essential for the award of the degree.

Credit Definition:	
1-hour Lecture **(L)** per week=**1Credit**.	04-Credits courses are to be designed for 50 hours of Teaching-Learning Session
2-hours Tutorial**(T)** per week=**1Credit**	04-Credits (IC) are to be designed for 40 hours' theory and 12-14 hours of practical sessions
2-hours Practical / Drawing (**P**) per week=**1Credit**	03-Credits courses are to be designed for 40 hours of Teaching-Learning Session
2-hous Skill Development Actives **(SDA)** per week = **1 Credit**	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.

AICTE Activity Points to be earned by Students admitted to the BE/B.Tech./B.Plan day college programs are required to earn AICTE Activity Points in addition to fulfilling academic requirements, as outlined in Chapter 6 of the AICTE Model Internship Guidelines. Every regular student enrolled in the 4-year degree program must earn **100 Activity Points**, while students entering through lateral entry into the second year must earn **75 Activity Points** for the award of the degree. Students who transfer from other universities into the fifth semester are required to earn **50 Activity Points**, starting from the year of their entry into VTU. The earned Activity Points will be reflected in the student's **8th Semester Grade Card**. These activities may be undertaken at any time during the semester, including weekends and holidays, and can be spread out over the course of the program according to the student's convenience. However, the **minimum hours required for each activity must be fulfilled**. Activity Points are **non-credit**, do **not affect the SGPA or CGPA**, and are **not required for vertical progression**. In case a student fails to earn the prescribed number of Activity Points, the **8th Semester Grade Card will be issued only after the required points are earned**.

*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.
25BPHXX102 SEE shall have the 03hours of theory examination and 02-03 hours of practical examination.
ESC 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).

Applied Mathematics -I					**ESC-I: Engineering Science Courses-I**					**PSC: Program Specific Courses**				
Code	Title	L	T	P	Code	Title	L	T	P	Code	Title	L	T	P
25BMACS101	Calculus and Linear algebra	3	2	0	25BESK104A	Building Sciences & Mechanic	3	0	0	25BPSC105A	Engineering Mechanics	3	0	0
25BMAEC101	Differential Calculus and Linear algebra	3	2	0	25BESK104B	Introduction to Electrical Engineering	3	0	0	25BPSC 105B	Elements of Mechanical Engineering	3	0	0
25BMAME101	Differential Calculus and Linear algebra	3	2	0	25BESK104C	Introduction to Electronics & Communication Engineering	3	0	0	25BPSC 105C	Basics of Electrical Engineering	3	0	0
Applied Physics					25BESK104D	Introduction to Mechanical Engineering	3	0	0	25BPSC 105D	Fundamentals of Electronics & Communication Engineering	3	0	0
25BPHCS102	Quantum Physics and Applications	3	0	2	25BESK104E	Essentials of Information Technology	3	0	0	25BPSC 105E	Principles of Programming Using C	3	0	0
25BPHEC102	Quantum Physics and Electronic Sensors	3	0	2	25BESK104F	Introduction to Linux	3	0	0	**PSC Lab: Program Specific Courses LAB**				
25BPHME102	Physics of Materials	3	0	2	25BESK104G	Introduction to Engineering Mechanics	3	0	0	25BPSL107A	Mechanics & Material Lab	0	0	2
CAED: Computer-Aided Engineering Drawing					25BESK104H	Introduction to Cyber Security	3	0	0	25BPSL107B	Elements of Mechanical Engineering Lab	0	0	2
25BCED103A	Computer-Aided Engineering Drawing for CSE stream	2	0	2						25BPSL107C	Basics of Electrical Engineering Lab	0	0	2
25BCED103B	Computer-Aided Engineering Drawing for ECE stream	2	0	2						25BPSL107D	Fundamentals of Electronics & Communication Engineering Lab	0	0	2
25BCED103C	Computer-Aided Engineering Drawing for ME stream	2	0	2						25BPSL107E	C-Programming Lab	0	0	2

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Scheme of Teachingandexaminations-2025

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

(Effective from the academic year2025-26)

II Semester **(For students attended 1st semester under Physics Group)**

Sl. No	Course and Course Code		Course Title	Course category	TD/PSB	Teaching Hours/Week				Examination				
						Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P	S					
1	*ASC	25BMAXX201	Applied Mathematics -II	CORE	Maths Dept.	3	2	0	0	03	50	50	100	04
2	#ASC(IC)	25BCHXX202	Applied Chemistry	IPCC	Chemistry Dept.	3	0	2	0	03	50	50	100	04
3	ETC	25BETCK203	Introduction to AI and Applications	CORE	Any Dept.	3	0	0	0	03	50	50	100	03
4	ESC-II	25BESC204X	Engineering Science Course-II	CORE	Respective Engg. Dept.	3	0	0	0	03	50	50	100	03
5	PLC	25BPLC205X	Programming Language Course	CORE	CSE & allied Dept.	3	0	0	0	03	50	50	100	03
6	HSMS	25BCPSK206	Communicative & Professional Writing Skills in English	HSMS	Humanities Dept.	1	0	1	0	01	50	50	100	01
7	AEC (NCMC)	25BICOK207	Indian Constitution	HSMS	Humanities Dept.	1	0	0	0	01	100	--	100	PP
8	AEC	25BPBLK208	Innovation and Design Thinking Lab (Project-Based Learning)	AEC	Respective Dept.	0	0	0	2	02	50	50	100	01
9	PLC	25BPLL209X	Programming Language Course Lab	LAB	CSE & allied Dept.	0	0	2	0	02	50	50	100	01
TOTAL											**500**	**400**	**900**	**20**

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SDA stands for Skill Development Activities, while TD/PSB refers to the Teaching Department or Paper Setting Board. **ASC** denotes Applied Science Courses, and **ESC** represents Engineering Science Courses. **ETC** stands for Emerging Technology Courses, and **AEC** refers to Ability Enhancement Courses. **HSMS** includes Humanity and Social Science and Management Courses, whereas SDC stands for Skill Development Courses. **C**IE means Continuous Internal Evaluation, and **SEE** is the abbreviation for Semester End Examination. **IC** refers to an Integrated Course, which is a theory course integrated with a practical component. **NCMC**: Non Credit mandatory course, **PP**: Pass/Pass for **NCMC** if student have successfully completed the CIE requirement, otherwise **NP** (not Pass) shall be awarded. **PP** is essential for the award of the degree.

*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.

#-25BCHXX202 SEE shall have the 03hours of theory examination and 02-03 hours of practical examination.

ESC 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 01Credit-courses shall have the SEE of 01hours duration and the pattern of the question paper shall be MCQ.

Credit Definition:	04-Creditscourses are to be designed for 50hours of Teaching-Learning Session
1-hour Lecture**(L)**per week=**1Credit**	04-Credits (IC) are to be designed for 40 hours' theory and 2-4hours of practical sessions
2-hoursTutorial**(T)**per week=**1Credit**	03-Credits courses are to be designed for 40hours of Teaching-Learning Session
3-hours Practical/Drawing(**P**)per week=**1Credit**	02-Credits courses are to be designed for 25hours of Teaching-Learning Session
2-hous Skill Development Actives **(SDA)**per week=**1Credit**	01-Credit courses are to be designed for12-15hoursofTeaching-Learning Session

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Students admitted to the BE/B.Tech./B.Plan day college programs are required to earn AICTE Activity Points in addition to fulfilling academic requirements, as outlined in Chapter 6 of the AICTE Model Internship Guidelines. Every regular student enrolled in the 4-year degree program must earn **100 Activity Points**, while students entering through lateral entry into the second year must earn **75 Activity Points** for the award of the degree. Students who transfer from other universities into the fifth semester are required to earn **50 Activity Points**, starting from the year of their entry into VTU. The earned Activity Points will be reflected in the student's **8th Semester Grade Card**. These activities may be undertaken at any time during the semester, including weekends and holidays, and can be spread out over the course of the program according to the student's convenience. However, the **minimum hours required for each activity must be fulfilled**. Activity Points are **non-credit**, do **not affect the SGPA or CGPA**, and are **not required for vertical progression**. In case a student fails to earn the prescribed number of Activity Points, the **8th Semester Grade Card will be issued only after the required points are earned**.

Applied Mathematics-II					ESC-II: Engineering Science Courses-II					PLC: Programming Language Courses				
Code		**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**
25BMACS201	Numerical Methods	3	2	0	**25BESC204A**	Building Sciences & Mechanic	3	0	0	**25BPLC205A**	Introduction to Python Programming	3	0	0
25BMAEC201	Calculus, Laplace Transform and Numerical Techniques	3	2	0	**25BESC 204B**	Introduction to Electrical Engineering	3	0	0	**25BPLC205B**	Introduction to C++ Programming	3	0	0
25BMAME201	Multivariable Calculus and Numerical Methods	3	2	0	**25BESC 204C**	Introduction to Electronics & Communication Engineering	3	0	0	**25BPLC205C**	Introduction to Web Programming	3	0	0
Applied Chemistry					**25BESC 204D**	Introduction to Mechanical Engineering	3	0	0	**PLL: Programming Language Courses Labs**				
25BCHCS202	Applied Chemistry for Smart Systems	3	0	2	**25BESC 204E**	Essentials of Information Technology	3	0	0	**25BPLL209A**	Introduction to Python Programming Lab	0	0	2
25BCHEC202	Applied Chemistry for Emerging Electronics and Futuristic Devices	3	0	2	**25BESC 204F**	Introduction to Linux	3	0	0	**25BPLL209B**	Introduction to C++ Programming Lab	0	0	2
25BCHME202	Applied Chemistry for Advanced Metal Protection and Sustainable Energy Systems	3	0	2	**25BESC 204G**	Introduction to Engineering Mechanics	3	0	0	**25BPLL209C**	Introduction to Web Programming Lab	0	0	2
					25BESC204H	Introduction to Cyber Security	3	0	0					

- **All courses under PLC and ETC groups can be taught by ANY DEPARTMENT**
- The student must select **one course from the ESC-I group**.
- Students must opt for courses from the **ESC group** without repeating any course taken in the **1st or 2nd semester**.
- The student must select **one course each from the ETC and PLC groups**.
- If a student studies a subject from the **PSC group in the 1st semester**, they must select a course from the **PLC group in the 2nd semester**, and **vice versa**.

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Department of Mathematics

SECOND SEMESTER SYLLABUS

Course : **Applied Mathematics-II for CSE Stream: Numerical Methods**		Semester	II
Course Code	**25BMACS201**	CIE Marks	50
Teaching Hours/Week(L:T:P:S)	3:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours Theory+20 Hours Tutorials	Total Marks	100
Credits	04	Exam Hours	03
Examination type(SEE)	**Theory**		

Course Objectives (Course Skill Set)

The goal of the course **Applied Mathematics-II for CSE Stream** is to

1. **Develop** the knowledge of numerical methods and apply them to solve transcendental and differential equations.
2. **Solve** the systems of linear equations and compute eigenvalues and eigenvectors using iterative and decomposition methods.
3. **Solve** first and higher-order differential equations using analytical methods and inverse differential operators for standard functional forms.

Module-1: Introduction to Numerical Methods

Errors and their computation: Round off error, Truncation error, Absolute error, Relative error and Percentage error. Solution of algebraic and transcendental equations: Bisection, Regula-Falsi, Secant and Newton-Raphson methods.

(Text 1: Ch-1(1.1, 1.3), Ch-2(2.1, 2.2, 2.3))

Text3: Ch 28(28.2(2))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-2: Numerical solutions for system of linear equations

Norms: Vector norms and Matrix norms-L1, L2 and L∞, Ill conditioned linear system, condition number. Solution of system of linear equations: Gauss Seidel method and LU-decomposition method.

Eigenvalues and Eigen vectors: Rayleigh power method, Jacobi's method.

(Text1: Ch-3(3.2, 3.3)

Text 3: Ch-28(28.7(1,2), 28.9))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-3: Interpolation

Finite differences, interpolation using Newton Gregory forward and Newton Gregory backward difference formulae, Newton's divided difference.

Lagrange interpolation formulae, Lagrange's inverse interpolation formula, piecewise interpolation-linear and quadratic.

(Text 3: Ch-29(29.1(1,2), 29.6, 29.9 to 29.13)

Text 1: Ch-4(4.6))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-4: Differential Equations of First and Higher Order

Linear and Bernoulli`s differential equations. Exact and reducible to exact differential equations with integrating factors on $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$and $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$. Homogeneous and non-homogeneous Differential equations of higher order with constant coefficients. Inverse differential operators $e^{ax}, sin(ax+b), cos(ax+b)$ and x^n.
(Text 3:Ch-11(11.9, 11.10, 11.11, 11.12(4)), Ch-13(13.1, 13.2, 13.3, 13.4,13.5, 13.6(Case I, II and III))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-5: Numerical Integration and Numerical Solution of Differential Equations

Numerical integration: Trapezoidal, Simpson's 1/3rd, Simpson's 3/8th rule and Weddle's rule.
Numerical solution of ordinary differential equations of first order and first degree - Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor-corrector method, Adam-Bashforth predictor-corrector method.
(Text 3: Ch-30(30.4, 30.6, 30.7, 30.8, 30.10), Ch-32(32.1, 32.3, 32.5, 32.7, 32.9, 32.10))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Course outcome (Course Skill Set)

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

CO1: **Apply** numerical methods to solve transcendental equations.

CO2: **Solve** the system of linear equations using the numerical methods.

CO3: **Apply** finite difference and interpolation techniques to estimate function values from discrete data using polynomial and piecewise approaches.

CO4: **Solve** first and higher-order differential equations using analytical methods and apply them to mathematical models.

CO5: **Demonstrate** the applications of computer science and allied engineering science using modern ICT tools.

Suggested Learning Resources:

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

1. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publishers, 8th Ed., 2022.
2. David C Lay, Linear Algebra and its Applications, Pearson Publishers, 5th Ed., 2023.
3. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2021.

Reference books:

1. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Education, 11th Ed., 2017
2. N. P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, 10th Ed., 2022.
3. S. S. Sastry, Introductory Methods of Numerical Analysis, PHI Learning Private Limited, 5th Ed. 2012.
4. Steven V. Chapra and Raymond P. Canale, Applied Numerical Methods with Matlab for Engineers and Scientists, McGraw-Hill, 3rd Ed., 2011.
5. Richard L. Burden, Douglas J. Faires, A. M. Burden, Numerical Analysis, 10th Edition.,2010, Cengage Publishers.

Web links and Video Lectures(e-Resources):

- https://nptel.ac.in/courses/111105134
- https://nptel.ac.in/courses/111107105
- https://nptel.ac.in/courses/111107107
- https://nptel.ac.in/courses/111104030
- https://nptel.ac.in/courses/111107063
- https://nptel.ac.in/courses/111106100
- http://academicearth.org/
- VTU e-Shikshana Program
- VTU EDUSAT Program
- https://nptel.ac.in/courses/111105160
- https://nptel.ac.in/courses/127106019
- https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-methods-spring-2019/
- https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring2012/pages/syllabus/

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching learning process and facilitate the achievement of 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 students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students' for self–study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
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).

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):

- Three Tests each of 25 Marks;
- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively. Average of three tests will be scaled down to 25 marks.

- Continuous Comprehensive Assessments will be conducted with a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

  Learning Activity-1: Practicing problems (Lab Activities/Surprise Test/ Seminar for 15 Marks) Execute the following lab exercises with the aid of any modern technological tool (Matlab/ Mathematica/ Scilab/ Python/ Maxima, etc).

  Learning Activity-2: Assignments (Marks-10)

List of Lab Activities:

1) Errors and approximation,
2) Root finding methods,
3) Norms, Condition number,
4) Gauss Seidel method and Rayleigh power's method,
5) Forward and Backward interpolation,
6) Lagrange's interpolation,
7) Solving differential equations of first and higher order,
8) Numerical integration,
9) Taylor's method, Modified Euler's method,
10) Runge-Kutta method of fourth order.

Total CIE marks will be the sum of average of three tests (25 marks) and continuous comprehensive assessments (25 marks) which will be scaled down to 50 marks.

Semester End Examination(SEE):

Theory SEE will be conducted by KSIT as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.
- 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. The student has to answer for 100 marks and marks scored out of 100 shall be proportionally reduced to 50 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review

- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

Signatures:

1. Dr. BHASKAR M
2. Dr. VENKATESHWARALU B
3. Dr. A.V. RAGHU
4. Dr. SHILPASHREE S P
5. Dr. RAJASHEKHAR M N
6. Mr. SUJITH THOMAS
7. Mr. SATISH V
8. Dr. KIRAN KUMAR S R
9. Dr. SHASHIKALA B S
10. Mrs. ANURADHA M V
11. Chairperson (Dr. JALAJA P)

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Department of Mathematics

SECOND SEMESTER SYLLABUS

Course: **Applied Mathematics-II for ECE Stream: Calculus, Laplace Transform and Numerical Techniques**		Semester	II
Course Code	**25BMAEC201**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours Theory+20 Hours Tutorials	Total Marks	100
Credits	04	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set):

The goal of the course **Applied Mathematics-II for ECE Stream** is to

1. **Familiarize** the importance of Integral calculus and Vector calculus, for Electrical and Communication Engineering.
2. **Utilize** the Laplace Transform to solve the ordinary differential equations.
3. **Develop** the knowledge of solving Electrical and Communication Engineering problems numerically.

Module-1: Integral Calculus and its Applications

Multiple Integrals: Evaluation of double and triple integrals, change of order of integration, changing to polar coordinates. Area and volume using double and triple integrals. Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions.
(Text 1: Ch-7(7.1 to 7.5, 7.6(1,2), 7.7(1), 7.14 to 7.16))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-2: Vector Calculus and its Applications

Vector Differentiation: Scalar and vector fields, gradient of a scalar field, directional derivatives, divergence of a vector field, solenoidal vector, curl of a vector field, irrotational vector, physical interpretation of gradient, divergence and curl and scalar potential.

Vector Integration**:** Line integrals and Surface integrals, Statement of Green's and Stokes' theorem without verification problems.

(Text 1: Ch-8(8.4 to 8.7,8.11 to 8.14))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-3: Numerical Methods -1

Solution of algebraic and transcendental equations: Regula-Falsi method and Newton-Raphson method.

Finite Differences and Interpolation: Forward and backward differences, Interpolation, Newton forward and backward interpolation formulae, Newton's divided difference interpolation formula and Lagrange's interpolation formula.

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd rule and Simpson's 3/8th rule, Weddle's rule.

(Text 1: Ch-28(28.2(2,3)), Ch-29(29.1(1,2),29.6(1,2), 29.9 to 29.12), Ch-30(30.4, 30.6, 30.7,30.8, 30.10)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-4: Numerical Methods – 2

Numerical solution of ordinary differential equations of first order and first degree: Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor corrector method and Adam-Bashforth predictor-corrector method.
(Text 1: Ch-32(32.1, 32.3, 32.5, 32.7, 32.9, 32.10))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-5: Laplace Transform

Laplace transform (LT): Definition and Formulae of Laplace Transform, LT of elementary functions. Properties–linearity, scaling, shifting property, differentiation in the s domain, division by t. LT of periodic functions, square wave, saw-tooth wave, triangular wave, full and half wave rectifier, Heaviside Unit step function.
Inverse Laplace Transforms: Definition, properties, evaluation using different methods, and applications to solve ordinary differential equations.
(Text 1: Ch-21(21.1 to 21.4, 21.7 to 21.10), Text 2: Ch-6(6.1,6.2.6.3), Text 1: Ch-21(21.5, 21.17, 21.12, 21.13, 21.15)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Course outcome (Course Skill Set)

CO1: Apply the concepts of integral calculus to solve problems in engineering applications such as area, volume.
CO2: Apply the vector calculus to compute derivatives.
CO3: Apply appropriate numerical methods to find approximate solutions of algebraic, transcendental, and ordinary differential equations and to perform interpolation and numerical integration in engineering contexts.
CO4: Apply Laplace transform techniques for time domain, wave forms, periodic functions and solving differential equations.
CO5: Demonstrate the applications of electrical engineering and allied engineering science using modern ICT tools.

Suggested Learning Resources: (Textbook/Reference Book):
Textbooks:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2021.
2. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2018.
3. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publishers, 8thEd., 2022.

Reference books:

1. B.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, Laxmi Publications, 10th Ed., 2022.
4. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publication, 3rd Ed., 2014.
5. Steven V. Chapra and Raymond P. Canale, Applied Numerical Methods with Matlab for Engineers and Scientists, McGraw-Hill, 3rd Ed., 2011.
6. Richard L. Burden, Douglas J. Faires and A. M. Burden, Numerical Analysis, 10th Ed.,2010, Cengage Publishers.
7. S.S. Sastry, "Introductory Methods of Numerical Analysis", PHI Learning Private Limited, 5th Ed., 2012.

Web links and Video Lectures (e-Resources):

- http://academicearth.org/
- VTU e-Shikshana Program
- VTU EDUSAT Program
- https://nptel.ac.in/courses/111105160
- https://nptel.ac.in/courses/127106019
- https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-methods-spring-2019/
- https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2012/pages/syllabus/

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of 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 students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students' for self–study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
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).

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):

- Three Tests each of 25 Marks;
- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively. Average of three tests will be scaled down to 25 marks.
- Continuous Comprehensive Assessments will be conducted with a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

  Learning Activity-1: Practicing problems (Lab Activities/Surprise Test/ Seminar for 15 Marks)
  Execute the following lab exercises with the aid of any modern technological tool (Matlab/

Mathematica/ Scilab/ Python/ Maxima, etc).

Learning Activity-2: Assignments (Marks-10).

List of Lab Activities:

1) Evaluate double integration and compute area and volume,
2) Evaluate triple integration and compute volume,
3) Finding gradient, divergence and curl,
4) Evaluate line integrals,
5) Regula Falsi and Newton Raphson method,
6) Interpolation,
7) Numerical integration,
8) Modified Euler's method, Fourth order Runge -Kutta method,
9) Laplace transform,
10) Inverse Laplace transform.

Total CIE marks will be the sum of average of three tests (25 marks) and Continuous Comprehensive Assessments (25 marks) which will be scaled down to 50 marks.

Semester End Examination(SEE):

Theory SEE will be conducted by KSIT as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.
- 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. The student has to answer for 100 marks and marks scored out of 100 shall be proportionally reduced to 50 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching

Role Play

Signatures:

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11. Chairperson (Dr. JALAJA P)

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Department of Mathematics

SECOND SEMESTER SYLLABUS

Course: **Applied Mathematics-II for ME stream: Multivariable Calculus and Numerical Methods**		Semester	II
Course Code	**25BMAME201**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours Theory+20 Hours Tutorials	Total Marks	100
Credits	04	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set):

The goal of the course **Applied Mathematics-II for ME stream** is to

1. **Familiarize** the importance of Integral calculus and Vector calculus essential for Mechanical engineering.
2. **Analyze** Mechanical engineering problems by applying Ordinary Differential Equations of higher order.
3. **Develop** the knowledge of solving Mechanical engineering problems numerically.

Module-1: Ordinary Differential Equations of Higher Order

Higher-order ordinary differential equations with constant coefficients, homogeneous and non-homogeneous equations- $e^{ax}, sin(ax+b), cos(ax+b), x^n$ only, Method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations. Applications: mass spring model.

(Text 1: Ch-13(13.4, 13.5, 13.6(1,2,3), 13.8(1), 13.9(1,2), 14.4)

(Text 2: Ch-4(4.1(Example 3 and Problem14)))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-2: Integral Calculus

Multiple Integrals: Definition, Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions.

(Text 1: Ch-7(7.1 to 7.5, 7.6(1), 7.7(1), 7.14 to 7.16)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-3: Vector Calculus

Scalar and vector fields. Gradient, directional derivative, divergence and curl - physical interpretation, solenoidal vector fields, irrotational vector fields and scalar potential. Vector Integration: Line integrals, surface integrals, work done by a force and flux. Statement of Green's theorem and Stoke's theorem and problems without verifications.

(Text 1: Ch-8(8.4 to 8.7, 8.11 to 8.14, 8.18))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-4: Numerical Methods - 1

Solution of algebraic and transcendental equations: Regula-Falsi and Newton-Raphson methods. Interpolation: Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula. Numerical integration: Trapezoidal, Simpson's 1/3rd and 3/8th rules, Weddle's rule.

(Text 1: Ch-28(28.2(2,3)), Ch-29(29.1(1,2),29.6(1,2), 29.9 to 29.12), Ch-30(30.4, 30.6, 30.7, 30.8, 30.10)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-5: Numerical Methods – 2

Numerical solution of ordinary differential equations of first order and first degree: Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order, Milne's predictor-corrector formula and Adams-Bashforth predictor-corrector method.

(Text 1: Ch-32(32.1, 32.3, 32.5, 32.7, 32.9, 32.10))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Course outcome (Course Skill Set)

CO1: Apply the concepts of higher order differential equations to model and solve problems in engineering applications such as heat conduction

CO2: **Apply** the concepts of integral calculus to solve problems in engineering applications such as area, volume.

CO3: Apply the concepts of vector calculus to model and solve problems in engineering applications such as field analysis.

CO4: Apply appropriate numerical methods to find approximate solutions of algebraic, transcendental, and ordinary differential equations and to perform interpolation and numerical integration in engineering contexts.

CO5: Demonstrate the applications of mechanical engineering and allied engineering science using modern ICT tools.

Suggested Learning Resources:

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

Textbooks:

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Reference books:

1) B.V.Ramana, Higher Engineering Mathematics, McGraw-Hill Education, 11th Ed., 2017
2) Srimanta Pal & Subodh C.Bhunia, Engineering Mathematics, Oxford University Press, 37 Ed., 2016.
3) N.P. Bali and Manish Goyal, ATextbook of Engineering Mathematics, Laxmi Publications, 10 Ed., 2022.
4) H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publication, 31 Ed., 2014.
5) Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, McGraw Hill Book Co., New York, 6th Ed., 2017.
6) Steven V. Chapra and Raymond P. Canale, Applied Numerical Methods with Matlab for Engineers and Scientists, McGraw-Hill, 3rd Ed., 2011.

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- VTU e-Shikshana Program
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- https://nptel.ac.in/courses/111105160
- https://nptel.ac.in/courses/127106019
- https://ocw.mit.edu/courses/18-335j-introduction-to-numerical-methods-spring-2019/
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Teaching-Learning Process (Innovative Delivery Methods)

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4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
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).

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):

- Three Tests each of 25 Marks.
- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively. Average of three tests will be scaled down

to 25 marks.

- Continuous Comprehensive Assessments will be conducted with a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

  Learning Activity-1: Practicing problems (Lab Activities/Surprise Test/ Seminar for 15 Marks) Execute the following lab exercises with the aid of any modern technological tool (Matlab/ Mathematica/ Scilab/ Python/ Maxima, etc).

  Learning Activity-2: Assignments (Marks-10).

List of Lab Activities:

1) Evaluate double and triple integration and compute area and volume,
2) Solve higher order differential equations,
3) Finding gradient, divergence and curl,
4) Evaluate line integrals,
5) Regula Falsi and Newton Raphson method,
6) Interpolation,
7) Numerical integration,
8) Modified Euler's method,
9) Fourth order Runge -Kutta method,
10) Milne's method

Total CIE marks will be the sum of average of three tests (25 marks) and Continuous Comprehensive Assessments (25 marks) which will be scaled down to 50 marks.

Semester End Examination (SEE):

Theory SEE will be conducted by KSIT as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.
- 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. The student has to answer for 100 marks and marks scored out of 100 shall be proportionally reduced to 50 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity

- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching

  Role Play

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Department of Physics

FIRST / SECOND SEMESTER SYLLABUS

Course : Applied Physics for CSE Stream: QUANTUM PHYSICS AND APPLICATIONS		Semester	I/II
Course Code	**25BPHCS102/202**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	04	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set): The students will be able

- To study the principles of quantum mechanics and its application in quantum computing
- To study the essentials of photonics and its application in Computer Science
- To study the electrical properties of materials

Module-1: Quantum Mechanics

Introduction to Quantum Mechanics : de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Heisenberg's Uncertainty Principle and its application (Non-existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity.

Mathematical Formulation : Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Role of higher dimensions (Qualitative),Waveforms and Probabilities, Particle inside a finite potential well and quantum tunneling, Linear superposition, Numerical Problems. **(8 hours)**

Text1: Ch 1and Ch 2

Module-2: Quantum Computing

Principles of Quantum Information & Quantum Computing: Introduction to Quantum Computing, Moore's law & its end, limitations of VLSI, Differences between Classical & Quantum computing. Concept of bit, qubit and its properties. Representation of qubit by Bloch sphere. Single and Two qubits. Extension to N qubits, Dirac notation, Matrix representation of 0 and 1 States, Superconducting qubits, Harmonic oscillator (qualitative) – Need for anharmonicity, Charge qubit.

Quantum Gates: Single Qubit Gates: Quantum Not Gate, Pauli – X, Y and Z Gates, Hadamard Gate, Phase Gate (or S Gate), T Gate. **Multiple Qubit Gates:** Controlled gate, CNOT Gate, (Discussion for 4 different input states), Numerical Problems. **(8 hours)**

Ref 3: Ch 1-1.1-1.3 , Ch 4-4.2-4.5

Module-3: Photonics

Lasers: Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Meta stable State, Requisites of a laser system, Characteristic properties of LASER, Semiconductor Diode Laser Applications: Laser range finder, Use of attenuators for single photon sources, Optical modulators – Pockel's effect, Kerr effect, Numerical Problems.

Optical Fiber: Principle and Structure, Propagation of Light, Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Modes of Propagation, V-number, Attenuation and Fiber Losses, Mach- Zchnder interferometer. Numerical Problems. **(8 hours)**

Text 1: Ch 6 and Ch 7

Module-4: Electrical Properties of Metals and Semiconductors

Electrical Conductivity in metals: Mechanisms of electron scattering in solids, Matheissen's rule, Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory (QFET), Density of States (Qualitative), Fermi Dirac Statistics, Fermi Energy, Fermi Factor, Variation of Fermi Factor with Temperature and Energy, Numerical Problems.

Semiconductors: Fermi level in Intrinsic & Extrinsic Semiconductor, Expression for concentration of electrons in conduction band & holes concentration in valance band (only mention the expression), Fermi level for intrinsic(with derivation) and extrinsic semiconductor (no derivation), Derivation of electron concentration in an intrinsic semiconductor, Hall effect, Expressions for Hall voltage and Hall coefficient, Numerical Problems. **(8 hours)**

Text 1:Ch 3 and Ch 9

Module-5: Superconductivity

Fundamental Concepts of Superconductivity: Zero resistance state, Persistent current, Meissner effect, Critical temperature, Critical current (Silsbee Effect) – Derivation for a cylindrical wire using ampere's law, Critical field, Formation of Cooper pairs - Mediation of phonons, Two-fluid model, BCS Theory - Phase coherent state, Limitations of BCS theory, Examples of systems with low and high electron-phonon coupling, Type-I and Type-II superconductors, Josephson junction, Flux quantization, DC and AC SQUID, Maglev vehicles, Numerical Problems. **(8 hours)**

Text 1: Ch 8

List of Laboratory experiments (2 hours/week per batch/batch strength 15) 10 lab sessions + 1 repetition class + 1 Lab Assessment.

Title of the experiment

1. Determination of Planck's Constant using LEDs.
2. Verification of Stefan's Law
3. Predicting the outputs of various combinations of single and two-qubit gates using QUIRK Quantum Simulator.
4. Predicting the outputs of various combinations of single and two-qubit gates using QUISKIT.
5. Determination of wavelength of LASER using Diffraction Grating.
6. Determination of acceptance angle and numerical aperture of the given Optical Fiber.
7. Determination of Fermi Energy of Copper.
8. Determination of Energy gap of a semiconductor.
9. Determination of resistivity of a material with increasing temperature.
10. Resonance in LCR circuit.
11. Identification of circuit elements in a Black Box and determination of values of the components.
12. Data analysis using Spread Sheet.

Course outcome (Course Skill Set)

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

CO1 Apply the fundamental principles of quantum mechanics to understand the behaviour of matter and energy.

CO2 Apply the basic concepts of quantum mechanics to understand their relevance in computational applications.

CO3 Describe the principles of lasers and optical fibers, and explain their relevant applications in Photonic devices.

CO4 Examine the behavior of electrons in metals and semiconductors using quantum theory to understand and explain the properties of materials.

CO5 Summarize the essential properties of superconductors and its applications

Suggested Learning Resources:

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

Text Books:

1. Engineering Physics, **S P Basavaraj**, 2018 Edition, Subhash Stores
2. A Textbook of Engineering Physics- **M.N. Avadhanulu and P.G. Kshirsagar**, 10th revised Ed, S. Chand. & Company Ltd, New Delhi.

Reference Books:

1. Concepts of Modern Physics, **Aurthur Beiser**, **Mc Grawhill**, 6th Edition, 2009.
2. Lasers and Non Linear Optics, **BB Loud**, New age international, 2011 edition.
3. Quantum Computation and Quantum Information, **MichaelA. Nielsen & IsaacL.** Chuang, Cambridge Universities Press, 2010 Edition.
4. Quantum Computation and Logic: How Quantum Computers Have Inspired Logical Investigations, **Maria Luisa Dalla Chiara, Roberto Giuntini, Roberto Leporini, Giuseppe Sergioli,** Trends in Logic, Volume 48, Springer.
5. Introduction to Superconductivity, **Michael Tinkham,** McGraw Hill, INC, II Edition
6. Solid State Physics, **S O Pillai**, New Age International Private Limited, 8th Edition, 2018.

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

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

Quantum Computing: https://www.youtube.com/watch?v=ZuvCUU2jD30

Physics of Animation : https://www.youtube.com/watch?v=kj1kaA_8Fu4

NPTEL Supercoductivity:https://archive.nptel.ac.in/courses/115/103/115103108/

NPTEL Quantum Computing : https://archive.nptel.ac.in/courses/115/101/115101092Virtual

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

Teaching-Learning Process Pedagogy

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

1. Flipped Class
2. Chalk and Talk
3. Blended Mode of Teaching and Learning
4. Simulations, Interactive Simulations and Animations
5. NPTEL and Other Videos for theory topics
6. Smart Class Room
7. Lab Experiment Videos

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE, minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as pass in the course if he/she secures 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 for the theory component of the IC:

- The internal Assessment Test component of the CIE carries 25 marks.
- Each test shall be conducted for 25 marks. The first test will be administered after 35-40% of the coverage of the syllabus, second test will be administered after 65-70%, and the third test will be administered after 90-100% of the coverage of the syllabus. The average of the three tests shall be considered for 25 marks.
- Three assignments (average is scaled down to 5 marks)/mini project/Quiz/Seminar are conducted for 5 marks.
- To qualify and become eligible to appear for SEE, in the CIE theory component, a student must score at least 40% of 30 marks, i.e., 12 marks.

CIE for the Lab component of the IC*:*

Every experiment in the laboratory will be evaluated for 15 marks, comprising marks for conducting the experiment and for laboratory record. An additional 05 marks shall be for the test conducted at the end of the semester. To qualify and become eligible to appear for SEE, in the CIE Practical component, a student must secure a minimum of 40% of 20 marks, i.e., 08 marks.

CIE for the theory 30 MARKS + CIE for the practical 20MARKS = Total CIE 50 MARKS

Semester End Exam (SEE):50 marks

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FIRST / SECOND SEMESTER SYLLABUS

Course : Applied Physics for ECE Stream: QUANTUM PHYSICS AND ELECTRONIC SENSORS		Semester	I/II
Course Code	**25BPHEC102/202**	CIE Marks	50
Teaching Hours/Week(L:T:P:S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	04	Exam Hours	03
Examination type(SEE)	**Theory**		

Course Objectives (Course Skill Set): The students will be able

- To study the principles of quantum mechanics
- To understand the electrical properties of materials
- To study the essentials of Lasers and optical fibers
- To study the properties of semiconductors and their applications in electronic devices and sensors.

Module-1: Quantum Mechanics

Introduction to Quantum Mechanics : de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Heisenberg's Uncertainty Principle and its application (Non-existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity.

Mathematical Formulation : Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Role of higher dimensions (Qualitative),Waveforms and Probabilities, Particle inside a finite potential well and quantum tunneling, Linear superposition, Numerical Problems. **(8 hours)**

Text1: Ch 1and Ch 2

Module-2: Electrical Properties of Metals and Semiconductors

Electrical Conductivity in metals: Mechanisms of electron scattering in solids, Matheissen's rule, Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory (QFET), Density of States (Qualitative), Fermi Dirac Statistics, Fermi Energy, Fermi Factor, Variation of Fermi Factor with Temperature and Energy, Numerical Problems.

Semiconductors: Fermi level in Intrinsic & Extrinsic Semiconductor, Expression for concentration of electrons in conduction band & holes concentration in valance band (only mention the expression). Fermi level for intrinsic (with derivation) and extrinsic semiconductor (no derivation), Derivation of electron concentration in an intrinsic semiconductor, Hall effect, Expressions for Hall voltage and Hall coefficient, Numerical Problems. **(8 hours)**

Text 1:Ch 3 and Ch 9

Module-3: Photonics

Lasers: Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Meta stable State, Requisites of a laser system, Characteristic properties of LASER, Semiconductor Diode Laser Applications: Use of attenuators for single photon sources, Optical modulators – Pockel's effect, Kerr effect, Photodetectors – Single Photon Avalanche Diode, Numerical Problems.

Optical Fiber: Principle and Structure, Propagation of Light, Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Modes of Propagation, V-number, Attenuation and Fiber Losses, Mach-Zchnder interferometer, Numerical Problems. **(8 hours)**

Text 1: Ch 6 and Ch 7

Module-4: Superconductivity

Fundamental Concepts of Superconductivity: Zero resistance state, Persitent current, Meissner effect, Critical temperature, Critical current (Silsbee Effect) – Derivation for a cylindrical wire using ampere's law, Critical field, Formation of Cooper pairs - Mediation of phonons, Two-fluid model, BCS Theory - Phase coherent state, Limitations of BCS theory, Examples of systems with low and high electron-phonon coupling, Type-I and Type-II superconductors, Josephson junction, Flux quantization, DC and AC SQUID, Maglev vehicles, Numerical Problems. **(8 hours)**

Text 1: Ch 8

Module-5: Semiconductor Devices and Sensors

Semiconductor Devices: Direct and indirect band gap, Band gap engineering, LED, Photo Diode, Light dependent resistor, Resistance temperature detectors (high, medium, low), VLSI basics, Construction and working of Solar Cell.

Sensors: Sensing mechanisms, Piezo electric Sensors, Metal Oxide Semiconductor (MOS) sensors, Superconducting Nanowire Single Photon Detector, Numerical Problems. **(8 hours)**

Text 1:Ch 9

Text 2:Ch 31

List of Laboratory experiments (2 hours/week per batch/batch strength 15) 10 lab sessions + 1 repetition class + 1 Lab Assessment.

Title of the experiment

1. Determination of Planck's Constant using LEDs.
2. Verification of Stefan's Law
3. Determination of Fermi Energy of Copper.
4. Determination of Energy gap of a semiconductor.
5. Determination of resistivity of a semiconductor by Four Probe Method.
6. Determination of dielectric constant of the material of capacitor by Charging and Discharging method.
7. Determination of wavelength of LASER using Diffraction Grating.
8. Determination of acceptance angle and numerical aperture of the given Optical Fiber.
9. Determination of resistivity of a material with increasing temperature.
10. Study the I-V Characteristics of the Given Bipolar Junction Transistor.
11. Study the characteristics of photodiode.
12. Determination of Efficiency of Solar Cell.
13. Simulation Experiment.

Course outcome (Course Skill Set)

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

CO1 Apply the fundamental principles of quantum mechanics to understand the behaviour of matter and energy.

CO2 Examine the behavior of electrons in metals and semiconductors using quantum theory to understand and explain the properties of materials.

CO3 Describe the principles of lasers and optical fibers, and explain their relevant applications in Photonic devices.

CO4 Summarize the essential properties of superconductors and its applications

CO5 Illustrate the properties of semiconductors and the working principles of semiconductor devices.

Suggested Learning Resources:

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

Text Books:

1. Engineering Physics, **S P Basavaraj**, 2018 Edition, Subhash Stores
2. A Textbook of Engineering Physics- **M.N. Avadhanulu and P.G. Kshirsagar**, 10th revised Ed, S. Chand. & Company Ltd, New Delhi.

Reference Books:

1. An Introduction to Lasers theory and applications by **M. N. Avadhanulu and P.S. Hemne**, revised Edition 2012. S. Chand and Company Ltd -New Delhi.
2. Concepts of Modern Physics-**Arthur Beiser**: 6th Ed;Tata McGraw Hill Edu Pvt Ltd- New Delhi 2006.
3. Fundamentals of Fibre Optics in Telecommunication & Sensor Systems, **B.P. Pal**, New Age International Publishers.
4. Lasers and Non Linear Optics – **B.B. Laud**, 3rd Ed, New Age International Publishers 2011.
5. Solid State Physics, **S O Pillai**, New Age International Private Limited, 8th Edition, 2018.

Weblinks and Video Lectures (e-Resources):

Laser: https://www.britannica.com/technology/laser,k
Laser: https://nptel.ac.in/courses/115/102/115102124/
Quantum mechanics: https://nptel.ac.in/courses/115/104/115104096/
Physics: http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
Numerical Aperture of fiber:https://bop-iitk.vlabs.ac.in/exp/numerical-aperture-measurement

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

http://nptel.ac.in
https://swayam.gov.in
https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham
https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1
https://virtuallabs.merlot.org/vl_physics.html
https://phet.colorado.edu
https://www.myphysicslab.com

Teaching-Learning Process Pedagogy

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

1. Flipped Class
2. Chalk and Talk
3. Blended Mode of Teaching and Learning
4. Simulations, Interactive Simulations and Animations
5. NPTEL and Other Videos for theory topics
6. Smart Class Room
7. Lab Experiment Videos

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE, minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as pass in the course if he/she secures 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 for the theory component of the IC:

- The internal Assessment Test component of the CIE carries 25 marks.

- Each test shall be conducted for 25 marks. The first test will be administered after 35-40% of the coverage of the syllabus, second test will be administered after 65-70%, and the third test will be administered after 90-100% of the coverage of the syllabus. The average of the three tests shall be considered for 25 marks.
- Three assignments (average is scaled down to 5 marks)/mini project/Quiz/Seminar are conducted for 5 marks.
- To qualify and become eligible to appear for SEE, in the CIE theory component, a student must score at least 40% of 30 marks, i.e., 12 marks.

CIE for the Lab component of the IC*:*

Every experiment in the laboratory will be evaluated for 15 marks, comprising marks for conducting the experiment and for laboratory record. An additional 05 marks shall be for the test conducted at the end of the semester. To qualify and become eligible to appear for SEE, in the CIE Practical component, a student must secure a minimum of 40% of 20 marks, i.e., 08 marks.

CIE for the theory 30 MARKS + CIE for the practical 20MARKS = Total CIE 50 MARKS

Semester End Exam (SEE):50 marks

Signatures:

1. Dr. BHASKAR M
2. Dr. VENKATESHWARALU B
3. Dr. A.V. RAGHU
4. Dr. SHILPASHREE S P
5. Dr. RAJASHEKHAR M N
6. Mr. SUJITH THOMAS
7. Mr. SATISH V
8. Dr. KIRAN KUMAR S R
9. Dr. SHASHIKALA B S
10. Mrs. ANURADHA M V
11. Chairperson (Dr. JALAJA P)

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Physics

FIRST / SECOND SEMESTER SYLLABUS

Course : **Applied Physics for ME Stream: PHYSICS OF MATERIALS**		Semester	I/II
Course Code	25BPHME102/202	CIE Marks	50
Teaching Hours/Week(L:T:P:S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	04	Exam Hours	03
Examination type(SEE)	**Theory**		

Course Objectives (Course Skill Set): The students will be able

- To understand the types of oscillation, shock waves and its applications.
- To Study the elastic properties of materials.
- To understand the fundamentals of thermoelectric materials and devices and their application.
- To understand the concepts of low temperature phenomena and the methods used for its generation.
- To study the basics of nanomaterials and various relevant material characterization techniques.

Module-1: Oscillations and Shock waves

Oscillations: Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Sprigs: Stiffness Factor and its Physical Significance, Series and Parallel combination of springs (Derivation), Types of Springs and their applications. Theory of Damped oscillations (Qualitative), Types of Damping (Graphical Approach). Engineering applications of Damped oscillations, Theory of Forced oscillations (Qualitative), Resonance, Sharpness of resonance, Resonance in LCR circuits (Qualitative), Numerical Problems.

Shock waves: Mach number and Mach Angle, Mach Regimes, Definition and Characteristics of Shock waves, Construction and working of Reddy Shock tube, Applications of Shock Waves. Numerical problems.

Text 1:Ch 1 and Ch 2 **Number of hours: 8 hours**

Module-2: Elasticity

Review Stress-Strain Curve, Strain hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio. Static and dynamic loading, Beams, Bending moment and derivation of expression, Cantilever, Torsion and Expression for couple per unit twist, Elastic materials (qualitative). Failures of engineering materials - Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), S-N Curve, Numerical problems.

Text 1: Ch 3 **Number of hours: 8 hours**

Module-3: Cryogenics

Introduction to Thermodynamics, Carnot's principle, Efficiency, Production of low temperature - Joule Thomson effect (Derivation with 3 cases), Porous plug experiment with theory, Thermodynamical analysis of Joule Thomson effect, Liquefaction of Oxygen by cascade process, Lindey's air liquefier, Liquefaction of Helium and its properties (superfluidity), Platinum Resistance Thermometer, Applications of Cryogenics: Aerospace, Tribology and Food processing(qualitative), Numerical Problems.

Ref 3: Ch 1,Ch 4-6, Ch 13, Ch 16 **Number of hours: 8 hours**

Module-4: Thermoelectric and energy conversion materials

Thermo emf and thermo current, Seeback effect, Peltier effect, Seebeck and Peltier coefficients, figure of merit (Mention Expression), laws of thermoelectricity. Expression for thermo emf in terms of T1 and T2, Thermo couples, thermopile, Construction and Working of Thermoelectric generators (TEG), Thermoelectric coolers (TEC), Low, mid and high temperature thermoelectric materials, Applications: Exhaust of automobiles, Refrigerator, Space program(Radioisotope Thermoelectric Generator- RTG), Numerical Problems.

Text 2: Ch 17 **Number of hours: 8 hours**

Module-5: Nanomaterials and Characterization Techniques

Nanomaterials: Nanotechnology, Length Scales, Variation of physical properties from bulk to thin films to nanomaterials, mesoscopic state, Confinement of electron in 0D, 1D, 2D and 3D systems, Surface to Volume Ratio, Carbon nano tubes: Types, Properties & its applications.

Characterization Techniques: Principle, construction and working of X-ray Diffractometer, Crystallite size determination by Scherrer equation, Principle, X-ray photoelectron spectroscopy (XPS), construction and working of Scanning electron microscopy (SEM) and Atomic force microscopy (AFM), Numerical Problems. **(8 hours)**

Text 1:Ch 10 Text 2:Ch 39 **Number of hours: 8 hours**

List of Laboratory experiments (2 hours/week per batch/batch strength 15) 10 lab sessions + 1 repetition class + 1 Lab Assessment.

Title of the experiment

1. Determination of effective spring constant of the given springs in series and parallel combinations.
2. Study the frequency response of Series & Parallel LCR circuits.
3. Demonstration of Reddy Shock Tube.
4. Determination of Moment of Inertia of an irregular body.
5. Determination of Rigidity modulus of the Material of the wire using Torsional Pendulum.
6. Determination of Young's modulus of the material of the given bar by uniform bending.
7. Verification of Newton's Law of Cooling.
8. Simulate coupled thermal and electrical transport in thermoelectric materials.
9. Determination of See beck Coefficient.
10. Verify Peltier Effect using thermocouples.
11. Simulate the Study flow characteristics of cryogenic fluids (LN_2, LHe) through vacuum-jacketed pipes.
12. Determination of wavelength of LASER using Diffraction Grating.

Course outcome (Course Skill Set)

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

CO1 Illustrate the various types of waves, oscillations and their implications.

CO2 Make use of the concepts of Elasticity to determine physical quantities.

CO3 Apply the fundamentals of Thermo electric materials and their experimental applications.

CO4 Apply the concepts of low temperature phenomena for various engineering applications.

CO5 Illustrate the various instrumentation techniques for nano material characterization.

Suggested Learning Resources:

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

Text Books:

1. Engineering Physics, **S P Basavaraj**, 2018 Edition, Subhash Stores.
2. A Textbook of Engineering Physics- **M.N. Avadhanulu and P.G. Kshirsagar**, 10th revised Ed, S. Chand. & Company Ltd, New Delhi.

Reference Books:

1. **Sadhu Singh**, "Theory of Elasticity", Khanna Publishers, 1997.
2. Heat and Thermodynamics (I-Edition) – **D. S. Mathur** - S. Chand & Company Ltd., New-Delhi, 1991.
3. Physics of Cryogenics by **Bahman Zohuri**, Elsevier, 2018
4. Nanoscience and Nanotechnology: Fundamentals to Frontiers – **M. S. Ramachandra Rao & Shubra Singh**, Wiley India Pvt Ltd.
5. Characterization of Materials- **Mitra P. K**. Prentice Hall India Learning Private Limited.

Web links and Video Lectures (e-Resources):

Simple Harmonic motion: https://www.youtube.com/watch?v=k2FvSzWeVxQ
Shock waves and its applications: https://www.youtube.com/watch?v=tz_3M3v3kxk
Stress- strain curves: https://web.mit.edu/course/3/3.11/www/modules/ss.pdf
Fracture in materials: https://www.youtube.com/watch?v=x47nky4MbK8
Thermoelecticity:https://www.youtube.com/watch?v=2w7NBuu5w9c&list=PLtkeUZItwHK5y6qy1GFxa4Z4Rc mzUaaz6

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

Thermoelectric generator and coolers: https://www.youtube.com/watch?v=NruYdb31xk8
Cryogenics: https://cevgroup.org/cryogenics-basics-applications/
Liquefaction of gases: https://www.youtube.com/watch?v=aMelwOsGpIs
Virtual lab:https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham
Material characterization :https://onlinecourses.nptel.ac.in/noc20_mm14/preview
https://www.encyclopedia.com/science-and-technology/physics/physics/cryogenics
https://www.usna.edu/NAOE/_files/documents/Courses/EN380/Course_Notes/Ch10_Deformation.pdf

Teaching-Learning Process Pedagogy

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CIE for the Lab component of the IC*:*

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Accredited by NAAC with 'A+' Grade, NBA (CSE, ECE)
#14, Raghuvanahalli, Kanakapura Road, Bengaluru-560 109, Karnataka, India.

DETAILS OF STREAM SPECIFIC COMPUTER AIDED ENGINEERING DRAWING

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Computer Aided Engineering Drawing for CSE Stream		Semester	I/II
Course Code	**25BCED103 / 203A**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**2:0:2:0**	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Laboratory**		

Course Objectives (Course Skill Set)

1. Generate orthographic projections of points, lines, planes, and solids manually and with computer aided tools.
2. Develop the lateral surfaces of solids for real-world applications.
3. Draw isometric views and convert isometric drawings to orthographic views.
4. Create 3D models of embedded, networking, and IoT devices.
5. Demonstrate of 3D printing components

Module-1

Introduction: Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate 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, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes: Introduction to Orthographic projections, Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only as per BIS) Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (Placed in First quadrant only using change of position method).

Number of Hours:8

Module-2

Orthographic Projection of Solids: Orthographic projection of right regular solids (Resting on HP only and inclined to both the planes); Prisms, Pyramids, Cylinders & Cones.

Number of Hours:8

Module-3

Section of Solids: Introduction, Section planes, Sectional views: apparent shapes and true shapes, Sections of right regular prisms, pyramids, cylinders and cones resting with their base on HP. (*Concepts only and No Problems for practice)*

Development of Lateral Surfaces of Solids: Development of lateral surfaces of right regular Prisms, Pyramids, Cylinders & Cones and their frustums and truncations. Problems on applications of development of lateral surfaces like funnels and trays.

Number of Hours:8

Module-4

Isometric Views: Introduction to Isometric views, Isometric projections, Isometric scale. Isometric view of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres, Isometric view of combination of two simple solids, step block.

Number of Hours:8

Module-5

Conversion of simple isometric drawings into orthographic views: Problems on conversion of Isometric view of simple objects / engineering components into orthographic views.

Computer Network Drawing (For CIE Only):2D Network drawing with wired and wireless, Network topology - wired and wireless. 3D Modeling: Raspberry Pi / Arduino boards, Router & switches, IoT devices - Concept of converting to 3D printing format (stl) Concept of Industrial drawing

Demonstration of working of 3-D printing Machine. Each section students will be demonstrated with a specific model for printing (between $8^{th}$and 10^{th}week of course).The details step of making the CAD model, converting it to suitable machine language and operating the 3-D printer will be demonstrated. A model will be printed using 3-D printing Machine and will be displayed. *(For practice only, not for CIE and SEE).*

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: **Make us of** the standards and conventions in Engineering Drawings to obtain projections of simple points and lines.

CO2: **Obtain** the orthographic views of different types of lamina kept on Horizontal and Vertical plane.

CO3: **Construct** the orthographic view of regular Solids resting on Horizontal plane at different angles.

CO4: **Build** isometric projections of solids and combination of two simple solids to obtain three dimensional appearances.

CO5: **Develop** the lateral surface of various solids and **make use of** 3D printing machine to print a simple 3D model.

Suggested Learning Resources:

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

1. K. R. Gopalakrishna, & Sudhir Gopalakrishna: A Textbook of Computer Aided Engineering Drawing, 39th Edition, Subash Stores, Bangalore, 2017
2. 2. Bhatt, N.D., Engineering Drawing: Plane and Solid Geometry, 53rd Edition, Charotar Publishing House Pvt. Limited, 2023.

Reference Books

1. Warren. J. Luzadder, Jon M Duff, Fundamentals of Engineering Drawing, 11^{th} edition, Prentine-Hall of India Pvt Ltd.
2. Chris Schroder, Printed Circuit Board Design using AutoCAD, Newnes, 1997.
3. R K Hegde and Niranjan Murthy, Computer Aided Engineering Drawing, Revised edition 2010, Sapna Book House Publications.
4. N H Dubey, Computer Aided Engineering Drawing, Revised edition, Himalaya Publishing House,First Edition, 2006.
5. A Primer on Computer Aided Enginerring Drawing 2006, published by VTU, Belagaum.
6. S Trymbaka Murthy, Computer Aided Engineering Drawing, Third Edition 2006, I. K. International Publishing House.
7. Gibson Ian., David Rosen, Brat Stucker, Additive Manufacturing Technologies, 2^{nd} Edition, Springer Publication, 2015.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/112104172
- https://nptel.ac.in/courses/112102304
- https://nptel.ac.in/courses/112105294
- https://www.coursera.org/courses?query=3d%20modeling&utm

  https://www.classcentral.com/subject/sheet-metal-design?utm

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Share **short videos/tutorials** on CAD basics before class.
2. **Theory + Hands-on**: Start each session with a short conceptual lecture (principles of projection, dimensioning, tolerances, etc.) followed by live software demonstrations.
3. Use **projected screen-sharing** to demonstrate CAD commands in real time.
4. Use **3D printed parts or real machine components** to explain orthographic projections and sectional views.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and Semester End Examination (SEE), with each carrying 50% weightage.

• To qualify and become eligible to appear for SEE, in the **CIE, a student must score at least 40% of 50 marks, i.e., 20 marks.**

• To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks.**

• Notwithstanding the above, a student is considered to **have passed the course**, provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Internal Evaluation (CIE):

CIE shall be evaluated for 50 marks as detailed below:

The final CIE (50) = Class work marks (30) + Test marks (20)

• Class work marks should comprise of continuous evaluation of Drawing work of students as and when the Modules are covered based on the weightage as shown in the following table.

Module	**Max. Marks Weightage**	**Evaluation Weightage in marks**	
		Computer display and printout(a)	**Sketching (b)**
Module 1	**20**	**15**	**5**
Module 2	**30**	**25**	**5**
Module 3	**25**	**20**	**5**
Module 4& 5	**25**	**20**	**5**
Total	**100**	**80**	**20**
Consideration of Class work		**Total of [(a)+(b)] =100 Scale down to 30 marks**	

At least one Test covering all the modules is to be conducted for 100 marks and evaluation to be based SEE pattern, and the same is to be scaled down to 20Marks.

Semester End Examination (SEE):

• SEE shall be conducted in batches similar to practical's and evaluated for maximum of 100 Marks. Obtained marks shall be accounted for SEE final marks, reducing it by 50%.

• **Two full questions** shall be set from Modules 1, 2, 3 and 4. Students need to answer one full quest from each module.

• Two full questions set from each Module shall cover the entire topic of the respective module.

• Question papers shall be provided by the **COE office, KSIT** for each batch as per schedule.

• SEE shall be conducted by one Internal and one External Examiner.

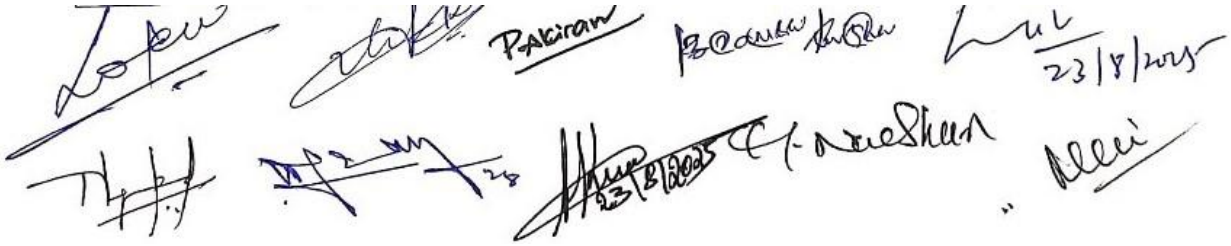
• Evaluation shall be carried out jointly by both the examiners.

• T**he student to be awarded marks, according to weightage mentioned in the table(*for solution on computer display and sketch*).**

Module	Max. Marks Weightage	Evaluation Weightage in marks	
		Computer display and printout(a)	Sketching(b)
Module 1	20	15	05
Module 2	30	25	05
Module 3	25	20	05
Module 4& 5	25	20	05
Total	100	80	20
Consideration of SEEMarks		Total of [(a)+(b)] ÷2 = Final SEE marks	

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play



K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Computer Aided Engineering Drawing for ECE Stream		Semester	I/II
Course Code	**25BCED103B / 203B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**2:0:2:0**	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Laboratory**		

Course Objectives (Course Skill Set)

1. Generate orthographic projections of points, lines, planes, and solids manually and with computer aided tools.
2. Develop the lateral surfaces of solids for real-world applications.
3. Draw isometric views and convert isometric drawings to orthographic views.
4. Create basic 3D models of electronic components and parts.
5. Demonstrate of 3D printing components

Module-1

Introduction: Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate 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, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

Orthographic Projections of Points, Lines and Planes: Introduction to Orthographic projections, Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only as per BIS) Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (Placed in First quadrant only using change of position method).

Number of Hours:8

Module-2

Orthographic Projection of Solids: Orthographic projection of right regular solids (Resting on HP only and inclined to both the planes); Prisms, Pyramids, Cylinders & Cones.

Number of Hours:8

Module-3

Section of Solids: Introduction, Section planes, Sectional views: apparent shapes and true shapes, Sections of right regular prisms, pyramids, cylinders and cones resting with their base on HP. (*Concepts only and No Problems for practice)*

Development of Lateral Surfaces of Solids: Development of lateral surfaces of right regular Prisms, Pyramids, Cylinders & Cones and their frustums and truncations. Problems on applications of development of lateral surfaces like funnels and trays.

Number of Hours:8

Module-4

Isometric Views: Introduction to Isometric views, Isometric projections, Isometric scale. Isometric view of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres, Isometric view of combination of two simple solids, step block.

Number of Hours:8

Module-5

Conversion of simple isometric drawings into orthographic views: Problems on conversion of Isometric view of simple objects / engineering components into orthographic views.

Electronic Components Visualization (For CIE Only): 3D Modeling: Optical fiber cable with core and cladding, photonic crystal fibers, Antenna: Single element patch antenna, antenna array. Sheet Metal & Surface Design: PCB Enclosures: Creation of different geometry with slots as per Standards: NMEA-0183, applying material properties for heat sink and water/dust proofing and rendering for realistic visualization. Concept of Industrial drawing.

Demonstration of working of 3-D printing Machine. Each section students will be demonstrated with a specific model for printing (between $8^{th}$and 10^{th}week of course).The details step of making the CAD model, converting it to suitable machine language and operating the 3-D printer will be demonstrated. A model will be printed using 3-D printing Machine and will be displayed. *(For practice only, not for CIE and SEE).* **Number of Hours:8**

Course outcome (Course Skill Set)

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

CO1: **Make us of** the standards and conventions in Engineering Drawings to obtain projections of simple points and lines.

CO2: **Obtain** the orthographic views of different types of lamina kept on Horizontal and Vertical plane.

CO3: **Construct** the orthographic view of regular Solids resting on Horizontal plane at different angles.

CO4: **Build** isometric projections of solids and combination of two simple solids to obtain three dimensional appearances.

CO5: **Develop** the lateral surface of various solids and **make use of** 3D printing machine to print a simple 3D model.

Suggested Learning Resources:

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

1. K. R. Gopalakrishna, & Sudhir Gopalakrishna: A Textbook of Computer Aided Engineering Drawing, 39th Edition, Subash Stores, Bangalore, 2017
2. 2. Bhatt, N.D., Engineering Drawing: Plane and Solid Geometry, 53rd Edition, Charotar Publishing House Pvt. Limited, 2023.

Reference Books

1. Warren. J. Luzadder, Jon M Duff, Fundamentals of Engineering Drawing, 11^{th} edition, Prentine-Hall of India Pvt Ltd.
2. Chris Schroder, Printed Circuit Board Design using AutoCAD, Newnes, 1997.
3. R K Hegde and Niranjan Murthy, Computer Aided Engineering Drawing, Revised edition 2010, Sapna Book House Publications.
4. N H Dubey, Computer Aided Engineering Drawing, Revised edition, Himalaya Publishing House,First Edition, 2006.
5. A Primer on Computer Aided Enginerring Drawing 2006, published by VTU, Belagaum.
6. S Trymbaka Murthy, Computer Aided Engineering Drawing, Third Edition 2006, I. K. International Publishing House.
7. Gibson Ian., David Rosen, Brat Stucker, Additive Manufacturing Technologies, 2^{nd} Edition, Springer Publication, 2015.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/112104172
- https://nptel.ac.in/courses/112102304
- https://nptel.ac.in/courses/112105294
- https://www.coursera.org/courses?query=3d%20modeling&utm

  https://www.classcentral.com/subject/sheet-metal-design?utm

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Share **short videos/tutorials** on CAD basics before class.
2. **Theory + Hands-on**: Start each session with a short conceptual lecture (principles of projection, dimensioning, tolerances, etc.) followed by live software demonstrations.
3. Use **projected screen-sharing** to demonstrate CAD commands in real time.
4. Use **3D printed parts or real machine components** to explain orthographic projections and sectional views.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and Semester End Examination (SEE), with each carrying 50% weightage.

• To qualify and become eligible to appear for SEE, in the **CIE, a student must score at least 40% of 50 marks, i.e., 20 marks.**

• To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks.**

• Notwithstanding the above, a student is considered to **have passed the course**, provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Internal Evaluation (CIE):

CIE shall be evaluated for 50 marks as detailed below:

The final CIE (50) = Class work marks (30) + Test marks (20)

• Class work marks should comprise of continuous evaluation of Drawing work of students as and when the Modules are covered based on the weightage as shown in the following table.

Module	**Max. Marks Weightage**	**Evaluation Weightage in marks**	
		Computer display and printout(a)	**Sketching (b)**
Module 1	**20**	**15**	**5**
Module 2	**30**	**25**	**5**
Module 3	**25**	**20**	**5**
Module 4& 5	**25**	**20**	**5**
Total	**100**	**80**	**20**
Consideration of Class work		**Total of [(a)+(b)] =100 Scale down to 30 marks**	

At least one Test covering all the modules is to be conducted for 100 marks and evaluation to be based SEE pattern, and the same is to be scaled down to 20Marks.

Semester End Examination (SEE):

• SEE shall be conducted in batches similar to practicals and evaluated for maximum of 100 Marks. Obtained marks shall be accounted for SEE final marks, reducing it by 50%.

• **Two full questions** shall be set from Modules 1, 2, 3 and 4. Students need to answer one full quest from each module.

• Two full questions set from each Module shall cover the entire topic of the respective module.

• Question papers shall be provided by the **COE office, KSIT** for each batch as per schedule.

• SEE shall be conducted by one Internal and one External Examiner.

• Evaluation shall be carried out jointly by both the examiners.

• T**he student to be awarded marks, according to weightage mentioned in the table(*for solution on computer display and sketch*).**

Module	**Max. Marks Weightage**	**Evaluation Weightage in marks**	
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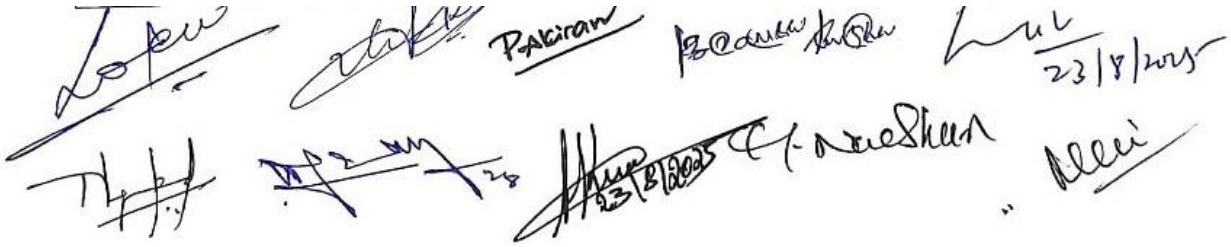
Module 3	**25**	**20**	**05**
Module 4& 5	**25**	**20**	**05**
Total	**100**	**80**	**20**
Consideration of SEEMarks		**Total of [(a)+(b)] ÷2 = Final SEE marks**	

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play



K. S. INSTITUTE OF TECHNOLOGY

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Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Computer Aided Engineering Drawing for ME Stream		Semester	I/II
Course Code	**25BCED103C / 203C**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**2:0:2:0**	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Laboratory**		

Course Objectives (Course Skill Set)

1. Generate orthographic projections of points, lines, planes, and solids manually and with computer aided tools.
2. Develop the lateral surfaces of solids for real-world applications.
3. Draw isometric views and convert isometric drawings to orthographic views.
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Module-1

Introduction: Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate 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, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves.

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Number of Hours:8

Module-2

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Number of Hours:8

Module-3

Section of Solids: Introduction, Section planes, Sectional views: apparent shapes and true shapes, Sections of right regular prisms, pyramids, cylinders and cones resting with their base on HP. (*Concepts only and No Problems for practice)*

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Number of Hours:8

Module-4

Isometric Views: Introduction to Isometric views, Isometric projections, Isometric scale. Isometric view of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres, Isometric view of combination of two simple solids, step block.

Number of Hours:8

Module-5

Conversion of simple isometric drawings into orthographic views: Problems on conversion of Isometric view of simple objects / engineering components into orthographic views.

Concept of Part Design (For CIE Only): 3D Modeling: Simple machine parts / engineering components. (Applying material properties and rendering for realistic visualization) Sheet Metal & Surface Design: Automotive panels, HVAC ducting Concept of Industrial drawing

Demonstration of working of 3-D printing Machine. Each section students will be demonstrated with a specific model for printing (between $8^{th}$and 10^{th}week of course).The details step of making the CAD model, converting it to suitable machine language and operating the 3-D printer will be demonstrated. A model will be printed using 3-D printing Machine and will be displayed. *(For practice only, not for CIE and SEE).* **Number of Hours:8**

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Module 3	25	20	5
Module 4& 5	25	20	5
Total	100	80	20
Consideration of Class work		Total of [(a)+(b)] =100 Scale down to 30 marks	

At least one Test covering all the modules is to be conducted for 100 marks and evaluation to be based SEE pattern, and the same is to be scaled down to 20Marks.

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Consideration of SEEMarks		Total of [(a)+(b)] ÷2 = Final SEE marks	

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
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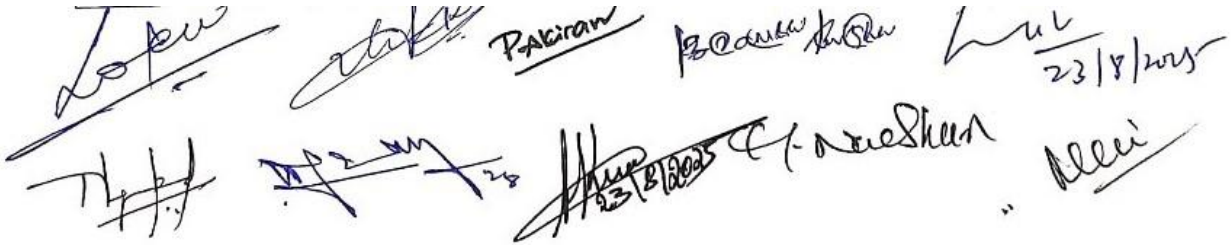

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institute, under Visvesvaraya Technological University, Belagavi
(Approved by AICTE, New Delhi & Government of Karnataka)
Accredited by NAAC with 'A+' Grade, NBA (CSE, ECE)
#14, Raghuvanahalli, Kanakapura Road, Bengaluru-560 109, Karnataka, India.

DETAILS OF ENGINEERING SCIENCE COURSES

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Building Science And Mechanics**		Semester	I/II
Course Code	**25BESC104A / 204A**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**3:0:0:0**	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1: To introduce students to the fundamentals of building science, civil engineering fields, and basic construction materials and their applications in practice

2: To develop awareness of sustainable building practices, emerging materials, and green building rating systems for environmentally responsible construction.

3: To impart knowledge of basic engineering mechanics concepts such as force systems, resolution and composition of forces, and their applications through problem-solving

4: To enable students to analyze equilibrium conditions, draw free body diagrams, and determine support reactions in statically determinate structures.

5: To train students in determining centroids of simple and composite plane figures using analytical methods and apply the concept to basic structural elements.

Module-1

Introduction to building science:

Importance and Scope of various fields of Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Transportation Engineering, Environmental Engineering, Construction Planning and Project Management.

Basic Materials of Construction: Types and Uses of Bricks, Stones, Cement, Structural Steel, Wood and Concrete.

Structural Elements of a Building: Concept of Foundation, Plinth, Lintel, Chejja, Masonry wall, Column, Beam, Slab, Flooring and Staircase.

Number of Hours:8

Module-2

Sustainable Built Environment: Emerging materials: Types and Uses of Autoclaved Aerated Concrete (AAC) blocks, Bamboo, Recycled plastics, Material selection criteria, Durability, Sustainability, Smart City concept.

Green Building : Green building materials and rating systems IGBC, LEED, GRIHA (Green Rating for Integrated Habitat Assessment) for new buildings – Purpose - Key highlights - Point System with Differential weightage.

Number of Hours:8

Module-3

Force Systems: Concept of idealization, System of forces, Principles of transmissibility of a force, Resolution and composition of forces, Law of Parallelogram of forces, Concurrent and non-concurrent coplanar force systems, Moment of forces, Couple, Varignon's theorem: Numerical examples.

Number of Hours:8

Module-4

Equilibrium and Support Reactions

Free body diagram, equations of equilibrium, Lami's Theorem, Equilibrium of Coplanar Concurrent and Non -concurrent force systems: Numerical examples. Types of loadings, beams and supports, Concept of Statically determinate and indeterminate structures (Definitions with examples only),

Support reactions: Numerical examples on Statically determinate beams.

Number of Hours:8

Module-5

Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle and quadrant of a circle using method of integration, centroid of composite areas and simple built up sections: Numerical examples.

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: Identify the scope of different fields of Civil Engineering and **describe** basic construction materials and building components.

CO2: Explain the principles of sustainability in construction, including the use of emerging and green building materials, and **interpret** rating systems such as IGBC, LEED, and GRIHA.

CO3: Apply the principles of force systems to **analyze** the resolution, composition, and moments of forces using engineering mechanics concepts.

CO4: Demonstrate the ability to draw free body diagrams, **analyze** equilibrium conditions, and **compute** support reactions for statically determinate beams.

CO5: Calculate the centroid of simple and composite plane areas using integration methods and **apply** the concept in analyzing structural elements.

Suggested Learning Resources:

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

Textbooks:

1. Rangwala, Building Construction,33rd Edition, 2016, Charotar Publishing House Pvt. Ltd., ISBN-10 : 9385039040, ISBN-13 : 978-9385039041
2. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 3rd Edition, 2015, Laxmi Publications, ISBN: 9789380856674.
3. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 11th Edition, 2018, Eastern Book Promoters Belgaum [EBPB], ISBN: 5551234003896

Reference books / Manuals:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers: Statics and Dynamics, 4th Edition, 1987, McGraw Hill, ISBN: 9780070045842
2. Meriam J. L. and Kraige L. G, Engineering Mechanics-Statics, Vol I–6th Edition,2008, Wiley publication.
3. Irving H. Shames, Engineering Mechanics-Statics and Dynamics, 4th Edition, 2002, Prentice-Hall of India(PHI)
4. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press, New Delhi
5. Timoshenko S, Young D. H., Rao J. V., Sukumar Patil, Engineering Mechanics, 5th Edition, 2017,McGraw Hill Publisher, ISBN: 9781259062667
6. Bhavikatti S S, Engineering Mechanics, 4th Edition, 2018, New Age International Publications.
7. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 3rd Edition 2013, BS Publications.

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=nGfVTNfNwnk&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT
- https://www.youtube.com/watch?v=nkg7VNW9UCc&list=PLOSWwFV98rfKXq2KBphJz95rao7

q8PpwT&index=2

- https://www.youtube.com/watch?v=ljDIIMvxeg&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=5
- https://www.youtube.com/watch?v=3YBXteL-qY4
- https://www.youtube.com/watch?v=z95UW4wwzSc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=10
- https://www.youtube.com/watch?v=ksmsp9OzAsI • https://www.youtube.com/watch?v=x1ef048b3CE
- https://www.youtube.com/watch?v=l_Nck-X49qc
- https://www.youtube.com/watch?v=R8wKV0UQtlo
- https://www.youtube.com/watch?v=0RZHHgL8m_A
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Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation **(25 Marks)**)

Rubrics for Learning Activity:

Case Study Presentation (25 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry.

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding **(5)**	Good understanding **(4)**	Adequate understanding. **(3)**	Limited understanding **(2)**	No clear understanding. **(0-1)**
Analysis & Critical Thinking (10 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. **(9-10)**	Clear analysis with mostly logical reasoning. **(7-8)**	Basic analysis with some reasoning gaps. **(5-6)**	Weak analysis; mostly descriptive without reasoning. **(3-4)**	No clear analysis or reasoning. **(0-2)**
Documentation & Presentation Skills (10 Marks) (PO 9)	Documentation is complete, accurate, well structured, follows all formatting guidelines. Well-structured, clear, confident delivery;	Documentation is mostly complete and accurate, well organized, follows formatting guidelines with minor deviations. Good	Documentation covers most required elements but has some inaccuracies or omissions. Average structure;	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear.	Documentation is largely missing or irrelevant, lacks structure. Unclear,

	excellent visuals. **(9-10)**	structure, clear delivery; visuals mostly effective. **(7-8)**	delivery clear but lacks engagement. **(5-6)**	**(3-4)**	disorganized presentation. **(0-2)**
Q&A Handling (5 Marks) (PO 9)	Confident, accurate, and concise responses. **(5)**	Good responses with minor gaps. **(4)**	Adequate responses; some uncertainty. **(3)**	Weak or hesitant responses. **(2)**	Unable to answer questions. **(0-1)**

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
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Department of Electronics & Communication Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Electrical Engineering		Semester	I/II
Course Code	**25BESC 104B /204B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course objectives (Course Skill Set)

1. To explain the laws used in the analysis of DC and AC circuits.
2. To explain the behavior of circuit elements in single-phase AC circuits.
3. To explain the construction and operation of transformers, DC Generators and motors and induction motors.
4. To introduce concepts of circuit protecting devices and earthing.
5. To explain electricity billing, equipment and personal safety measures.

Module-1

DC Circuits: Ohm's Law and its limitations. Series, parallel, series-parallel circuits, KCL & KVL, Simple Numerical.
(Text1: 2.1, 2.2,3.6)

Electromagnetic Induction: Definition, Faradays laws, Fleming's RH rule, Lenz's Law, Statically and Dynamically Induced Emf, Self-Inductance, Mutual Inductance and Coefficient of coupling. Force on current carrying conductor placed in a magnetic field, Fleming's Left hand Rule (Text 2: 8.1-8.14)

Number of Hours:8

Module-2

A.C. Fundamentals:

Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions)

Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical).

(Text1: 4.1 to 4.8, 5.1 to 5.6)

Three Phase Circuits:

Generation of Three phase AC quantity, advantages and limitations; star and delta connection, relationship between line and phase quantities (excluding proof)

(Text1 : 6.1 to 6.5, 6.8) **Number of Hours:8**

Module-3

DC Machines:

DC Generator: Principle of operation, constructional details, induced emf expression.

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

(Text1: 9.1 to 9.7, 9.9 to 9.13)

Speed control (armature & field) of DC motors (series & shunt only).

(Text2 : 13.1 to 13.3)

Special Electrical Machines and Its Applications: Construction and working principle of BLDC Motor, stepper motor and servo motor and their applications.

(Text3: 39.1-39.4, 39.22-39.24) **Number of Hours:8**

Module-4

Transformers:
Applications of transformer, principle of operation, Types and construction of single phase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical.(Text1: 10.1-10.4, 10.6,10.11)

Three-phase induction Motors:
Concept of rotating magnetic field, Principle of operation, Constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance Simple numerical.
(Text1: 12.1 to 12.5, Text 3: 34.7)

Number of Hours:8

Module-5

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

Electricity Bill:
Power rating of household appliances including air conditioners, PCs, laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.(Text 4)

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

Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.
(Text1: 8.18.6 to 8.12) **Number of Hours:8**

Course outcome (Course Skill Set)
At the end of the course, the student will be able :

- To understand and apply various laws used for analysis of DC and AC circuits.
- To understand the behaviour of circuit elements in single-phase circuits and analyse it's working.
- To understand and interpret the construction and operation of transformers, DC Machines and induction motors.
- To interpret and analyse concepts of circuit protecting devices and earthing.
- To understand and outline the concepts of electricity billing, equipment and personal safety measures.

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

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Fundamentals of Electrical Engineering and Electronics by B.L. Theraja, S Chand and Company, reprint edition 2012.
3. A text book of Electrical Technology- by B.L. Theraja, S Chand and Company Vol.2 reprint edition 2007
4. Principles of Electrical Engineering & Electronics by V. K. Mehta, Rohit Mehta, S. Chand and Company Publications, 2nd edition, 2015.

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill 4th edition, 2019.

2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI, 3rd edition, 2014.

3. K Venkataratnam – Special Electrical Machines, Universities Press, 2014

Web links and Video Lectures (e-Resources): www.nptel.ac.in

(1)Principle of Electrical Sciences, Prof Sanjay Agrawal, Indira Gandhi National Open University.

(2)Electricity and Electrical Wiring, Dr. Antara Mahanta Barua, Krishna Kanta Handiqui State Open University, Guwahati.

. **Teaching-Learning Process (Innovative Delivery Methods):**

. The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching learning process and facilitate the achievement of course outcomes.

. 1. Technology Integration, 2. Collaborative Learning, 3. Flipped Classroom, 4. Visual Based Learning

Assessment Structure:

- The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.
- To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks.
- To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks.
- Not- withstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

Continuous Comprehensive Assessments (CCA): CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity -1: (Marks- 15)

Learning Activity -2 (optional): (Marks-10)

Signatures:

1. Dr. SUREKHA MANOJ : 23/8/25
2. Dr. GURUPRASAD A S:
3. Dr. PARAMESHACHARI B D
4. Dr. ABDUL HAQ NALBAND 23/8/25
5. Mr. SOMASHEKAR YAMANI
6. One Senior Member
7. Chair Person

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Electronics & Communication Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Electronics and Communication Engineering		Semester	I/II
Course Code	**25BESC 104C /204C**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

1. Understand the working of the basic electronic circuits using the principles of rectifiers, voltage regulators, and amplifiers.
2. Analyze the behaviour of analog circuits including oscillators and operational amplifiers in signal generation and conditioning applications.
3. Illustrate the fundamental concepts of analog and digital modulation techniques based on their characteristics and suitability for communication systems.
4. Interpret the structure and functionality of embedded systems and digital logic components such as microcontrollers, sensors, and logic gates.
5. Understand number system conversions and Boolean algebra to design and implement basic combinational logic circuits.

Module-1

Semiconductor Diodes and Transistors: Introduction, PN Junction diode, Characteristics and Parameters, Half-wave rectifier, Full-wave rectifiers and filters. Introduction to Bipolar Junction Transistors and its Applications.
(Text 1)

Power Supplies and Amplifiers – Block diagram, Voltage regulators, Improved Ripple Filter Output resistance and voltage regulation.
(Text 2: Page No: 117-128, 139-146)

Types of amplifiers, Gain, Input and output resistance, Frequency response, Bandwidth, Phase shift, Negative feedback, multi-stage amplifiers.
(Text 2) **Number of Hours:8**

Module-2

Oscillators –Introduction, Types of Oscillators, Positive feedback, Barkhausen criterion, Wein bridge oscillator, Ladder network, Multivibrators, Single-stage a stable oscillator**,** Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)
(Text 1: Page No:179-186, 165-169, 171-175)

Operational amplifiers - Introduction, Block Diagram Representation of Typical Op-Amp, Schematic Symbol, Operational amplifier parameters, characteristics, configurations, and circuits.
(Text 3) **Number of Hours:8**

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.
(Text 4: 1.2, 1.3, 1.4, 1.5,2.1, 2.2, 2.3, 2.4, 2.5, 2.5, 2.5, 2.6, 2.7)

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

(Text 4: 1.2, 1.3, 1.4, 1.5, 2.1, 2.3, 2.4, 2.5, 2.7, 4.1, 4.2, 4.3.) **Number of Hours:8**

Module-4

Embedded Systems – Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Purpose of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor Vs ASIP, Microcontroller, Microprocessor vs Microcontroller, DSP,RISC vs CISC.

Memory: R O M , Sensors, Actuators, LED, 7-Segment LED Display.

(Text 5: 1.1, 1.2, 1.4, 1.5, 1.6, 2.1.1.1-2.1.1.6, 2.2.1, 2.3.1, 2.3.2, 2.3.3.1, 2.3.3.2.)

Number of Hours:8

Module-5

Analog Communication Schemes – Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM, Angle Modulation, Concept of Radio wave propagation (Ground, space, sky).

Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK.

(Text 6: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.9, 1.12, 1.15, 2.2.1, 3.2.1, 6.11, 6.12, 6.13, 6.15, 6.16)

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: Analyze the characteristics of semiconductor devices (diodes and transistors) and evaluate their applications in rectifiers, filters, power supplies, and amplifiers.

CO2: Explain the operation of oscillators and operational amplifiers, and apply feedback concepts to design and evaluate practical amplifier and oscillator circuits.

CO3: Apply Boolean algebra theorems to simplify logic expressions and design basic combinational logic circuits such as adders.

CO4: Describe the structure and classification of embedded systems, and demonstrate the role of memory, sensors, actuators, and display devices in real-time applications.

CO5: Explain the principles of analog and digital communication systems and differentiate among modulation techniques, multiplexing methods, noise effects, and propagation modes.

Suggested Learning Resources:

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

1. Electronic Devices and Circuits, David A Bell, 5th Edition, Oxford, 2016
2. Electronics Circuits : Fundamentals and applications, Mike Tooley,5th Edition
3. Op-amps and Linear Integrated Circuits, Ramakanth A Gayakwad, Pearson Education, 4th Edition
4. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-8
5. K V Shibu, 'Introduction to Embedded Systems', 2nd Edition, McGraw Hill Education (India), Private Limited, 2016.
6. S L Kakani and Priyanka Punglia, 'Communication Systems', New Age International Publisher, 2017.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/122106025
- https://nptel.ac.in/courses/108105132

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Lecture 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. Show Video/animation films to explain the functioning of various analog and digital circuits.
3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
4. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
5. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.

Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Evaluation (CCE):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity 1: (Marks 25): Two assignments (for 10marks and 15marks) related to simulation of simple circuits (using any simulation tool such as LT Spice, KI Cad etc.), at RBL3, RBL4, or RBL5 levels, assignment reports should include circuit design, schematic, and simulation results.

Suggested Learning Activities may include (but are not limited to):

- **Learning Activity -1:** Course Project
- **Learning Activity -2:** Open Book Test (preferably at RBL4 and RBL5 levels)
- **Learning Activity -3:** Assignment (at RBL3, RBL4, or RBL5 levels)
- **Learning Activity -4:** Any other relevant and innovative academic activity
- **Learning Activity -5:** Use of MOOCs and Online Platforms

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits

Signatures:

1. Dr. SUREKHA MANOJ :
2. Dr. GURUPRASAD A S:
3. Dr. PARAMESHACHARI B D
4. Dr. ABDUL HAQ NALBAND
5. Mr. SOMASHEKAR YAMANI
6. One Senior Member
7. Chair Person

K. S. INSTITUTE OF TECHNOLOGY

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Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Mechanical Engineering		Semester	I/II
Course Code	**25BESC104/204D**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3-0-0-0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1: Identify real-world problems with social relevance and apply fundamental mechanical engineering concepts to propose viable engineering solutions.

2: Explain the construction, working principles, and performance parameters of internal combustion engines and various power transmission systems and to Evaluate emerging technologies in future mobility vehicles, such as electric and hybrid systems.

3: Classify different engineering materials, including metals, polymers, ceramics, and composites, and explain their key properties. Illustrate the applications and advantages of advanced materials such as composites and smart materials in modern engineering.

4: Describe the operating principles of common manufacturing processes (casting, machining, forming, joining, additive manufacturing, etc.) and their industrial applications.

5: Summarize recent advances in mechanical engineering technologies and discuss their potential impact on industry and society

Module-1

Introduction: Streams in mechanical engineering and their relevance/significance, role of mechanical engineers in solving the real case problems (with examples), careers in mechanical engineering. Realization of some of the engineering solutions through principles of mechanical engineering(with a schematic diagram):

Introduction to Renewable energy sources: Solar, wind and biomass

Vehicle systems: Identification of parts of vehicle systems such as steering system, brake system, gear system, working principle of Power steering.

Flying machines: Classification, basic parts involved in drone making, working principle of Drones.

Number of Hours:8

Module-2

Engines: Introduction, petrol engine, diesel engines, Working of four Stroke engines, applications.

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

Power Transmission systems: Classification of gears, simple & compound gear trains, concepts of automatic and CVT transmission.

Number of Hours:8

Module-3

Engineering materials: Introduction, Classification, Ferrous and Non-Ferrous metals: Types, Properties and their applications.
Composite materials: Introduction, Constituents of a composite, Classification, Types of Matrix and Reinforcement materials, Advantages, Disadvantages and Applications of composite materials.
Smart materials: Introduction, Types - Piezoelectric materials, MR fluids, Shape memory alloys and Advantages, Disadvantages and Applications.
Nano material: Introduction. Application in semi-conductor chips

Number of Hours:8

Module-4

Manufacturing overview, classification of manufacturing processes, process selection criterion.
Principles of Welding, soldering, brazing.
Introduction to machine tools – lathe, drilling and milling machine.
Lathe operations: Turning, facing, knurling,
Drilling machine operations: Drilling, reaming, tapping.
Milling machine operations: End milling, face milling.
Finishing operations: Grinding machine
Basic principles of 3D printing.

Number of Hours:8

Module-5

Advances in mechanical engineering
Automation technology: Definition of automation, types of automation, basic elements of automation. Introduction to CNC, components, advantages and applications.
Mechatronic systems: Definition of mechatronics, elements of mechatronics systems, examples.
Elementary sensors: Working principle and applications of Potentiometer, capacitive sensor and optical encoders.
Integrated system: Need for integration of technologies, ADAS (Advanced Driver Assistance System), PLC

Number of Hours:8

Course outcome (Course Skill Set)
At the end of the course, the student will be able to:

CO1: **Recognize** the significance of mechanical engineering principles to solve the problems of social relevance.
CO2: **Understand** the working of I.C. engines, power transmission elements and future mobility vehicles.
CO3: **Discuss** the properties and applications of engineering materials, composite materials and smart materials.
CO4: **Describe** the working principles and applications of various manufacturing processes.
CO5: **Explain** the advances in mechanical engineering in the field of manufacturing of semi-conductor devices.

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

1. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008
2. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012

Reference books / Manuals:

1. Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rd Ed., 2003.
2. William D. Callister, Materials Science & Engineering, An Introduction, John Wiley & Sons Inc, 2010.
3. V. Ganesan, Internal Combustion Engines, Tata McGraw Hill Education; 4th edition, 2017.
4. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1
5. Groover M. P.(2008). Automation, production systems, and computer integrated manufacturing, 3rd ed. Prentice Hall.
6. Dr SRN Reddy, Rachit Thukral and Manasi Mishra, "Introduction to Internet of Things: A Practical Approach", ETI Labs.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/112104526
- https://nptel.ac.in/courses/112104616
- https://nptel.ac.in/courses/112104769
- https://theconstructor.org/practical-guide/pelton-turbine-parts-working-design-aspects/2894/
- https://www.mechstudies.com/centrifugal-pump/
- https://cfdflowengineering.com/working-principle-and-components-of-drone/
- https://youtu.be/i1ojp09VXHY
- https://www.theengineerspost.com/automatic-transmission/
- https://learnmech.com/continuously-variable-transmission-components-working-types

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

• To qualify and become eligible to appear for SEE, in the **CIE, a student must score at least 40% of 50 marks, i.e., 20 marks (Average of 3 CIE Test will be scale down to 25 Marks**

• To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks.**

• Notwithstanding the above, a student is considered to **have passed the course**, provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA shall be conducted for 25 marks. It is evaluated through the learning activity which is aimed at enhancing the holistic development of students. The activity should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation (Marks - 25)

Rubrics for Learning Activity:

Case Study Presentation (25 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry.

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding (5)	Good understanding (4)	Adequate understanding. (3)	Limited understanding (2)	No clear understanding. (0-1)
Analysis & Critical Thinking (10 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. (9-10)	Clear analysis with mostly logical reasoning. (7-8)	Basic analysis with some reasoning gaps. (5-6)	Weak analysis; mostly descriptive without reasoning. (3-4)	No clear analysis or reasoning. (0-2)
Documentation & Presentation Skills (5 Marks) (PO 9)	Documentation is complete, accurate, well-structured, follows all formatting guidelines. Well-structured, clear, confident delivery; excellent visuals. (5)	Documentation is mostly complete and accurate, well-organized, follows formatting guidelines with minor deviations. Good structure, clear delivery; visuals mostly effective. (4)	Documentation covers most required elements but has some inaccuracies or omissions. Average structure; delivery clear but lacks engagement. (3)	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear. (2)	Documentation is largely missing or irrelevant, lacks structure. Unclear, disorganized presentation. (0-1)
Q&A Handling (5 Marks) (PO 9)	Confident, accurate, and concise responses. (5)	Good responses with minor gaps. (4)	Adequate responses; some uncertainty. (3)	Weak or hesitant responses. (2)	Unable to answer questions. (0-1)

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

K. S. INSTITUTE OF TECHNOLOGY, BENGALURU

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Department of Computer Science and Engineering

FIRST/ SECOND SEMESTER SYLLABUS

Course : Essentials Of Information Technology		Semester	I/II
Course Code	**25BESK104E/25BESK204E**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	3	Exam Hours	3
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

1. Understand the fundamentals of data storage, manipulation, and computer architecture to represent and process information effectively.
2. Analyse the role of operating systems and algorithms in managing resources, coordinating processes, and solving computational problems.
3. Illustrate the principles of networking, internet protocols, cybersecurity practices, and ethical issues related to information technology.
4. Apply software engineering concepts and database management techniques for efficient design and handling of information systems.
5. Develop basic skills in web development, computer graphics, and IT applications for real-world problem-solving and communication.

Module-1

Data Storage: Bits and Their Storage, Main Memory, Mass Storage, Representing Information as Bit Patterns, The Binary System, Storing Integers, Storing Fractions.

Data Manipulation: Computer Architecture, Machine Language, Program Execution, Arithmetic/Logic Instructions, Communicating with Other Devices.

Textbook 1: Chapter-1 (1.1-1.7), Chapter-2 (2.1-2.5)

Number of Hours: 8

Module-2

Operating Systems: The History of Operating Systems, Operating System Architecture, Coordinating the
Machine's Activities, Handling Competition Among Processes, Security.

Algorithms: The Concept of an Algorithm, Algorithm Representation, Algorithm Discovery.

Textbook 1: Chapter-3, Chapter-5 (5.1-5.3)

Number of Hours: 8

Module-3

Networking and the Internet: Network Fundamentals, The Internet, The World Wide Web, Internet Protocols, Security.

Cybersecurity: Overview—What is Cybersecurity?, Brief History of Cybersecurity Events, The Basic Information Security Model, Cyber Hygiene, Teams in Cybersecurity.

Ethical Issues in Information Technology: Overview, Ownership Rules, Ethics and Online Content.

Textbook 1: Chapter-4
Textbook 2: Chapter-16, Chapter-17

Number of Hours: 8

Module-4

Software Engineering: The Software Engineering Discipline, The Software Life Cycle, Software Engineering Methodologies, Modularity, Tools of the Trade.

Database Systems: Database Fundamentals, The Relational Model.

Textbook 1: Chapter-7 (7.1-7.5), Chapter-9 (9.1-9.2)

Number of Hours: 8

Module-5

Introduction to HTML and Website Development: What is HTML?, Cascading Style Sheets (CSS), Website Design and Storyboarding, Structure of a Website.

Computer Graphics: The Scope of Computer Graphics, Overview of 3D Graphics, Modeling, Rendering.

Textbook 2: Chapter-12.
Textbook 1: Chapter-10 (10.1-10.4)

Number of Hours: 8

Course outcomes (Course Skill Set)

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

CO1: Illustrate different information representation and manipulation schemes.
CO2: Make use of Information Technology (IT) infrastructure for information exchange.
CO3: Apply basic software engineering concepts for Website and application development.
CO4: Develop queries for quick insert, access and updating of structured information.
CO5: Identify role of cybersecurity and ethics issues in Information Technology (IT).

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Textbooks:

1. J. Glenn Brookshear and Dennis Brylow, Computer Science: An Overview, 12th Edition, Pearson Education Limited, 2017.
2. Roy, Shambhavi; Daniel, Clinton; and Agrawal, Manish, "Fundamentals of Information Technology", Digital Commons at The University of South Florida (2023). https://digitalcommons.usf.edu/dit_tb_eng/19

Reference books :

1. V. Rajaraman, “Introduction to Information Technology”, Third Edition, PHI Learning, 2018.
2. Pelin Aksoy, Information Technology in Theory, First Edition, Cengage.

Web links and Video Lectures (e-Resources):

- Information Technology: https://onlinecourses.swayam2.ac.in/cec20_cs05/preview
- Computer Organization and Architecture: https://nptel.ac.in/courses/106103068
- Introduction To Internet: https://nptel.ac.in/courses/106105084

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Flipped Classroom
2. Problem-Based Learning (PBL)
3. Case-Based Teaching
4. Simulation and Virtual Labs
5. ICT-Enabled Teaching

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Evaluation (CCE):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity 1: (Marks 25): Two assignments (for 10 marks and 15 marks) related to practical applications of Information Technology (such as file management, spreadsheets, word processing, presentation tools, database queries, or basic web development), at RBL3, RBL4, or RBL5 levels**.** Assignment reports should include the problem statement, procedure/steps, screenshots of implementation, and output/results**.**

Suggested Learning Activities may include (but are not limited to):

- **Learning Activity -1:** File Management, Word Processors, Introduction to Spreadsheets and Introduction to Presentation Applications.
- **Learning Activity -2:** Open Book Test (preferably at RBL4 and RBL5 levels)
- **Learning Activity -3:** Assignment (at RBL3, RBL4, or RBL5 levels)
- **Learning Activity -4:** Course Project
  Refer Textbook 2: Chapter-6, Chapter-8, Chapter-9, Chapter-10.
- **Learning Activity -5:** Use of MOOCs and Online Platforms

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K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Computer Science & Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course: Introduction to Linux Programming		Semester	I/II
Course Code	**25BESC104F/25B BESC204F**	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

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

1. Interpret the features of UNIX and basic commands.
2. Demonstrate different UNIX files and permissions
3. Understand UNIX command syntax and semantics.
4. To provide a comprehensive introduction & Implement shell programming
5. Use awk for advanced text processing and filtering.

Module-1

Introduction to UNIX –

Introduction,

The UNIX operating System, The UNIX Architecture & command usage: Architecture, Features of UNIX , The PATH, Internal & External commands, Command Strucrture.

General purpose Utilities: Basic commands, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, bc

Textbook : Chapter 1(1.2)2(2.1,2.2,2.5,2.6),3(3.1-3.13)

Number of Hours: 08

Module-2

The File System-

The file, what's in a filename? The parent-child relationship, The HOME variable,pwd, the Home directory, absolute pathnames, cd, mkdir, rmdir, Relative pathnames,ls The UNIX file system.ls |

Handling Ordinary Files: cat, cp, rm, mv,file,

Textbook : Chapter 4(4.1-4.12)5(5.1-5.5)

Number of Hours: 08

Module-3

Basic File Attributes

- Is – l, the –d option, File ownership, File Permissions, chmod,

The vi Editor: vi Basics, Input mode, Saving text and quitting, Editing, Repeating last Editing Command(.),Searching for a pattern(/ and ?),Substitution –search & replace(:s)

Textbook 1: Chapter 6(6.1-6.5),7(7.1-7.9)

Number of Hours:08

Module-4

Introduction to the Shell Scripting –

The shell: the shell's Interpretive Cycle,Pipes,tee:creating a tee, shell variables.

Essential Shell Programming: Shell Scripts, read, Command Line Arguments, The Logical Operators && and ||, exit, if, and case conditions, while, for,The here document, set, trap,

Textbook 1: Chapter 8(8.1,8.7-8.10),14(14.1-14.12)

Number of Hours: 08

Module-5

awk-an advanced filter

Simple awk Filtering, printf, variables & Expressions, the Comparisons Operators, variables, the –f Option: storing awk programs in a file, Arrays, Functions , Control flow -if statement, looping with for, while.

Textbook 1: Chapter 18(18.1-18.15)

Number of Hours: 08

Course Outcomes (Course Skill Set):

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

CO1: Identify the architecture and features of UNIX Operating System and distinguish it from other Operating System.

CO2: Demonstrate UNIX commands for file handling.

CO3: Define basic file attributes ,permissions and Write expressions for pattern matching and apply them to various commands for a specific task.

CO4: Illustrate Shell Programming and to write Shell Scripts.

CO5: Make use of awk to filter and process text data, and write simple awk programs with variables and loops.

Suggested Learning Resources

Textbooks:

1. Unix Concepts & Applications 4rth Edition, Sumitabha Das, Tata McGraw Hill .

Reference books

2. Unix Shell Programming, Yashwant Kanetkar
3. Introduction to UNIX by M G Venkatesh Murthy

Web links and Video Lectures (e-Resources): www.nptel.ac.in

1. https://www.youtube.com/watch?v=ffYUfAqEamY
2. https://www.youtube.com/watch?v=Q05NZiYFcD0
3. https://www.youtube.com/watch?v=8GdT53KDIyY
4. https://youtube.com/playlist?list=PLVlQHNRLflP8WncRgkwFqTOzRf_GSgl00&si=VEqSWlmzeqtHDMZg

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Technology Integration, 2. Collaborative Learning, 3. Flipped Classroom, 4. Visual Based Learning

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Not- withstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity -1: Marks- 15

Learning Activity -2 : Marks-10

Suggested Learning Activities may include (but are not limited to):

-**Learning Activity -1:** Course Project
-**Learning Activity -2:** Open Book Test (preferably at RBL4 and RBL5 levels)
-**Learning Activity -3:** Assignment (at RBL3, RBL4, or RBL5 levels)
-**Learning Activity -4:** Any other relevant and innovative academic activity
-**Learning Activity -5:** Use of MOOCs and Online Platforms

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits

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Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Introduction to Engineering Mechanics**		Semester	I/II
Course Code	**25BESC104/ 204G**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3-0-0-0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1: To develop student's ability to analyse the problems involving forces, moments with their applications.

2: To analyse the member forces in trusses.

3: To make students to learn the effect of friction on different planes

4: To develop the student's ability to find out the centre of gravity and moment of inertia and their applications.

5: To make the students learn about kinematics and kinetics and their applications.

Module-1

System of forces: Resultant of coplanar concurrent and non-concurrent forces

Resultant of coplanar force system: Basic dimensions and units, Idealisations, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment, Principle of moments, couple, Resultant of coplanar concurrent force system, Resultant of coplanar non-concurrent force system- Numerical examples

Number of Hours:8

Module-2

System of forces: Equilibrium concepts, Support reactions and Truss analysis

Equilibrium of coplanar force system: Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical examples. Analysis of Trusses: Introduction, Classification of trusses, analysis of plane perfect trusses by the method of joints and method of sections- Numerical examples **Number of Hours:8**

Module-3

Friction

Friction: Introduction, laws of Coulomb friction, equilibrium of blocks on horizontal plane, equilibrium of blocks on inclined plane, ladder friction, wedge friction - Numerical examples

Number of Hours:8

Module-4

Centroid and Moment of Inertia

Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle, quadrant and sector of a circle using method of integration, centroid of composite areas and simple built up sections, Numerical examples. Moment of inertia of plane areas: Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built up sections- Numerical examples.

Number of Hours:8

Module-5

Kinematics

Kinematics: Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity, Numerical examples on linear motion Projectiles: Introduction, numerical examples on projectiles. Kinetics: Introduction, D 'Alembert's principle of dynamic equilibrium and its application in-plane motion and connected bodies including pulleys- Numerical examples

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1. Apply the concepts of statics for the analysis of coplanar force systems.

CO2. Apply the concept of equilibrium of forces to resolve the forces on a truss element.

CO3. Apply the principles of static equilibrium for solving problems involving friction

CO4. Apply the centroid concepts and evaluate second moment of area of plane composite and built-up areas.

CO5. Apply the concepts of dynamics to solve problems related to kinematics and kinetics of particles.

Textbooks:

1. Bhavikatti S S, Engineering Mechanics, 2019, New Age International
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2018, EBPB
3. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015, Laxmi Publications.

Reference books / Manuals:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill
2. Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall.
3. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication
4. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press
5. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.

Web links and Video Lectures (e-Resources):

- NPTEL: Engineering Mechanics https://archive.nptel.ac.in/courses/112/106/112106286/
- https://www.iitg.ac.in/rkbc/me101/Presentation/L16-18.pdf

Assessment Structure:

Assessment Structure:

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- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA shall be conducted for 25 marks. It is evaluated through the learning activity which is aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation **(15 Marks)**

Learning activity 2- 1 Assignment covering all syllabus for (**10 Marks)**

Rubrics for Learning Activity:

Case Study Presentation (25 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding **(5)**	Good understanding **(4)**	Adequate understanding. **(3)**	Limited understanding **(2)**	No clear understanding. **(0-1**)
Analysis & Critical Thinking (5 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. **(5)**	Clear analysis with mostly logical reasoning. **(4)**	Basic analysis with some reasoning gaps. **(3)**	Weak analysis; mostly descriptive without reasoning. **(2)**	No clear analysis or reasoning. **(0-1)**
Documentation & Presentation Skills & QA Handling (5 Marks) (PO 9)	Documentation is complete, accurate, well structured, follows all formatting guidelines. Well-structured, clear, confident delivery; excellent visuals. Confident, accurate, and concise responses **(5)**	Documentation is mostly complete and accurate, well organized, follows formatting guidelines with minor deviations. Good structure, clear delivery; visuals mostly effective. Good responses with minor gaps. **(4)**	Documentation covers most required elements but has some inaccuracies or omissions. Average structure; delivery clear but lacks engagement. Adequate responses; some uncertainty. **(3)**	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear. Weak or hesitant responses. **(2)**	Documentation is largely missing or irrelevant, lacks structure. Unclear, disorganized presentation. Unable to answer questions. **(0-1)**

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

K. S. INSTITUTE OF TECHNOLOGY

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Department of Computer Science and Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Cyber Security		Semester	I/II
Course Code	**25BESC104H/ 204H**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course objectives

- To familiarize cybercrime terminologies and perspectives
- To understand Cyber Offenses and Botnets
- To gain knowledge on tools and methods used in cybercrimes
- To understand phishing and computer forensics

Module-1

Introduction to Cybercrime:

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

Textbook:1 Chapter 1 (1.1 to 1.5, 1.7-1.9)

Number of Hours: 08

Module-2

Cyber Offenses:

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

Botnets: The fuel for cybercrime, Attack Vector. Textbook:1 Chapter 2 (2.1 to 2.7)

Number of Hours: 08

Module-3

Tools and Methods used in Cybercrime: Introduction, Proxy Servers, Anonymizers, Phishing, Password Cracking, Key Loggers and Spy ways, Virus and Worms, Trozen Horses and Backdoors, Steganography, DoS and DDOS Attacks, Attacks on Wireless networks.

Textbook:1 Chapter 4 (4.1 to 4.9, 4.12)

Number of Hours:08

Module-4

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

Textbook:1 Chapter 5 (5.1. to 5.3) Number of Hours: 08

Module-5

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

Textbook:1 Chapter 7 (7.1. to 7.5, 7.7 to 7.9) Number of Hours: 08

Suggested Learning Resources

Textbooks:

Sunit Belapure and Nina Godbole,"CyberSecurity: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, 2011, First Edition (Reprinted 2018

Course outcome (Course Skill Set)

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

CO1: Define and explain key terminologies related to cybercrime.
CO2: Describe Cyber offenses and Botnets
CO3: Illustrate Tools and Methods used on Cybercrime
CO4: Explain the concepts of phishing and identity theft with relevant examples.
CO5: Describe the need of computer forensics in investigating and preventing cybercrime.

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=nzZkKoREEGo&list=PL9ooVrP1hQOGPQVeapGsJCktzIO4DtI4_
- https://www.youtube.com/watch?v=6wi5DI6du-4&list=PL_uaeekrhGzJlB8XQBxU3zhDwT95xlk
- https://www.youtube.com/watch?v=KqSqyKwVuA8

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

- Illustration of standard case study of cyber crime
- Setup a cyber-court at Institute level

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.

Not- withstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity -1: **Marks- 15**

Learning Activity -2 : **Marks-10**

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DETAILS OF
PROGRAM SPECIFIC COURSES

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Engineering Mechanics**		Semester	I/II
Course Code	**25BPSC105A / 205A**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**3:0:0:0**	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1: To introduce the basic concepts of dimensions, units, force, and classification of force systems.
2: To explain the principle of transmissibility, moments, and characteristics of a couple.
3: To enable students to construct and interpret free body diagrams.
4: To develop understanding of composition and resolution of concurrent and non-concurrent coplanar forces.
5: To apply Varignon's theorem and moment principles in solving simple engineering problems

Module-1

Coplanar force system: Basic dimensions and units, Idealisation, Force, Classification of force system, principle of transmissibility of a force, Composition and resolution of forces, Free body diagrams, Resultant of coplanar concurrent and non-concurrent force system, Moment, Couple and Characteristics of couple, Varignon's theorem: Numerical Examples. **Number of Hours:8**

Module-2

Equilibrium: Conditions of static equilibrium, Equilibrium of coplanar concurrent force systems, Lami's theorem, Equilibrium of coplanar non-concurrent force system, Numerical examples. Types of supports, loadings and beams, Concept of statically determinate and indeterminate beams. Support reactions for statically determinate beams subjected to various loadings: Numerical examples.

Number of Hours:8

Module-3

Friction: Introduction, Types of friction, Concept of static friction, Kinetic (Dynamic) friction, Laws of friction, Angle of repose, Cone of friction, Equilibrium of blocks on horizontal and inclined plane, Ladder friction: Numerical examples.

Number of Hours:8

Module-4

Centroid: Introduction, definitions of centroid and centre of gravity. Axes of symmetry, Locating the centroid of square, rectangle, triangle, circle, semicircle, quadrant and sector of a circle using method of integration, Centroid of composite areas and simple builtup sections: Numerical examples.

Number of Hours:8

Module-5

Moment of Inertia of plane Areas: Introduction, Moment of inertia about an axis, Parallel axes theorem, Perpendicular axes theorem, Polar moment of inertia, Radius of gyration. 2 Moment of inertia of square, rectangular, triangular and circular areas from the method of Integration, Moment of inertia of composite areas and simple built-up sections: Numerical Examples

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: Explain the fundamental concepts of force systems, equilibrium, friction, centroid, and moment of inertia in engineering mechanics.

CO2: Construct free body diagrams and apply principles of resolution, composition, and transmissibility to analyze coplanar force systems.

CO3: Apply conditions of equilibrium, Lami's theorem, and support reaction analysis to solve problems on beams and structures.

CO4: Analyze problems involving friction, centroid of plane figures, and moments of inertia of simple and composite sections using appropriate theorems and methods.

CO5: Solve numerical problems in engineering mechanics by integrating theoretical principles with practical applications for real-world systems.

Suggested Learning Resources:

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

Textbooks:

1. Bhavikatti S S, Engineering Mechanics, 2019, New Age International
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2018, EBPB
3. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015, Laxmi Publications.

Reference books / Manuals:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill
2. Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall.
3. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication
4. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press
5. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.
6. J K Gupta and S K Gupta, Engineering Mechanics and Applied Mechanics, first edition, 2021, Cengage learning. ISBN: 9789353505851.

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=nGfVTNfNwnk&list=PLOSWwFV98rfKXq2KBphJz95rao7q8Ppw
- https://www.youtube.com/watch?v=nkg7VNW9UCc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&i ndex=2
- https://www.youtube.com/watch?v=ljDIIMvxeg&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=5
- https://www.youtube.com/watch?v=VQRcChR9IkU&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=18
- https://www.youtube.com/watch?v=3YBXteL-qY4
- https://www.youtube.com/watch?v=z95UW4wwzSc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=10
- https://www.youtube.com/watch?v=lheoBL2QaqU&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=7
- https://www.youtube.com/watch?v=atoP5_DeTPE
- https://www.youtube.com/watch?v=ksmsp9OzAsI
- https://www.youtube.com/watch?v=x1ef048b3CE

- https://www.youtube.com/watch?v=l_Nck-X49qc
- https://play.google.com/store/apps/details?id=appinventor.ai_jgarc322.Resultant_Force 3
- https://www.youtube.com/watch?v=RIBeeW1DSZg
- https://www.youtube.com/watch?v=R8wKV0UQtlo
- https://www.youtube.com/watch?v=0RZHHgL8m_A
- https://www.youtube.com/watch?v=Bls5KnQOWkY

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

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- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA shall be conducted for 25 marks. It is evaluated through the learning activity which is aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation **(25 Marks)**)

Rubrics for Learning Activity:

Case Study Presentation (25 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry.

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding **(5)**	Good understanding **(4)**	Adequate understanding. **(3)**	Limited understanding **(2)**	No clear understanding. **(0-1**)
Analysis & Critical Thinking (10 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. **(9-10)**	Clear analysis with mostly logical reasoning. **(7-8)**	Basic analysis with some reasoning gaps. **(5-6)**	Weak analysis; mostly descriptive without reasoning. **(3-4)**	No clear analysis or reasoning. **(0-2)**
Documentation & Presentation Skills (10 Marks) (PO 9)	Documentation is complete, accurate, well structured, follows all formatting guidelines. Well-structured, clear, confident delivery; excellent visuals. **(9-10)**	Documentation is mostly complete and accurate, well organized, follows formatting guidelines with minor deviations. Good structure, clear delivery; visuals mostly effective. **(7-8)**	Documentation covers most required elements but has some inaccuracies or omissions. Average structure; delivery clear but lacks engagement. **(5-6)**	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear. **(3-4)**	Documentation is largely missing or irrelevant, lacks structure. Unclear, disorganized presentation. **(0-2)**

Q&A Handling (5 Marks) (PO 9)	Confident, accurate, and concise responses. **(5)**	Good responses with minor gaps. **(4)**	Adequate responses; some uncertainty. **(3)**	Weak or hesitant responses. **(2)**	Unable to answer questions. **(0-1)**

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

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Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Elements of Mechanical Engineering**		Semester	I/II
Course Code	**25BPSC105B /205B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3-0-0-0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1. To introduce students to various **engineering materials** and their properties, applications, advantages, and limitations.
2. To develop an understanding of **thermodynamics**, steam properties, IC engines, and **hybrid/electric vehicles**.
3. To familiarize students with **machine tools** and **metal joining processes** and their industrial significance.
4. To provide insights into **power transmission systems** and **robotics** with their applications in automation.
5. To introduce **CNC, CAD/CAM, automation, additive manufacturing, and AI applications** in mechanical engineering.

Module-1

Engineering materials: Introduction, Classification, Ferrous and Non-Ferrous metals: Types, Properties and their applications. **Composite materials:** Introduction, Constituents of a composite, Classification, Types of Matrix and Reinforcement materials, Advantages, Disadvantages and Applications of composite materials in Aerospace and Automobile industries. **Smart materials:** Introduction, Types - Piezoelectric materials, MR fluids, Shape memory alloys and Advantages, Disadvantages and Applications. **Nano materials**: Introduction, Types of nano materials, Advantages, Disadvantages and Applications. **Number of Hours:8**

Module-2

Concepts of Thermodynamics: Work, Energy, Heat, Modes of Heat transfer: Conduction, Convection and Radiation. Steam: Formation of steam, Properties of Steam, Numerical related to the properties of steam. Introduction to Heat engines and Heat pumps.

Introduction to Internal Combustion engines: Working principle of Two stroke and Four stroke engines (SI & CI Engines), Simple Numerical involving BP, IP and Mechanical efficiency only.

Electric vehicles and Hybrid vehicles: Electric and Hybrid vehicle components, power trains & comparison, Brief introduction to energy storage in Electric vehicles.

Principles of renewable energy sources, energy & sustainable developments.

Number of Hours:8

Module-3

Machine Tools:

Lathe: Working principle, Specifications, Operations performed – Turning, Facing, Taper turning by swiveling the compound rest, Thread cutting and Knurling.

Drilling Machine: Working principle, Specifications, Operations performed – Drilling, Reaming, Boring, Counter boring, Countersinking, Tapping.

Milling machine: Working principle, Specifications, Operations performed – Plane milling, End milling, Slot milling, Angular milling. (Sketches of machine tools not required. Sketches to be used only for explaining the operations).

Joining Processes: Introduction, Temporary and Permanent joining methods: Working principle of Soldering, Brazing and Electric Arc welding, Advantages, Limitations and Applications.
Finishing Processes: Grinding, Lapping, Honing

Number of Hours:8

Module-4

Belt drives: Introduction, Open and Cross belt drives. (No derivations and numericals), Flat belts and V belts.

Gear Drives: Types of Gears, Velocity ratio, Gear Trains - Simple and Compound gear trains and Numericals.

Chain Drive and Rope Drives: Principle of operation

Robotics: Introduction, Generation of Robots, Asimov's laws of Robots, Robot anatomy - Links and Joints, Types of Robots, Configurations of Robots, Robot motion - Degrees of Freedom, Robot sensors: Tactile, Force, Proximity and Vision sensors, Definition of Work volume, Accuracy, Precision, Repeatability and Payloads. **Introduction to cognitive robotics.** **Number of Hours:8**

Module-5

Computer Numerical Control (CNC): Introduction, Definition of NC and CNC Components of CNC. Definition of CAD, CAM, CAE and CIM.

Automation: Definition, Types of Automation, Reasons for Automation.

Additive manufacturing: Introduction, Basic principles (Steps in additive manufacturing), Additive manufacturing processes –classifications, Automotive and Aerospace applications.

Applications of AI in Mechanical Engineering: Automobile industry, manufacturing industry and Mechanical design.

Introduction to digital twin technology: Definition, concept, evolution & core components(Lecture Video in one session; *NOT for SEE*)

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1.**Understand** the significance of advanced engineering materials catering to various industrial applications

CO2.**Make use of** thermodynamic concepts to study properties of steam and performance of combustion engine & EHV.

CO3.**Demonstrate** the working and operations of machine tools and metal joining techniques.

CO4.**Apply** the concepts of power transmission through belt, gear, Chain, and Rope drives and discuss the anatomy of robots.

CO5.**Discuss** the role of computer systems in manufacturing, their contribution to automation, and the applications of 3D printing and AI in mechanical engineering.

Textbooks:

1. K R Gopala Krishna, Elements of Mechanical Engineering, Subhash Publications, 2018.
2. S K Hajra Choudhury and Nirjhar Roy, Elements of Workshop Technology (Vol. I and II), Media Promoters and Publishers Pvt. Ltd., 2016.
3. Ganeshan. V, Internal Combustion Engines, Tata McGraw Hill, 4th Edition, 2012.
4. Rajput R.K, Thermal Engineering, Laxmi Publications (Pvt) Ltd., New Delhi. 6th Edition, 2007.
5. Mikell P. Grover, Automation Production Systems and Computer Integrated Manufacturing, PHI, 2004.
6. Husain Iqbal, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 3rd Edition, 2021.

7. Ian Gibson, David. W. Rosen, Brent Stucker, Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing, Springer, 2nd Edition, 2014.
8. Mikell P. Groover and Emory W. Zimmers, CAD/CAM. Zimmer & Groover CAD/CAM, 2007.
9. Russeli and Norvig, Artificial Intelligence: A Modern approach, Khanna Publications, 2020

Reference books / Manuals:

1. Serope Kalpakjian and Steven R Schmid, Manufacturing Engineering and Technology, Fourth Edition, Pearson Education, Asia, 2000.
2. Radha Krishna & S. Subramanian, CAD/CAM/CIM, New Age International Publishers, 2009
3. F.L. Matthews and R.D. Rawlings, Composite materials: Engineering and Science, Woodhead Publishing Ltd. & CRC Press, 2003.
4. Mikell P.Groover and Mitchel Weiss and Roger N.Nagel Nicholas G.Odrey, Industrial Robotics technology, programming and applications, Tata McGraw Hill Edition, 2008

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/112104526
- https://nptel.ac.in/courses/112104616 • https://nptel.ac.in/courses/112104769
- https://venturebeat.com/ai/how-ai-is-impacting-the-automotive-world/
- https://www.vlcsolutions.com/blog/artificial-intelligence-in-manufacturing/
- https://skill-lync.com/blogs/technical-blogs/design-applications-of-machine-learning-and-ai-inmechanical-engineering
- https://caeassistant.com/blog/ai-in-mechanical-engineering-video/
- https://www.neuralconcept.com/post/how-is-ai-used-in-mechanical-engineering
- https://www.youtube.com/watch?v=MKiiXubKaGM
- https://www.youtube.com/watch?v=_canCYWZPsc
  - https://www.youtube.com/watch?v=lQ-MYnyxh7M

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA shall be conducted for 25 marks. It is evaluated through the learning activity which is aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation **(15 Marks)**

Learning Activity - 2: Material Selection and Justification for a chosen Real-world Engineering Product **(10 Marks)**

Rubrics for Learning Activity:

(To be conducted for 30 marks and the marks obtained shall be reduced to 15)

Case Study Presentation (15 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry.

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding **(5)**	Good understanding **(4)**	Adequate understanding. **(3)**	Limited understanding **(2)**	No clear understanding. **(0-1**)
Analysis & Critical Thinking (10 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. **(9-10)**	Clear analysis with mostly logical reasoning. **(7-8)**	Basic analysis with some reasoning gaps. **(5-6)**	Weak analysis; mostly descriptive without reasoning. **(3-4)**	No clear analysis or reasoning. **(0-2)**
Documentation & Presentation Skills (10 Marks) (PO 9)	Documentation is complete, accurate, wellstructured, follows all formatting guidelines. Well-structured, clear, confident delivery; excellent visuals. **(9-10)**	Documentation is mostly complete and accurate, wellorganized, follows formatting guidelines with minor deviations. Good structure, clear delivery; visuals mostly effective. **(7-8)**	Documentation covers most required elements but has some inaccuracies or omissions. Average structure; delivery clear but lacks engagement. **(5-6)**	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear. **(3-4)**	Documentation is largely missing or irrelevant, lacks structure. Unclear, disorganized presentation. **(0-2)**
Q&A Handling (5 Marks) (PO 9)	Confident, accurate, and concise responses. **(5)**	Good responses with minor gaps. **(4)**	Adequate responses; some uncertainty. **(3)**	Weak or hesitant responses. **(2)**	Unable to answer questions. **(0-1)**

Rubrics for Learning Activity 2:

Material Selection and Justification for a chosen Real-world Engineering Product (10 Marks) (To be conducted for 20 marks and the marks obtained shall be reduced to 10)

Students will select one real-world engineering product (e.g., aircraft wing, car chassis, biomedical implant, wind turbine blade, Tennis racket etc.) and they will justify the choice of materials (Ferrous/Non-ferrous, Composite, Smart, Nano) based on properties, advantages, disadvantages, and application suitability, etc.,

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Material Selection & Relevance (10 Marks) (PO 1)	Chosen materials perfectly match the product	Mostly relevant materials with good justification.	Materials somewhat match requirements;	Poor material product match; weak reasoning. **(3-4)**	Irrelevant material choice; no justification .**(0-2)**

	requirements; strong justification using properties & industry relevance. **(9-10)**	**(7-8)**	justification partial. **(5-6)**		
Technical Content Accuracy (5 Marks) (PO 2)	All properties, types, advantages / disadvantages, and applications are correct and well explained. **(5)**	Mostly accurate with minor errors. **(4)**	Adequate content; a few gaps or inaccuracies. **(3)**	Several inaccuracies; missing key aspects. **(2)**	Mostly incorrect or missing technical details. **(0-1)**
Organization & Presentation (5 Marks) (PO 10)	Well-structured, clear flow, good visuals/tables, and concise explanation. **(5)**	Clear structure; minor improvements needed. **(4)**	Acceptable structure but some clutter. **(3)**	Poor organization; difficult to follow. **(2)**	Disorganized; lacks clarity. **(0-1)**

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE
Department of Electronics & Communication Engineering
FIRST / SECOND SEMESTER SYLLABUS

Name of the Course: **Basics of Electrical Engineering**		Semester	1/2
Course Code	**25BPSC105/205C**	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course objectives:

- To explain basic laws used in the analysis of DC circuits, Electrostatics and Electromagnetism.
- To explain electromagnetic induction.
- To explain the behavior of circuit elements in single-phase circuits.
- To explain the behavior of circuit elements in three-phase circuits.
- To explain circuit protective devices, earthing. electricity billing.

Teaching-Learning Process Pedagogy
(General Instructions):

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

1. Chalk and talk
2. Visual Based Learning
3. Cut sections
4. Flipped Classroom

Module-1

DC circuits: Ohm's law and Kirchhoff's laws, analysis of series, parallel and series-parallel circuits. Power and energy. Problems. (Text1: 1.13,1.14,1.15,1.16,1.25,2.2,2.3,2.4)

Electrostatics: Coulombs law, definitions of absolute and relative permittivity, electric field, electric flux, electric field strength, flux density. Capacitor: Expression of parallel plate capacitor, factors affecting capacitance, capacitors in series and capacitors in parallel, energy stored in an electrostatic field, problems.

Electromagnetism: Electromagnets-direction of flux produced, right-hand rule, definition-magnetic circuit, mmf, magnetic field strength, free space and relative permeability, reluctance, permeance, useful and leakage flux, simple series circuits and parallel circuit problems.

(Text 1: 4.1,4.2,4.3,4.4,4.5,4.6,4.7,4.8,5.5,5.6,5.11,5.12,5.15)

Number of Hours:8

Module-2

Electromagnetic Induction: Faraday's law of electromagnetic induction, Lenz's law, dynamically and statically induced emf, Fleming's right-hand rule. Simple problems. Inductance and mutual inductance, coefficient of coupling, energy stored and its applications. Force experienced by a current-carrying conductor placed in the magnetic field. Fleming's left-hand rule. Force between conductors carrying current in the same and in the opposite directions. (Text1: 7.3, 7.5,7.7,7.8,7.9,7.10,7.11,7.12,7.13)

Number of Hours:8

Module-3

Single-phase Circuits: Generation of sinusoidal voltage, frequency of generated voltage, Expression of average value, RMS value, form factor and peak factor of sinusoidal voltage and current. Phasor representation of alternating quantities. Analysis of R, L and C circuits. Series and parallel R-L, R-C and R-L-C circuits with phasor diagrams, calculation of real power, reactive power, apparent power, and power factor, illustrative examples. (Text1: 11.1,11.2,11.8,11.11,11.12, Text:9.2,9.7,10.1,10.2, 10.4, 10.6)

Number of Hours:8

Module-4

Three- phase Circuits: Generation of three-phase system, definition of phase sequence, star and delta (mesh) connections, relation between phase and line values of voltages and of currents of star and delta connections, considering the phasor diagram. Definition of balanced and unbalanced source and load. Power, reactive power and power factor. Problems on balanced loads. Measurement of 3-phase power by 2-wattmeter method. Expression of power factor in terms wattmeter readings. Effect of power factor on wattmeter readings. Comparison between single phase and three-phase systems. (Text2:12.1, 12.2,12.3,12.4,12.5,12.6,12.7,12.8,12.9,12.11)

Number of Hours:8

Module-5

Domestic Wiring: Service mains – overhead and underground. Types of wiring: Exposed to open space – wooden batten wiring and casing and capping. Concealed wiring: conduit wiring. Wiring for two-way and three-way control of load.

Domestic Electricity Bill: Power-rating of household connected loads. Sanctioned Load. Practical unit of measuring energy, energy expressed for commercial purposes - Unit, its definition. Electricity bill [as per Electricity Supply Companies (escoms)]: Tariff method considered: two-part tariff. Particulars considered for billing: sanctioned load and units consumed. Calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principles of fuse and miniature circuit breaker (MCB), the merits and demerits of fuse and MCB.

Personal safety measures: Electric shock, possible effects of shocks. Safety precautions to avoid personal shock while dealing with electricity. Permanent measure: Earthing: Pipe and plate**.**
(Text2:19.1,19.4,19.519.9)

Number of Hours:8

Course outcomes (Course Skill Set):

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

CO1: Explain and apply the fundamental laws used in the analysis of DC circuits, electrostatics, and electromagnetism.

CO2: Summarize and evaluate the principles and implications of electromagnetic induction.

CO3: Understand and analyze the operation and behavior of single-phase circuits.

CO4: Interpret and analyze the performance of three-phase circuits and measure electrical power accurately.

CO5: Summarize and demonstrate the procedures involved in electricity billing, domestic wiring, and implementing electrical safety measures.

Assessment Structure: The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks.
- To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks.
- Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.
Learning Activity -1: (Marks- 15) Learning Activity -2 (optional): (Marks- 10)

Suggested Learning Resources:

Textbooks:

1. A textbook of Electrical Technology by B.L. Theraja, Volume-1, S Chand and Company, Reprint Edition 2014. [Covers modules 1 to 4]
2. Basic Electrical Engineering, D.C. Kulshreshtha, McGraw Hill, 2nd Edition, 2024. [Covers all modules]

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, McGraw Hill 2 nd edition, 3 rd Reprint 2024.
2. Principles of Electrical Engineering & Electronics by V. K. Mehta, Rohit Mehta, S. Chand and Company Publications, 2nd edition, 2015.
3. Electrical Technology by E. Hughes, Pearson, 12th Edition, 2016.
4. Basic Electrical and Electronics Engineering, S.K Bhattacharya, et al, Pearson. 2 nd edition, 2017.
5. Handbook of Electrical Engineering formulae, Harish C Rai, CBS Publications, 2018.

Web links and Video Lectures (e-Resources):

- http://nptel.ac.in/courses./108108076/
- http://elearning.vtu.ac.in/content/BS.php

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

- Quizzes
- Assignments
- Seminar
- Activity based learning (Poster presentation, model making)

Signatures:

1. Dr. SUREKHA MANOJ :
2. Dr. GURUPRASAD A S:
3. Dr. PARAMESHACHARI B D
4. Dr. ABDUL HAQ NALBAND
5. Mr. SOMASHEKAR YAMANI
6. One Senior Member
7. Chair Person

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE
Department of Electronics & Communication Engineering
FIRST SEMESTER SYLLABUS

Name of the Course: **Fundamentals of Electronics & Communication Engineering**		Semester	I/II
Course Code	**25BPSK105/205D**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	CORE		

Course objectives:
Students will be taught

- Operation of Semiconductor diode, Zener diode and Special purpose diodes and their applications.
- Biasing circuits for transistor (BJT) as an amplifier.
- Study of linear Op-amps and its applications.
- Logic circuits and their optimization.
- Principles of Analog Communication and Transducers

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching learning process and facilitate the achievement of course outcomes.

1. Lecture 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. Show Video/animation films to explain the functioning of various analog and digital circuits.
3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
4. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
5. Arrange visits to nearby industries to give brief information about the electronics manufacturing industry. 6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Module-1

Semiconductor Diodes: Introduction, PN Junction diode, Characteristics and Parameters, Diode Approximations, DC Load Line analysis (Text 1: 2.1,2.2,2.3,2.4)

Diode Applications: Introduction, Half Wave Rectification, Full Wave Rectification, Full Wave Rectifier Power Supply: Capacitor Filter Circuit, (only qualitative approach), **Diode as Clipper**, **(Text 1: 3.1,3.2,3.4,3.8)**

Zener Diodes: Zener Diode and its use in Voltage Regulation (Text1:2.9, 3.7)

Number of Hours:8

Module-2

Bipolar Junction Transistors: Introduction Voltages & Currents, BJT Amplification, Common Base Characteristics, Common Emitter Characteristics, Common Collector Characteristics, BJT Biasing: Introduction, Fixed Biasing and Voltage Divider, DC Load line and Bias point. (Text 1: 4.1,4.2, 4.3, 4.5,4.6, 4.7,5.1)

Field Effect Transistor: Junction Field Effect Transistor, JFET Characteristics, MOSFETs: Enhancement MOSFETs, (Text 1: 9.1,9.2,9.5)

Case Study: MOSFET as a Switch. **Number of Hours:8**

Module-3

Operational Amplifiers: Introduction The Operational Amplifier, Block Diagram Representation of Typical Op-Amp, Schematic Symbol, Op-Amp parameters - Gain, input resistance, Output resistance, CMRR, Slew rate, Bandwidth, input offset voltage, Input bias Current and Input offset Current, The Ideal Op-Amp , Equivalent Circuit of Op-Amp, Open Loop Op-Amp configurations, Differential Amplifier, Inverting & Non Inverting Amplifier

Op-Amp Applications: Inverting Configuration, Non-Inverting Configuration, Differential Configuration, Voltage Follower, Integrator, Differentiator.

(Text 2: 1.1, 1.2, 1.3, 1.5, 2.3, 2.4, 2.6, 6.5.1, 6.5.2, 6.5.3, 6.12, 6.13). **Number of Hours:8**

Module-4

Oscillators: Positive Barkhausen criterion, Sinusoidal and Non-Sinusoidal oscillators, Wein bridge oscillator. (Text 5: 9.1,9.3)

Communications: Elements of a Communication System, Communication Channels and their Characteristics; Wireline, Fiber Optic, Wireless Electromagnetic Channels, Modulation, Need for Modulation, Types of Modulation, waveforms. (Textbook 3: 1.2, 1.3, 3.1)

Applications: AM Radio Broadcasting, Superheterodyne FM Receiver, Mobile Wireless Telephone Systems. (Textbook 4: 3.5 ,4.4.1,4.5,18.3.1,18.3.2) **Number of Hours:8**

Module-5

Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Signed Binary Numbers - Arithmetic Addition and Subtraction Binary Logic, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates (Text 5 : 1.2, 1.3, 1.4, 1.5, 1.6,1.9, 2.2, 2.3, 2.4, 2.5,2.6, 2.8,3.6),

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

(Text 5 :4.1, 4.2, 4.3,4.5), **Case Study with 4- Bit Adder Simulation**

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: Understand and analyze construction, operation, and characteristics of semiconductor devices.

CO2: Demonstrate understanding by applying acquired knowledge to design and construct small-scale circuits using semiconductors.

CO3: Develop competence by applying knowledge to construct basic digital circuits using logic gates and understanding their functions.

CO4: Understand and construct the conceptual blocks for basic communication system.

CO5: Develop and demonstrate basic knowledge of transducers and oscillators.

Assessment Structure: The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage. • To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks. • To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks. Notwithstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks. Note: The Case Studies provided in Modules 2, 4 and 5 are only meant to motivate the application of concepts to students and will not appear in the SEE.

Continuous Comprehensive Evaluation (CCE):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity: (Marks 25): Two assignments (for 10marks) and 15marks for Mini project using discrete components, demonstration and report submission.

Suggested Learning Resources: (Textbooks)

1. David A Bell, Electronic Devices and Circuits, 5th Edition, Oxford University Press, 30th Impression, 2025.

2. Ramakanth A Gayakwad, Op-amps and Linear Integrated Circuits, 4th Edition, Pearson Education, 2015.

3. John G. Proakis, Masoud Saleh, Fundamentals of Communication Systems, Second Edition, Pearson Educations, Inc., 2014.

4. D.P Kothari and I J Nagrath, Basic electronics, Second Edition, McGraw Hill Education Pvt ltd, 2018.

5. M.Morris Mano and Michael D.Ciletti, Digital Design - With an Introduction to the Verilog HDL, VHDL and System Verilog 6th Edition, Pearson Education Inc, 2024.

Reference Book

1. Mike Tooley, Electronic Circuits, Fundamentals & Applications, 5th Edition, Elsevier, 2020.

2. Albert Malvino, Electronic Principles, 9th Edition, McGraw Hill Publications, 2021.

3. Electronic Devices and Circuit Theory, R Nashelsky and L Nashelsky, 11th Edition, Pearson, 2012

Web links and Video Lectures (e-Resources):

- Introduction to Basic Electronics: https://nptel.ac.in/courses/122106025
- Digital Electronic Circuits https://nptel.ac.in/courses/108105132

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

- Quizzes
- Assignments
- Seminar
- Presentations
- Mini Projects

Signatures:

1. Dr. SUREKHA MANOJ : 23/8/25
2. Dr. GURUPRASAD A S:
3. Dr. PARAMESHACHARI B D
4. Dr. ABDUL HAQ NALBAND 23/8/25
5. Mr. SOMASHEKAR YAMANI
6. One Senior Member
7. Chair Person

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Computer Science and Engineering

FIRST/SECOND SEMESTER SYLLABUS

Course: **Principles of Programming Using C**		Semester	I/II
Course Code	**25BPSC205E /205E**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course objectives (Course Skill Set)

1. Elucidate the basic architecture and functionalities of a Computer
2. Apply the concepts of Console I/O and also various statements of C language
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
5. Apply programming constructs of C language to solve the real-world problems

Module-1

Introduction to Computing: Computer languages, Creating and Running Programs, System Development.

Overview of C: A Brief History of C, C Is a Structured Language, Compilers Vs. Interpreters, The Library and Linking, Separate Compilation, Compiling a C Program, C's Memory Map

Program Design Tools: Algorithms, Flowcharts and Pseudo codes. Types of Errors.

Expressions:, The Basic Data Types, Modifying the Basic Types, Identifier Names, Variables, The Four C Scopes, Type Qualifiers, Storage Class Specifiers, Variable Initializations, Constants, Operators, Expressions.

Textbook 2: Chapter 1: 1.3, 1.4, 1.5; Textbook 1: Chapter 1, 2 Number of Hours: 08

Module-2

Console I/O: Reading and Writing Characters, Reading and Writing Strings, Formatted Console I/O, printf(), scanf().

Statements: True and False in C, Selection Statements, Iteration Statements, Jump Statements, Expression Statements, Block Statements.

Textbook 1: Chapter 8, 3 Number of Hours: 08

Module-3

Arrays and Strings: Single-Dimension Arrays, Generating a Pointer to an Array, Passing Single-Dimension Arrays to Functions, Strings, Two-Dimensional Arrays, Multidimensional Arrays, Array Initialization, Variable - Length Arrays.

Pointers: What Are Pointers?, Pointer Variables, The Pointer Operators, Pointer Expressions, Pointers and Arrays, Multiple Indirection, Initializing Pointers.

Textbook 1: Chapter 4, 5 Number of Hours: 08

Module-4

Functions: The General Form of a Function, Understanding the Scope of a Function, Function Arguments, argc and argv—Arguments to main(), The return Statement, What Does main() Return?, Recursion, Function Prototypes, Declaring Variable Length Parameter Declarations, The inline Keyword.

Pointers (Contd…): Pointers to Functions, C's Dynamic Allocation Functions.

Textbook 1: Chapter 5, Chapter 6 Number of Hours:08

Module-5

Structures, Unions, Enumerations, and typedef: Structures, Arrays of Structures, Passing Structure to Functions, Structure Pointers, Arrays and Structures within Structures, Unions, Bit-Fields, Enumerations, Using sizeof to Ensure Portability, typedef.

Textbook 1: Chapter 7 Number of Hours:08

Course outcomes (Course Skill Set)

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

CO1: Explain the fundamental structure of a C program and primitive constructs**.**

CO2: Apply decision-making and iterative control structures to solve simple computational problems.

CO3: Develop programs using arrays, string operations and pointer to solve real-world problems.

CO4: Develop modular programs using user-defined functions and pointers for complex computational problems.

CO5: Construct user defined datatypes using structures, unions and enumerations to model simple real-world scenarios.

Suggested Learning Resources:

Textbooks:

1. Schildt, Herbert. "C the complete reference", 4th Edition, Mc GrawHill.
2. Hassan Afyouni, Behrouz A. Forouzan. "A Structured Programming Approach in C", 4th Edition, Cengage.

Reference books:

1. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, 2nd Edition, Prentice Hall of India.
2. Reema Thareja, Programming in C, 3rd Edition, Oxford University Press, 2023.

Web links and Video Lectures (e-Resources):

1. elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html
2. Introduction to Programming in C [https://onlinecourses.nptel.ac.in/noc23_cs02/preview]
3. C for Everyone: Programming Fundamentals [https://www.coursera.org/learn/c-for-everyone]
4. Computer Programming Virtual Lab [https://cse02-iiith.vlabs.ac.in/exp/pointers/]
5. C Programming: The ultimate way to learn the fundamentals of the C language [https://www.pdfdrive.com/c-programming-the-ultimate-way-to-learn-the-fundamentals-of-the-c- language-e187584209.html]
6. C Programming: The Complete Reference [https://viden.io/knowledge/programming-in-c-language/attachment/28313/c-the-complete-reference-herbert-schildt-4th-edition-pdf/preview]
7. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843237039374336345 17_shared/overview
8. C programming Tutorial: https://www.geeksforgeeks.org/c/c-programming-language/.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course outcomes and promote higher-order thinking and application-based learning.

Learning Activity -1: Programming Assignment **(Marks- 25)**

INSTRUCTIONS:

1. Course instructor will refer to HackerRank/HackerEarth/LeetCode or any other platform to derive the questions for problem-solving.
2. Course Instructor must identify programming problems from these sections: Statements (control), Arrays, Strings, Structures & Unions and Functions.
3. Courser instructor will assign THREE questions from each section to the students for design of algorithm, program and coding/execution.
4. Students must demonstrate the solutions to the course instructor and submit the record containing algorithm, program, debugging/execution and results with observations.
5. Course instructor must evaluate the student performance as per the rubrics.

Dr. JAYASHREE. R	Dr. JAYAVRINDA VRINDAVANAM V	Dr. SOWMYA B J
Dr. M.S. DINESH	Mr. SHARANGOUD BIRADAR	Mr. MADHUSUDHAN G L
Dr. BALAJI K	Dr. REKHA B VENKATAUR	Dr Chanda V Reddy

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICT
Department of Applied Science and Humanities
FIRST/SECOND SEMESTER SYLLABUS-2025 Scheme

Soft Skills	**Semester**	**I/II**	
Course Code	**25BSDAK106/206**	**CIE Marks**	**100**
Teaching Hours/Week (L:T:P: S)	1:0:0	SEE Marks	--
Total Hours of Pedagogy	**Theory/Practical/Lab:** 15 Hours	Total Marks	100
Credits	PP	Exam Hours	--

Course Learning Objectives:

The competencies those are important for engineering students joining the digital age workforce or looking to become entrepreneurs are listed in 5 modules:

CO1: Apply social skills for clear communication, persuasion, self-awareness, and active listening.

CO2: Use emotional skills to build confidence, manage stress, and adapt to change. CO3: Set ambitious goals, practice empathy, and apply creativity for problem-solving. CO4: Demonstrate discipline, time management, and structured problem-solving.

CO5: Work in teams, negotiate, resolve conflicts, and think critically.

1.

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 and software's to meet the present requirements of the Global employment market.

(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 through language Labs in teaching of of LSRW skills.

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 in teaching of communicative
skills in general

Module I – Social Skills

- **Communication:** Principles of clear and effective exchange of ideas in professional and social contexts.
- **Persuasion:** Techniques to influence and convince through logical, emotional, and ethical appeals.

- **Self-Awareness:** Identifying personal strengths, weaknesses, opportunities, and challenges (SWOC analysis).
- **Active Listening:** Paraphrasing, questioning techniques, and demonstrating attentiveness.

(3 hours)

Module-2: Emotional Skills I

- **Emotional Intelligence (EI):** Recognizing and managing emotions, empathy, relationship management, and conflict resolution.
- **Stress Management:** Identifying stress triggers, relaxation techniques, work-life balance strategies, and mindfulness practices.
- **Time Management:** Prioritization (Eisenhower Matrix), setting SMART goals, avoiding procrastination, and effective scheduling.
- **Adaptability & Resilience:** Handling change, bouncing back from setbacks, and developing a growth mindset.

(3 hours)

Module-3 Emotional Skills II

- Ambition & Goal Setting: Defining personal and professional aspirations, creating SMART goals, and aligning actions with long-term vision.
- Sympathy & Empathy: Understanding emotional perspectives, differentiating between the two, and applying them in workplace and social interactions
- Creativity & Innovation: Generating original ideas, problem-solving, and applying creative thinking techniques (mind-mapping, SCAMPER). **(3 hours)**

Module-4: Professional Skills I

- **Problem Solving:** Identifying root causes, analysing options, and implementing solutions using methods like 5 Whys and Fishbone Diagram.
- **Discipline:** Building consistency, accountability, and professional habits.
- **Time Management:** Prioritizing tasks (Eisenhower Matrix), scheduling, avoiding procrastination.

(3 hours)

Module-5: Professional Skills II

- Collaboration & Teamwork: Working effectively in diverse teams, fostering trust, and achieving shared goals.
- Negotiation & Conflict Resolution: Strategies to resolve differences and reach win– win outcomes.
- Critical Thinking: The ability to analyze, evaluate, and synthesize information to make well-reasoned decisions **(3hours)**

CO	Modules	Assessment Component	Description	Marks
CO1: Apply social skills for clear communication, persuasion, self-awareness, and active listening	Module I	Role-Play & Oral Presentation	Scenario-based role-play (persuasion, active listening) + short presentation; assessed on clarity, articulation, engagement, and non-verbal cues.	**20**
CO2: Use emotional skills to build confidence, manage stress, and adapt to change	Module II	Stress Management Activity & Reflection Journal	Guided stress-relief simulation + reflection linking EI concepts to personal experiences.	**20**
CO3: Set goals, practice empathy, and apply creativity for problem- solving	Module III	Goal-Setting & Creativity Project	SMART goal plan + creative problem-solving idea using mind-mapping or SCAMPER.	**20**
CO4: Demonstrate discipline, time management, and structured problem-solving	Module IV	Problem-Solving Exercise (Case-Based)	Apply 5 Whys/Fishbone diagram to a business/engineering problem; structured solution submission.	**20**
CO5: Work in teams, negotiate, resolve conflicts, and think critically	Module V	Group Debate/Negotiation Simulation	Teams negotiate a given scenario and defend solutions in a debate; assessed on teamwork, arguments, and conflict resolution.	**20**

Extra Reading

1. Principles of Scientific and Technical Writing, 1e, By Pratap K. J. Mohapatra, Sanjib Moulick, © 2025 | Published: December 23, 2024
2. Soft Skills, 1e, By Soma Mahesh Kumar © 2024 | Published: June 8, 2023
3. Effective Technical Communication, 3e, By Ashraf M. Rizvi, Priyadarshi Patnaik, © 2024 | Published: September 12, 2024
4. Yadav, D. P. (2022). *A course in English pronunciation*. Notion Publications.

Learning Resources:

- Oxford Advance Learners Dictionary
- Cambridge English Skills Real Listening and Speaking by Miles Craven
- Communicative English for Professionals by Nitin Bhatnagar and Mamta Bhatnagar

Digital Resources

- Google Docs + Voice Typing - https://docs.google.com
- LearnEnglish – https://learnenglish.britishcouncil.org/
- TakeIELTS - https://www.britishcouncil.in/exam/ielts
- British Council Apps - **bbcLearnEnglishonline Grammar**
  LearnEnglish Podcasts IELTS Word Power
  Bbclearningenglishgrammer online
  Sounds Right (Phonemic Chart)

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

Signatures:

1. Dr. BHASKAR M
2. Dr. VENKATESHWARALU B
3. Dr. A.V. RAGHU
4. Dr. SHILPASHREE S P
5. Dr. RAJASHEKHAR M N
6. Mr. SUJITH THOMAS
7. Mr. SATISH V
8. Dr. KIRAN KUMAR S R
9. Dr. SHASHIKALA B S
10. Mrs. ANURADHA M V
11. Chairperson (Dr. JALAJA P)

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institute, under Visvesvaraya Technological University, Belagavi
(Approved by AICTE, New Delhi & Government of Karnataka)
Accredited by NAAC with 'A+' Grade, NBA (CSE, ECE)
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DETAILS OF
PROGRAM SPECIFIC LABS

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Mechanics & Materials Laboratory**		Semester	I/II
Course Code	**25BPSL107A/207A**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**0-0-0-2**	SEE Marks	50
Total Hours of Pedagogy	24	Total Marks	100
Credits	01	Exam Hours	03
Examination type (SEE)	**Laboratory**		

Course Objectives (Course Skill Set)

1. To provide hands-on experience in verifying fundamental principles of engineering mechanics such as Lami's theorem, equilibrium of forces, and beam reactions.
2. To develop the ability to perform laboratory tests on construction materials (aggregates, cement, soil) for determining properties like specific gravity and gradation.
3. To train students in analyzing and interpreting experimental data through graphical methods such as soil gradation curves.
4. To familiarize students with visual identification and classification of commonly used building materials in civil engineering practice.
5. To encourage creativity and critical thinking by engaging students in open-ended experiments, enabling them to design, conduct, and explore solutions to practical engineering problems.

PART-A
CONVENTIONAL EXPERIMENTS

1. Verification of Lami's Theorem.
2. Equilibrium of concurrent forces.
3. Parallel force system- Simply supported beam.
4. Specific Gravity of
   i. Fine aggregates.
   ii. Coarse aggregates.
   iii. Cement.
   iv. Soil.
5. Sieve analysis of soil-Graphical representation of the gradation curve & Visual identification of building materials: Bricks, Stones, Tiles, M-Sand, Bitumen, Fly-Ash, GGBS, Steel Bars of Various Sizes.

PART-B
OPEN ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. Reactions.
2. Field tests on cement.
3. Particle size distribution.
4. Gap graded.
5. Uniformly graded
6. Well graded.

Course outcome (Course SkillSet)

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

CO1. Apply fundamental principles of engineering mechanics by conducting experiments on equilibrium of forces and beams.

CO2. Determine physical properties of construction materials such as aggregates, cement, and soil through specific gravity and particle size distribution tests.

CO3. Analyze and interpret soil gradation data using sieve analysis and represent results graphically for classification and engineering applications.

CO4. Identify and classify commonly used building materials (bricks, stones, tiles, M-sand, bitumen, fly ash, GGBS, and steel) through visual inspection and standard field tests.

CO5. Design and perform open-ended experiments to investigate material behavior and force systems, fostering creativity, critical thinking, and inquiry-based problem solving

Suggested Learning Resources: (Textbook/ Reference Book/ Manuals):

Textbooks:

1. M. L. Gambhir : Concrete Manual : Dhanpat Rai & sons New – Delhi, ISBN-135551234001965.
2. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, third edition, 2015, Laxmi Publications, ISBN: 9789380856674
3. Ramamrutham.S, Engineering Mechanics, Dhanpat Rai Books, 2013,ISBN: 9789352164271.
4. Soil Mechanics and foundation Engineering by B C Punmia, Ashok kumar jain, Arun kumar jain, 18th edition, 2023, Laxmi Publications New Delhi.

Reference books / Manuals:

1. Meriam J. L. and Kraige L. G, Engineering Mechanics-Statics, Vol I–sixth Edition,2008, Wiley publication
2. Rattan S.S., Strength of Materials, Third edition, 2017, McGraw Hill Education; New Delhi. ISBN13978-9385965517.
3. Bansal R K, Strength of Materials, Laxmi Publications. 2023, 4th Edition, ISBN:978-8131808146.
4. IS 4031 (Part 11):1988 – Specific gravity test for hydraulic cement
5. IS 383:1970 – Specification for coarse and fine aggregates from natural sources for concrete.
6. IS 2386(Part 3):1963 Methods of test for aggregates for concrete: Part 3 Specific gravity, density, voids, absorption and bulking.

Web links and Video Lectures (e-Resources):

1. https://www.nptel.ac.in/courses/122104015/
2. https://nptel.ac.in/courses/112103109/
3. http://vlab.co.in/

Assessment Structure:

- The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying 50% weightage (i.e., 50 marks each). The CIE Theory component will be 25 marks and CIE Practical component will be 25 marks.
- The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks.
- The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 20 marks.
- For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

Rubrics for Continuous Assessment: 30 Marks

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Technical Skills & Procedure (PO1 & PO5) (10)	Performs operations flawlessly, correct sequence, excellent tool use. (9-10)	Minor errors, generally correct sequence and tool use. (7-8)	Performs task with some errors; needs occasional help. (5-6)	Many errors, requires frequent guidance. (3-4)	Cannot perform task without continuous supervision. (0-2)
Safety Compliance (PO6) (5)	Strictly follows all safety protocols, proper PPE usage at all times. (5)	Follows safety rules, occasional minor lapses. (4)	Mostly safe, some reminders needed. (3)	Frequent safety violations. (2)	Unsafe behavior, ignores safety rules. (0-1)
Interaction with the Group (PO8) (5)	Naturally leads, encourages, and includes all group members. Facilitates communication and ensures tasks are distributed fairly. Respects all opinions. (5)	Cooperates well with group members. Communicates clearly, shares the workload, and is a reliable and positive team member. (4)	Works alongside others but with limited communication or collaboration. Tends to work in isolation or contributes unevenly to the group effort. (3)	Fails to cooperate with the group. Is dismissive of others' ideas or causes friction and disagreement within the team. (2)	Refuses to work with the group or actively disrupts the group's ability to complete the experiment. (1)
Lab Report (PO9) (10)	Report is exceptionally well-organized, detailed, and insightful. All data and analysis are accurate. Submitted on time. (9-10)	Report is complete, well-organized, and accurate. All required sections are present and data is correctly reported. Submitted on time. (7-8)	Report has minor errors in data or analysis, or is missing some minor components. Organization could be clearer. (5-6)	Report is incomplete, contains significant errors, is poorly organized, or is submitted late without a valid reason. **(3-4)**	Fails to submit a report, or the submitted work is of completely unacceptable quality and lackscritical information **(0-2)**

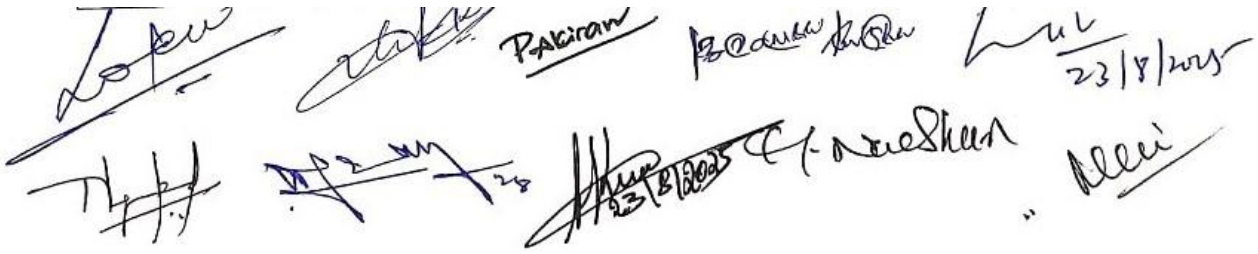
Rubrics for SEE / CIE :

CIE-To be conducted for 100 Marks and the marks obtained shall be reduced to 20.

SEE to be conducted for 100 Marks

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Execution (PO3 & PO5) (8)/ (40)	Executes operations accurately with correct parameters; smooth, safe handling of equipment. (7-8) / (33-40)	Minor execution errors; mostly correct handling of tools/ machines. (5-6) / (25-32)	Acceptable performance with some parameter or handling errors. (3-4) / (17-24)	Multiple execution errors; needs frequent correction. (2) / (9-16)	Unable to perform operation independently. (0-1)/ (0-8)
Result and Discussion (PO4) (7)/ (40)	Presents accurate results; clearly compares with standards; insightful discussion of deviations and causes. (7-8) / (33-40)	Accurate results; some useful discussion. 5-6) / (25-32)	Results mostly correct; discussion basic. (3-4) / (17-24)	Results incomplete or partially wrong; weak discussion. (2) / (9-16)	Presents accurate results; clearly compares with standards; insightful discussion of deviations and causes. (0-1)/ (0-8)
Viva Voce (PO9) (5)/ (20)	Answers all questions confidently, showing deep conceptual and practical understanding. (5) / (17-20)	Answers most correctly; minor conceptual gaps. (4) / (13-16)	Answers some but lacks depth. (3) / (9-12)	Gives vague or incomplete answers. (2) / (5-8)	Unable to answer. (1) / (0-4)

- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks**, i.e., **20 marks**.
- To pass the SEE component, a student must secure a minimum of 35% of 50 marks, i.e., 18 marks.
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.



K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Elements of Mechanical Engineering Laboratory**		Semester	I/II
Course Code	**25BPSL107/207B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**0-0-0-2**	SEE Marks	50
Total Hours of Pedagogy	20	Total Marks	100
Credits	01	Exam Hours	03
Examination type (SEE)	**Laboratory**		

Course Objectives (Course Skill Set)

1. To familiarize students with basic machining operations such as turning, facing, knurling, and step turning using the lathe machine.
2. To develop practical skills in metal joining processes through preparation of welded joints and sheet metal fabrication.
3. To train students in the use, calibration, and accuracy assessment of precision measuring instruments such as vernier calipers, micrometers, and sine bars.
4. To enable students to evaluate material properties, including hardness, and compare fuel/oil characteristics like flash point, fire point, and viscosity.
5. To encourage critical thinking and problem-solving through open-ended experiments involving selection of joining methods, effect of additives, and design-based fabrication tasks.

PART-A
CONVENTIONAL EXPERIMENTS

1. Performing facing, plain turning and step turning operations by using a lathe.
2. Performing facing, plain turning and knurling operations by using a lathe.
3. Preparation of welded joints using the arc welding process.
4. Calibration of vernier caliper and micrometer using slip gauges.
5. Preparation of plumbing models of various joints

PART-B
OPEN ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. Comparative study of flash point and fire point of various fuels / oils using the open cup method.
2. Comparative study of flash point and fire point of various fuels / oils using the closed cup method
3. Comparative study on viscosity of different base fuels.
4. **Measuring area of irregular surface using planimeter.**
5. Comparison of valve and piston mechanism of Two-stroke and Four stroke engines.
6. Fabrication of a sheet metal part with simple geometry and soldering.
7. Demonstration of simple python code for working of engine

Course outcome (Course SkillSet)

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

CO1.Perform various operations using lathe and welding machine.

CO2.Prepare the various joints using welding and plumbing.

CO3.Demonstrate angular measurement of a given specimen using appropriate device.

CO4.Determine the properties and characteristics of fuels and oils.

CO5.Determine the valve angles for two-stroke and four stroke engines.

Suggested Learning Resources: (Textbook/ Reference Book/ Manuals):

Textbooks:

1. Amitabh Ghosh and Amit Kumar Mallik, Manufacturing Science, Affiliated East West Press (p) Ltd, New Delhi, 2002
2. Hajara and Choudhary, Workshop Technology Vol. I (2008) & II (2010), Median Promoters & publishers, Bombay.
3. Khanna O. P, Workshop Practice, Vol. I, Dhanpat Rai & Co., 2000.
4. Engineering Metrology, R.K. Jain, Khanna Publishers, Delhi, 2009.

Reference books / Manuals:

1. Serope Kalpakjian and Steven R Schmid, Manufacturing Engineering and Technology, Fourth Edition, Pearson Education, Asia, 2000.
2. P.N. Rao, Manufacturing technology--Foundry, Forming and Welding, Tata McGraw Hill Education, 2001.
3. I.C. Gupta, Engineering Metrology, Dhanpat Rai Publications, New Delhi, 2018.
4. Ganeshan. V, Internal Combustion Engines, Tata McGraw Hill, 4th Edition, 2012.

Web links and Video Lectures (e-Resources):

- https://openoregon.pressbooks.pub/manufacturingprocesses45/chapter/chapter-unit-1-the-engine-lathe
- https://www.millerwelds.com/resources/article-library/the-fundamentals-of-welding-process-equipment-and-applications
- https://www.youtube.com/watch?v=sbbwJ5p6irc
- https://sm-nitk.vlabs.ac.in/

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- The laboratory syllabus consists of PART-A and PART-B. While PART-A has 5 conventional experiments, PART-B has 7 typical open-ended experiments. The maximum marks for the laboratory course are 100.
- Both PART-A and PART-B are considered for CIE and SEE.
- Students have to answer 1(one) question from PART-A and 1(one) question from PART-B.
- The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks.
- The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks.

For continuous internal evaluation, during the semester, classwork, the typical open-ended questions shall be from PART-B, and any other similar questions to enhance the skill of the students.

Rubrics for Continuous Assessment: 30 Marks

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Technical Skills & Procedure (PO1 & PO5)	Performs operations flawlessly, correct sequence,	Minor errors, generally correct sequence and tool use.	Performs task with some errors; needs occasional help.	Many errors, requires frequent guidance. (3-4)	Cannot perform task without continuous supervision.

(10)	excellent tool use. (9-10)	(7-8)	(5-6)		(0-2)
Safety Compliance (PO6) (5)	Strictly follows all safety protocols, proper PPE usage at all times. (5)	Follows safety rules, occasional minor lapses. (4)	Mostly safe, some reminders needed. (3)	Frequent safety violations. (2)	Unsafe behavior, ignores safety rules. (0-1)
Interaction with the Group (PO8) (5)	Naturally leads, encourages, and includes all group members. Facilitates communication and ensures tasks are distributed fairly. Respects all opinions. (5)	Cooperates well with group members. Communicates clearly, shares the workload, and is a reliable and positive team member. (4)	Works alongside others but with limited communication or collaboration. Tends to work in isolation or contributes unevenly to the group effort. (3)	Fails to cooperate with the group. Is dismissive of others' ideas or causes friction and disagreement within the team. (2)	Refuses to work with the group or actively disrupts the group's ability to complete the experiment. (1)
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Result and Discussion (PO4) (7)/ (40)	Presents accurate results; clearly compares with standards; insightful discussion of deviations and causes. (7-8) / (33-40)	Accurate results; some useful discussion. 5-6) / (25-32)	Results mostly correct; discussion basic. (3-4) / (17-24)	Results incomplete or partially wrong; weak discussion. (2) / (9-16)	Presents accurate results; clearly compares with standards; insightful discussion of deviations and causes. (0-1)/ (0-8)
Viva Voce (PO9) (5)/ (20)	Answers all questions confidently, showing deep conceptual and practical understanding. (5) / (17-20)	Answers most correctly; minor conceptual gaps. (4) / (13-16)	Answers some but lacks depth. (3) / (9-12)	Gives vague or incomplete answers. (2) / (5-8)	Unable to answer. (1) / (0-4)

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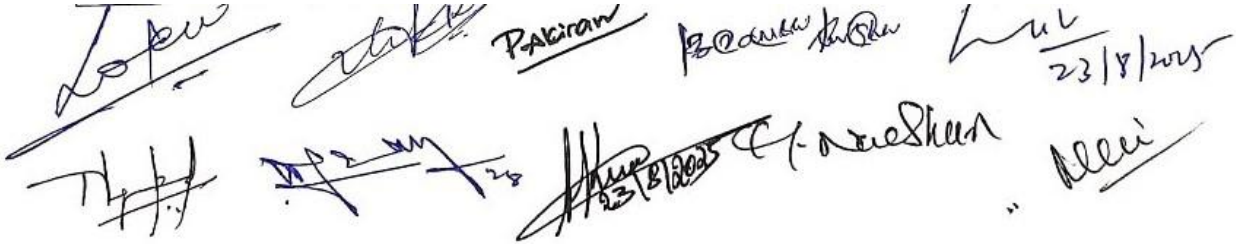
- To pass the SEE component, a student must secure a minimum of 35% of 50 marks, i.e., 18 marks.
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.



K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE
Department of Electronics & Communication Engineering.
FIRST / SECOND SEMESTER SYLLABUS – 2025 scheme

Course: Basics of Electrical Engineering Lab		Semester	I/II
Course Code	**25BPSL207C /207C**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	2	Total Marks	100
Credits	01	Exam Hours	03
Examination type (SEE)	**Practical**		

Course outcome (Course Skill Set) At the end of the course, the student will be able to:

1. Conduct standard electrical experiments to verify theoretical principles.
2. Measure key electrical parameters such as resistance, inductance, impedance, power, and power factor with standard methods.
3. Design and perform experiments to solve practical open-ended electrical problems.
4. Analyse experimental data from non-routine method to arrive at a solution

Note:

(i)The laboratory syllabus consists of PART-A and PART-B. While PART-A has 6 conventional experiments, PART-B has 6 typical open-ended experiments. The maximum mark for laboratory course is 100.

(ii) Both PART-A and PART-B are considered for CIE and SEE.

(iii) Students have to answer 1(one) question from PART-A and 1(one) question from PART-B.

(iv a) The questions set for SEE shall be from amongst the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks.

(iv b) The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks.

(v) For continuous internal evaluation, during the semester classwork, the typical open-ended questions may be selected from PART-B or there may be any other similar question to enhance the skill of the students.

PART – A CONVENTIONAL EXPERIMENTS

(1) Verification of Ohm's law and Kirchhoff's laws.

(2) Measurement of low range resistance using voltmeter-ammeter method. Verification of resistance value using multimeter/LCR meter.

(3) Measurement of earth's resistance by 3-electrode method.

(4) Measurement of resistance, inductance, impedance and power factor using voltmeter, ammeter and wattmeter in single-phase AC circuits.

(5) Measurement of Line and Phase quantities in star and delta connected three phase load.

(6) Wiring an appropriate electric circuit, understanding the basic principle used for 2-way and 3-way control of load.

PART – B
TYPICAL OPEN-ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

(1) Creation of short circuit to determine the time taken by a fuse of different length. Documenting the test data and the conclusions.

(2) Trouble shooting experiments in simple DC circuits. The trouble may be due to loose connection, faulty component leading to open circuits or short circuits. Detection of fault and the reasons for that and conclusion.

(3) Measurement of voltage between line and neutral, ground and line, ground and neutral in respect of heathy and unhealthy 3-pin socket. Conclusions arrived for the faulty wiring. Allowable ground voltage.

(4) A 12 V battery is available. It is required to obtain 3 V from the battery to charge a mobile. Create a circuit to obtain the required voltage. Specify all the ratings of the components used.

(5) Only three ammeters and standard resistance are available in the laboratory. Using the same measure the single-phase power consumed by an inductive load.

(6) Only three voltmeters and standard resistance are available in the laboratory. Using the same measure the single-phase power consumed by an inductive load

Suggested Learning Resources:

1) Manual prepared for the conventional experiments by the Department.

Textbooks:

1. A textbook of Electrical Technology byB.L. Theraja, Volume-1, S Chand and Company, Reprint Edition 2014. [Covers modules 1 to 4]
2. Basic Electrical Engineering, D.C. Kulshreshtha, McGraw Hill, 2nd Edition, 2024. [Covers all modules]

Web links and Video Lectures (e-Resources):

(1) https://bes-iitr.vlabs.ac.in/List%20of%20experiments.html [Virtual Labs, a ministry of education (MOE) Govt. of India Initiative]

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching learning process and facilitate the achievement of course outcomes.

(i)Demonstration with hands-on practice.

Perform the experiment step-by-step to reinforce understanding and skill after a demonstration.

(ii)Problem-based learning (PBL)

Students to work individually or in groups to analyse the situation, design solutions, and present their findings.

Assessment of CIE and SEE

The assessment of the practical course is for a maximum of 100 marks. Both CIE and SEE are evaluated for 50 marks each.

(a)CIE Assessment

(i)The CIE marks of 25 shall be based on the work carried out during the laboratory hours. The components considered for assessment of marks shall be based on the experiment conducted under both PART-A and PART-B and the laboratory record.

(ii)The rest 25 marks shall be for the test conducted under PART-A and PART-B.

(iii)The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early), shall be conducted for both PART-A and PART-B.

(iv)PART-A shall be evaluated for a maximum of 15 marks and PART-B for a maximum of 10 marks. Each student has to conduct the PART-A experiment individually. The time allotted for this is 1.5 hours. The question under PART-B may be attempted by an individual student. The time allotted for this is 1.5 hours.

(v)The evaluation process shall as per university notification.

(b)SEE Assessment

The maximum SEE mark for the final examination is 100 marks. While PART-A carries a maximum of 70 marks,

PART-B carries a maximum of 30 marks. The sum total of PART-A and PART-B should be scaled down to 50 marks.

The evaluation process shall as per university notification.

Passing Standard

(i)To become eligible to appear for SEE, the marks secured by a student in CIE must be a minimum of 40 % of 50 marks, i.e., 20 marks.

(ii)For a pass in SEE, the marks secured by a student must be a minimum of 35 % of 50 marks, i.e., 18 marks.

(iii) A student is deemed to have successfully completed the course if the sum total of CIE and SEE is at least 40 out of 100 marks.

Signatures:

1. Dr. SUREKHA MANOJ : 23/8/25
2. Dr. GURUPRASAD A S:
3. Dr. PARAMESHACHARI B D
4. Dr. ABDUL HAQ NALBAND
5. Mr. SOMASHEKAR YAMANI 23/8/25
6. One Senior Member
7. Chair Person

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE
Department of Electronics & Communication Engg.
FIRST / SECOND SEMESTER SYLLABUS – 2025 scheme

Course: Fundamentals of Electronics and Communication Engineering Lab		Semester	I/II
Course Code	**25BPSL207D**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	01	Exam Hours	03
Examination type (SEE)	**Practical**		

Course outcome (Course Skill Set)

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

1. Apply the operating principles of diodes, transistors, and MOSFETs to construct and test basic analog circuits.
2. Implement operational amplifier configurations such as inverting, non-inverting, integrator, and differentiator for analog signal processing applications.
3. Analyze the functionality of logic gates and combinational circuits including adders, subtractors, and code converters using digital ICs.
4. Investigate amplitude modulation to explore fundamental analog communication techniques.
5. Develop solutions to open-ended electronic design problems by selecting appropriate components, constructing circuits, and interpreting results to meet defined objectives.

Note:

1. The laboratory syllabus consists of PART-A and PART-B. While PART-A has 6 conventional experiments, PART-B has 6 typical open-ended experiments. The maximum marks for the laboratory course are 100.
2. Both PART-A and PART-B are considered for CIE and SEE.
3. Students have answer 1(one) question from PART-A and 1(one) question from PART-B.
   a) The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks.
   b) The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks.
4. For continuous internal evaluation, during the semester, classwork, the typical open-ended questions shall be from PART-B, and any other similar questions to enhance the skill of the students

PART – A : CORE/BASIC HARDWARE EXPERIMENTS

1. Design and Testing of Half-Wave and Full-Wave Rectifiers With and Without Filter for Determining Ripple Factor, Voltage Regulation, and Efficiency
2. Design and Testing of Bridge Rectifier With and Without Filter for Determining Ripple Factor, Voltage Regulation, and Efficiency
3. Analysis of Input and Output Characteristics of a Bipolar Junction Transistor in Common Emitter Configuration
4. Study of Transfer and Drain Characteristics of a MOSFET in Common Source Configuration

5. Investigation of Op-Amp in Inverting and Non-Inverting Modes with Gain Measurement
6. Study of Truth Tables for OR, AND, NOT, NAND, and NOR Gates Using Basic and Universal Gates

PART – B
OPEN ENDED HARDWARE EXPERIMENTS

1. Design and Testing of Clipping and Clamping Circuits to obtain desired Transfer Characteristics
2. Design and test a single stage bipolar junction transistor amplifier to obtain desired gain and bandwidth requirements.
3. Testing of Op-Amp as voltage follower and a weighted summer with waveform analysis.
4. Design and Testing of Integrator and Differentiator Circuits using Op-Amp with Waveform Analysis
5. Amplitude Modulation using Discrete Components for Given Specifications.
6. Realization of Half/ Full Adder and Subtractor using Logic Gates.
7. Design and test Hartley Oscillator for the given frequency

Suggested Learning Resources:

Text books:

1. David A Bell, Electronic Devices and Circuits, 5th Edition, Oxford University Press, 30th Impression, 2025.
2. Ramakanth A Gayakwad, Op-amps and Linear Integrated Circuits, 4th Edition, Pearson Education, 2015.
3. John G. Proakis, Masoud Saleh, Fundamentals of Communication Systems, Second Edition, Pearson Educations, Inc., 2014.
4. D.P Kothari and I J Nagrath, Basic electronics, Second Edition, McGraw Hill Education Pvt ltd, 2018.
5. M.Morris Mano and Michael D.Ciletti, Digital Design - With an Introduction to the Verilog HDL, VHDL and System Verilog 6th Edition, Pearson Education Inc, 2024.
6. Robert L. Boylestad, Louis Nashelsky, “Electronic Devices and Circuit Theory", 11th Edition, PHI, 2016.

Web links and Video Lectures (e-Resources):

- Introduction to Basic Electronics: https://nptel.ac.in/courses/122106025
- Digital Electronic Circuits: https://nptel.ac.in/courses/108105132

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

1. While explaining each experiment, also focus on the application of that particular experiment in the electronics industry.
2. Students need not memorize pin diagrams, these can be provided to the student during CIE and SEE.

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K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Computer Science and Engineering

FIRST/SECOND SEMESTER SYLLABUS

Course: C Programming Lab		Semester	I/II
Course Code	**25BPSL107E/207E**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	24	Total Marks	100
Credits	1	Exam Hours	3
Examination type (SEE)	Practical		

Course objectives (Course Skill Set)

1. Elucidate the basic architecture and functionalities of a Computer
2. Apply the concepts of Console I/O and also various statements of C language
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
5. Apply programming constructs of C language to solve the real-world problems

Note:

1. The laboratory syllabus consists of PART-A and PART-B. While PART-A has 6 conventional experiments, PART-B has 6 typical open-ended experiments. The maximum marks for the laboratory course are 100.
2. Both PART-A and PART-B are considered for CIE and SEE.
3. Students have answer 1(one) question from PART-A and 1(one) question from PART-B.
   a. The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks.
   b. The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks.
4. For continuous internal evaluation, during the semester, classwork, the typical open-ended questions shall be from PART-B, and any other similar questions to enhance the skill of the students

List of Experiments

1. A robot needs to find how far it must travel between two points on a 2D plane. Develop a C program to calculate the straight-line distance between the given coordinates.

2. Develop a C program that takes a student's marks as input and displays their grade based on the following criteria:
   90 and above: Grade
   A 75 to 89: Grade B
   60 to 74: Grade C
   50 to 59: Grade D
   Below 50: Grade F
   Choose a suitable control structure to implement this logic efficiently.
3. Develop a C program that takes a unique identification input like PAN Number, AADHAR_Number, APAAR_Id, Driving License, Passport and checks it against a set of stored KYC records. Based on the input, display whether the individual is verified or not. Use an appropriate control structure to handle multiple possible ID matches. Assume all Unique identification are of integer type.
4. A math app needs to determine the type of roots for a quadratic equation based on user input. Develop a C program to calculate and display the roots based on the given coefficients.

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5. A sensor in a robotic arm needs to calculate the angle of rotation in real-time, but the hardware doesn't support built-in trigonometric functions. Develop a C program to approximate the value of sin(x) using a series expansion method for improved performance.

6. Develop a C program that accepts a course description string and a keyword from the user. Search whether the keyword exists within the course description using appropriate string functions. If found, display: "Keyword '<keyword>' found in the course description." Otherwise, display: "Keyword '<keyword>' not found in the course description."

7. Develop a C program that takes marks for three subjects as input. Use a function to check if the student has passed (minimum 40 marks in each subject). Display the average and whether the student passed or failed.

8. In an ATM system, two account balances need to be swapped temporarily for validation. Develop a C program that accepts two balances and uses a function with pointers to swap them. Display the balances before and after swapping.

PART – B

TYPICAL OPEN-ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined, and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. A college library has a digital bookshelf system where each book is assigned a unique Book ID. The bookshelf is organized in ascending order of Book IDs. Develop a C Program to quickly find whether a book with a specific Book ID is available in the shelf.

2. A sports teacher has recorded the scores of students in a 100-meter race. To prepare the result sheet, the teacher wants the scores arranged in descending order (from highest to lowest). Develop a C program to sort the scores.

3. A small warehouse tracks how many units of different products are shipped from multiple branches. Another dataset shows how much revenue each product generates per unit. Develop a C program which combines these datasets to calculate the total revenue generated by each branch.

4. A basic mobile contact manager stores first and last names separately. For displaying full names in the contact list, you need to join them manually. Additionally, the system must check the length of each full name to ensure it fits the screen. Perform these operations by developing a C program without using built- in string functions

5. A currency exchange booth allows users to convert between two currencies. Before confirming the exchange, the system simulates a swap of the values to preview the result without actually changing the original data. In other cases, it updates the actual values. Develop a C program that implements both behaviors using Call by Value and Call by reference.

6. A currency exchange booth allows users to convert between two currencies. Before confirming the exchange, the system simulates a swap of the values to preview the result without actually changing the original data. In other cases, it updates the actual values. Develop a C program that implements both behaviours using Call by Value and Call by reference

7. A local library needs to store and display details of its books, including title, author, and year of publication. Design a structure that can hold these details and develop a C program to display a list of all books entered

Course outcome(Course Skillset)

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

CO1: Develop programs in C to solve simple computational problems.
CO2: Make use of C language derived datatypes to solve simple real-world problems.
CO3: Build a document consisting of experiment setup, design, implementation and results with inferences.
CO4**:** Develop modular programs using user-defined functions and pointers for complex computational problems.
CO5: Construct user defined datatypes using structures, unions and enumerations to model simple real- world scenarios

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Textbook:

1. Hassan Afyouni, Behrouz A. Forouzan. "A Structured Programming Approach in C", 4th Edition, Cengage.

Reference books:

1. Schildt, Herbert. "C the complete reference", 4th Edition, Mc GrawHill.
Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, 2nd edition, Prentice Hall of India.

Web links and Video Lectures (e-Resources):

1. Introduction to Programming in C [https://onlinecourses.nptel.ac.in/noc23_cs02/preview]
2. C for Everyone: Programming Fundamentals [https://www.coursera.org/learn/c-for-everyone]
3. Computer Programming Virtual Lab [https://cse02-iiith.vlabs.ac.in/exp/pointers/]
4. C Programming: The ultimate way to learn the fundamentals of the C language [https://www.pdfdrive.com/c-programming-the-ultimate-way-to-learn-the-fundamentals-of-the-c- language-e187584209.html]
5. C Programming: The Complete Reference [https://viden.io/knowledge/programming-in-c-language/attachment/28313/c-the-complete-reference-herbert-schildt-4th-edition-pdf/preview]

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

1. Engineering tool usage for the conduction of experiment
2. Demonstration through ICT tools
3. Use of virtual labs (https://www.vlab.co.in/)

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 20 marks. For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.

Dr. JAYASHREE. R	Dr. JAYAVRINDA VRINDAVANAM V	Dr. SOWMYA B J
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K. S. INSTITUTE OF TECHNOLOGY

(An Autonomous Institution under VTU, Approved by AICTE)

Department of Applied Science and Humanities

FIRST SEMESTER SYLLABUS --2025 Scheme

Name of the Course: **ಬಳಕೆ ಕನ್ನಡ**		Semester	1	
Course Code	25BKBKK208	CIE Marks	50	
Teaching Hours/Week (L:T:P: S)	1:0:0	SEE Marks	50	
Total Hours of Pedagogy	15	Total Marks	100	
Credits	01	Exam Hours	01	
Examination type (SEE)	Theory			

Course Objectives: ಬಳಕೆ ಕನ್ನಡ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು	
1.	To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2.	To enable learners to Listen and understand the Kannada language properly.
3.	To speak, read and write Kannada language as per requirement.
4.	To train the learners for correct and polite conservation.
5.	To know about Karnataka state and its language, literature and General information about this state.

Teaching-Learning Process: ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ

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

1. ಬಳಕೆ ಕನ್ನಡವನ್ನು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಬೋಧಿಸಲು ವಿಟಿಯು ಸೂಚಿಸಿರುವ ಪಠ್ಯ ಪುಸ್ತಕವನ್ನುಉಪಯೋಗಿಸಬೇಕು.

2. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ಗಳನ್ನು ತಯಾರಿಸಲು ಉತ್ತೇಜಿಸುವುದು ಮತ್ತು ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.

3. ಪ್ರತಿ ವಿದ್ಯಾರ್ಥಿ ಪುಸ್ತಕವನ್ನುತರಗತಿಯಲ್ಲಿ ಬಳಸುವಂತೆ ನೋಡಿಕೊಳ್ಳುವುದು ಮತ್ತು ಪ್ರತಿಪಾಠ ಮತ್ತು ಪ್ರವಚನಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧ ಪಟ್ಟಂತೆ ಪೂರಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ತೊಡಗಿಸತಕ್ಕದ್ದು.

4. ಡಿಜಿಟಲೀ ತತ್ರಜ್ಞಾನದ ಮುಖಾಂತರ ಇತ್ತೀಚೆಗೆ ಡಿಜಿಟಲೀಕರಣ ಗೊಂಡಿರುವ ಭಾಷೆ ಕಲಿಕೆಯ ವಿಧಾನಗಳನ್ನು ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ಮುಖಾಂತರ ಚರ್ಚಿಸಲು ಕ್ರಮ ಕೈಗೊಳ್ಳುವುದು. ಇದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ತರಗತಿಯಲ್ಲಿ ಹೆಚ್ಚು ಏಕಾಗ್ರತೆಯಿಂದ ಪಾಠಕೇಳಲು ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ತೊಡಗಲು ಅನುಕೂಲವಾಗುತ್ತದೆ.

5. ಭಾಷಾ ಕಲಿಕೆಯ ಪ್ರಯೋಗಾಲಯದ ಮುಖಾಂತರ ಬಹುಬೇಗ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಕಲಿಯಲು ಅನುಕೂಲವಾಗುವಂತೆ ಕಾರ್ಯ ಚಟುವಟಿಕೆಗಳನ್ನು ಮತ್ತು ಕ್ರಿಯಾ ಯೋಜನೆಗಳನ್ನು ರೂಪಿಸುವುದು.

Module – 1 (3 hours)	RBT Level
1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language. 2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation, Listening and Speaking Activities, Key to Transcription 3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ ಸಂಬಂಧಿತ ಸರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words	L2
Module-2 (3 hours)	
1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳನ್ನು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು- Possessive forms of nouns, dubitive question and Relative nouns 2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು-Qualitative, Quantitative and Color Adjectives, Numerals 3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು-ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) Predictive Forms, Locative Case	L2
Module – 3 (3 hours)	
1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - Dative Cases, and Numerals 2. ಸಂಖ್ಯಾ ಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು - Ordinal numerals and Plural markers 3. ನ್ಯೂನ ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ವರ್ಣಗುಣ ವಾಚಕಗಳು - Defective/Negative Verbs & Color Adjectives	L2
Module – 4 (3 hours)	
1. ಅಪ್ಪಣೆ ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಅರ್ಥ ರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು - Permission, Commands, encouraging and Urging words (Imperative words and sentences) 2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು - Accusative Cases and Potential Forms used in General Communication	L2
Module – 5 (3 hours)	
1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು - Different types of Tense, Time and Verbs 2. ದ್ ಇತು ಆಗಿ ಅಲ್ಲ ಗ್ ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms	L2
Course outcome(Course Skill Set) ಬಳಕೆ ಕನ್ನಡ (25BKBKK208**) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ** **(**At the end of the course the student will be able to) :**	
To understand the necessity of learning of local language for comfortable life.	
To speak, read and write Kannada language as per requirement.	
To communicate (converse) in Kannada language in their daily life with kannada speakers.	
To Listen and understand the Kannada language properly.	
To speak in polite conservation.	

University prescribed Text Books:

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್ ತಿಮ್ಮೇಶ
ಪ್ರಕಟಣೆ: ಪ್ರಸಾರಾಂಗ,
ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ:

1. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ (9900832331) ಇವರನ್ನುಸಂಪರ್ಕಿಸಿ.
2. .ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ ಮತ್ತು ಬಹುಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ಸೈಟ್ ಟ್ಯೋಡುವುದು.

Assessment Details(both CIE and SEE)

The weight age 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 Test search of 30 Marks(duration01hour)

- 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 20Marks

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.

Topics Removed	Updated/Added	Reason for Change

	Topics	
NIL	**Presentation according to industry needs, Video ethics, Business clarity and relevance MODULE 5**	To make students fluent in communication and industry ready

Topics Removed	Updated/Added Topics	Reason for Change
NONE	Clarity in report writing, Relevance and removal ambiguity in reports	Crucial for professional writing
Topics Removed	**Updated/Added Topics**	**Reason for Change**
NONE	Clarity in report writing, Relevance and removal ambiguity in reports	Crucial for professional writing
Topics Removed	**Updated/Added Topics**	**Reason for Change**
NONE	Clarity in report writing, Relevance and removal ambiguity in reports	Crucial for professional writing

K. S. INSTITUTE OF TECHNOLOGY

(An Autonomous Institution under VTU, Approved by AICTE)

Department of Applied Science and Humanities

FIRST SEMESTER SYLLABUS --2025 Scheme

Name of the Course: ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ		Semester	1	
Course Code	25BKSKK208	CIE Marks	50	
Teaching Hours/Week (L:T:P: S)	1:0:0	SEE Marks	50	
Total Hours of Pedagogy	15	Total Marks	100	
Credits	01	Exam Hours	01	
Examination type (SEE)	Theory			

Course Objectives: ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:	
1.	ವೃತ್ತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಮೇಲಿನ ಪ್ರೀತಿ ಹೆಚ್ಚಾಗುವುದು.
2.	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಯಿಸುವುದು.
3.	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.
4.	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
5.	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.

Teaching-Learning Process: ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ

These are sample Strategies, which teacher can use to accelerate the attainment of the course out comes.

1. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಭೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಗಳಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.
2. ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳವುದು. ಅಂದರೆ ಕವಿ–ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ
   ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧ ಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಪಿ.ಪಿ.ಟಿ. ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.
3. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಭೋಧನೆಗೆ ಸಮಬಂಧ ಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.

ಘಟಕ – 1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (3 hours)	RBT Level
1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ – ಹಂಪಾ ನಾಗರಾಜಯ್ಯ **2** ಕರ್ನಾಟಕದ ಏಕೀಕರಣ ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ – ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ **3** ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ – ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೋ.ವಿ. ಕೇಶವಮೂರ್ತಿ	**L2**
ಘಟಕ – 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (3 hours)	
1. ವಚನಗಳು: ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರ ದಾಸಿಮಯ್ಯ, ಆಯ್ಕಕ್ಕಿ ಲಕ್ಕಮ್ಮ. 2. ಕೀರ್ತನೆಗಳು: ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಪುರಂದರದಾಸರು **3.** ತತ್ವ ಪದಗಳು: ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು – ಶಿಶುನಾಳ ಷರೀಫ	**L2**
ಘಟಕ – 3 ಆಧುನಿಕ ಕಾವ್ಯ ಭಾಗ (3 hours)	
1. ಡಿ.ವಿ.ಜಿ.ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು 2. ಕುರುಡು ಕಾಂಚಾಣ: ದ.ರಾ. ಬೇಂದ್ರೆ **3.** ಹೊಸಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು	**L2**
ಘಟಕ – 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (3 hours)	
1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ – ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್ **2.** ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ: ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ	**L2**
ಘಟಕ – 5 ಸಾಂಸ್ಕೃತಿಕ ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (3 hours)	
1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ 2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ	**L2**

Course out come (Course Skill Set) ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (25BKSKK208) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ At the end of the course the student will be able to:
ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಫೂರ್ತಿ ಮೂಡಿರುತ್ತದೆ.
ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯು ಹೆಚ್ಚಾಗುತ್ತದೆ.
ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳು ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.
ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

University prescribed Text Books:

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ
ಡಾ. ಹಿ. ಚಿ. ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್ ತಿಮ್ಮೇಶ
ಪ್ರಕಟಣೆ: ಪ್ರಸಾರಾಂಗ,
ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ:

1. **ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ** (9900832331) **ಇವರನ್ನುಸಂಪರ್ಕಿಸಿ**.
2. **.ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ ಮತ್ತು ಬಹುಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ಸೈಟ್ ಟೊನೀಡುವುದು**.

Assessment Details (both CIE and SEE)

The weight age 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 Test search of 30 Marks (duration01hour)

- First test after the completion of 30-40% of the syllabus
- Secondtestaftercompletionof80-90%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

Twoassignmentseachof20Marks

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.

Topics Removed	Updated/Added Topics	Reason for Change
NIL	ವಿಷಯದ ಅಗತ್ಯಗಳಿಗೆ ಅನುಗುಣವಾಗಿ ಪ್ರಸ್ತುತಿ/ ಜ್ಞಾನದ ಸ್ಪಷ್ಟತೆ ಮತ್ತು ಪ್ರಸ್ತುತತೆ/ಬರವಣಿಗೆಯಲ್ಲಿ ಸ್ಪಷ್ಟತೆ, ಪ್ರಸ್ತುತತೆ ಮತ್ತು ಅಸ್ಪಷ್ಟತೆ ನಿವಾರಣೆ	ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಸಂವಹನ ಮತ್ತು ವಿಷಯದ ಮಂಡನೆಗೆ ಸದೃಢರನ್ನಾಗಿ ಮಾಡಲು, ವೃತ್ತಿಪರ ಬರವಣಿಗೆಯಲ್ಲಿ ಸ್ಪಷ್ಟತೆ, ಮತ್ತು ಅಸ್ಪಷ್ಟತೆ ನಿವಾರಣೆ

Topics Removed	Updated/Added Topics	Reason for Change
NONE	Clarity in report writing, Relevance and removal ambiguity in reports	Crucial for professional writing
Topics Removed	**Updated/Added Topics**	**Reason for Change**
NONE	Clarity in report writing, Relevance and removal ambiguity in reports	Crucial for professional writing
Topics Removed	**Updated/Added Topics**	**Reason for Change**
NONE	Clarity in report writing, Relevance and removal ambiguity in reports	Crucial for professional writing

K. S. INSTITUTE OF TECHNOLOGY, BENGALURU

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Scheme of Teaching and examinations-2025
Outcome-Based Education (OBE)and Choice Based Credit System (CBCS)
(Effective from the academic year 2025-26)

I Semester **(For students attending under Chemistry Group)**

Sl. No	Course and Course Code		Course Title	Course category	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	25BMAXX101	Applied Mathematics-I	CORE	Maths Dept.	3	2	0	0	03	50	50	100	04
2	#ASC(IC)	25BCHXX102	Applied Chemistry	IPCC	Chemistry Dept.	3	0	2	0	03	50	50	100	04
3	ETC	25BETCK103	Introduction to AI and Applications	CORE	Respective Engg. Dept.	3	0	0	0	03	50	50	100	03
4	ESC-I	25BESC104X	Engineering Science Course-I	CORE	Respective Engg. dept.	3	0	0	0	03	50	50	100	03
5	PLC	25BPLC105X	Programming Language Course	CORE	CSE & Allied Dept.	3	0	0	0	03	50	50	100	03
6	AEC	25BCPSK106	Communicative & Professional Writing Skills in English	HSMS	Humanities	1	0	0	0	01	50	50	100	01
7	AEC (NCMC)	25BICOK107	Indian Constitution	HSMS	Humanities	1	0	0	0	01	100	--	100	PP
8	AEC/ SDC	25BPBLK108	Innovation and Design Thinking Lab (Project based learning)	AEC	Any Dept.	0	0	0	2	02	50	50	100	01
9	PLC	25BPLL109X	Programming Language Course Lab	LAB	CSE & Allied Dept.	0	0	2	0	02	50	50	100	01
					TOTAL	**17**	**2**	**7**	**2**	**21**	**500**	**400**	**900**	**20**

10. AICTE Activity Points : Students have to must earn 100 activity points between 1st to 8th Semester for the Award of Degree

SDA stands for Skill Development Activities, while TD/PSB refers to the Teaching Department or Paper Setting Board. **ASC** denotes Applied Science Courses, and **ESC** represents Engineering Science Courses. **ETC** stands for Emerging Technology Courses, and **AEC** refers to Ability Enhancement Courses. **HSMS** includes Humanity and Social Science and Management Courses, whereas SDC stands for Skill Development Courses. **C**IE means Continuous Internal Evaluation, and **SEE** is the abbreviation for Semester End Examination. **IC** refers to an Integrated Course, which is a theory course integrated with a practical component. **NCMC**: Non Credit mandatory course, **PP**: Pass/Pass for **NCMC** if student have successfully completed the CIE requirement, otherwise **NP** (not Pass) shall be awarded. PP is essential for the award of the degree.

***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.**

#- 25BCHXX102**-** 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

Credit Definition:	04-Credits courses are to be designed for 50 hours of Teaching-Learning Session
1- hour Lecture **(L)** per week=**1Credit**	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
2- 2-hoursTutorial**(T)** per week=**1Credit**	02- Credits courses are to be designed for 25 hours of Teaching-Learning Session
3- hours Practical / Drawing (**P**) per week=**1Credit**	01-Credit courses are to be designed for 12-15 hours of Teaching-Learning sessions
2-hours Skill Development Actives **(SDA)** per week = **1 Credit**	

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.

AICTE Activity Points to be earned by Students admitted to the BE/B.Tech./B.Plan day college programs are required to earn AICTE Activity Points in addition to fulfilling academic requirements, as outlined in Chapter 6 of the AICTE Model Internship Guidelines. Every regular student enrolled in the 4-year degree program must earn **100 Activity Points**, while students entering through lateral entry into the second year must earn **75 Activity Points** for the award of the degree. Students who transfer from other universities into the fifth semester are required to earn **50 Activity Points**, starting from the year of their entry into VTU. The earned Activity Points will be reflected in the student's **8th Semester Grade Card**. These activities may be undertaken at any time during the semester, including weekends and holidays, and can be spread out over the course of the program according to the student's convenience. However, the **minimum hours required for each activity must be fulfilled**. Activity Points are **non-credit**, do **not affect the SGPA or CGPA**, and are **not required for vertical progression**. In case a student fails to earn the prescribed number of Activity Points, the **8th Semester Grade Card will be issued only after the required points are earned**.

Applied Mathematics					**(ESC-I)Engineering Science Courses-I**					**(PLC)Programming Language Courses**				
Code		**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**	**Code**	**Title**	**L**	**T**	**P**
25BMACS101	Calculus and Linear algebra	3	2	0	**25BESC104A**	Building Sciences & Mechanic	3	0	0	**25BPLC105A**	Introduction to Python Programming	3	0	0
25BMAEC101	Differential Calculus and Linear algebra	3	2	0	**25BESC 104B**	Introduction to Electrical Engineering	3	0	0	**25BPLC105B**	Introduction to C++ Programming	3	0	0
25BMAME101	Differential Calculus and Linear algebra	3	2	0	**25BESC 104C**	Introduction to Electronics & Communication Engineering	3	0	0	**25BPLC105C**	Introduction to Web Programming	3	0	0
Applied Chemistry					**25BESC 104D**	Introduction to Mechanical Engineering	3	0	0	**(PLC)Programming Language Courses Labs**				
25BCHCS102	Applied Chemistry for Smart Systems (CSE)	3	0	2	**25BESC 104E**	Essentials of Information Technology	3	0	0					
25BCHEC102	Applied Chemistry for Emerging Electronics and Futuristic Devices (EEE, ECE)	3	0	2	**25BESC 104F**	Introduction to Linux	3	0	0	**25BPLL109A**	Introduction to Python Programming Lab	0	0	2
25BCHME102	Applied Chemistry for Advanced Metal Protection and Sustainable Energy Systems (ME)	3	0	2	**25BESC 104G**	Introduction to Engineering Mechanics	3	0	0	**25BPLL109B**	Introduction to C++ Programming Lab	0	0	2
					25BESC 104H	Introduction to Cyber Security	3	0	0	**25BPLL109C**	Introduction to Web Programming Lab	0	0	2

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II Semester **(For students attending under Physics Group)**

Sl No	Course and course code		Course title	Course category	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	25BMAXX201	Applied Mathematics -II	CORE	Maths Dept.	3	2	0	0	03	50	50	100	04
2	#ASC(IC)	25BPHXX202	Applied Physics	IPCC	Physics Dept.	3	0	2	0	03	50	50	100	04
3	ESC	25BCED203X	Computer-Aided Engineering Drawing	IPCC	Mechanical Engg. Dept.	2	0	2	0	03	50	50	100	03
4	ESC-II	25BESC204X	Engineering Science Course-II	CORE	Respective Engg. Dept.	3	0	0	0	03	50	50	100	03
5	PSC	25BPSC205X	Program Specific Courses	CORE	Any Dept.	3	0	0	0	03	50	50	100	03
6	AEC (NCMC)	25BSDAK206	Soft Skills	AEC	Humanities Dept.	0	0	0	2	02	100	--	100	PP
7	PSC	25BPSL207X	Program Specific Course Lab	PSC-Lab	Respective Engg. Dept.	0	0	2	0	02	50	50	100	01
8	AEC/SDC	25BIDPK208	Interdisciplinary Project-Based Learning	AEC	Any Dept.	0	0	0	2	01	50	50	100	01
9	HSMS	25BKSKK209/ 25BKBKK209	Samskrutika Kannada/ Balake Kannada	HSMC	Humanities Dept.	1	0	0	0	01	50	50	100	01
					TOTAL	**16**	**2**	**6**	**2**	**21**	**500**	**400**	**900**	**20**

10. AICTE Activity Points: Students have to must earn 100 activity points between 1st to 8th Semester for the Award of Degree.

SDA stands for Skill Development Activities, while TD/PSB refers to the Teaching Department or Paper Setting Board. ASC denotes Applied Science Courses, and

ESC represents Engineering Science Courses. ETC stands for Emerging Technology Courses, and AEC refers to Ability Enhancement Courses. HSMS includes Humanity and Social Science and Management Courses, whereas SDC stands for Skill Development Courses. CIE means Continuous Internal Evaluation, and SEE is the abbreviation for Semester End Examination. IC refers to an Integrated Course, which is a theory course integrated with a practical component. NCMC: Non Credit mandatory course, PP: Pass/Pass for NCMC if student have successfully completed the CIE requirement, otherwise NP (not Pass) shall be awarded. PP is essential for the award of the degree. IDP: Interdisciplinary Project.

Credit Definition:	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
1-hour Lecture **(L)** per week=**1Credit**. 2-hours Tutorial**(T)** per week=**1Credit** 2-hours Practical / Drawing (**P**) per week=**1Credit** **2-**hous Skill Development Actives **(SDA)** per week = **1 Credit**	

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.

AICTE Activity Points to be earned by Students admitted to the BE/B.Tech./B.Plan day college programs are required to earn AICTE Activity Points in addition to fulfilling academic requirements, as outlined in Chapter 6 of the AICTE Model Internship Guidelines. Every regular student enrolled in the 4-year degree program must earn **100 Activity Points**, while students entering through lateral entry into the second year must earn **75 Activity Points** for the award of the degree. Students who transfer from other universities into the fifth semester are required to earn **50 Activity Points**, starting from the year of their entry into VTU. The earned Activity Points will be reflected in the student's **8th Semester Grade Card**. These activities may be undertaken at any time during the semester, including weekends and holidays, and can be spread out over the course of the program according to the student's convenience. However, the **minimum hours required for each activity must be fulfilled**. Activity Points are **non-credit**, do **not affect the SGPA or CGPA**, and are **not required for vertical progression**. In case a student fails to earn the prescribed number of Activity Points, the **8th Semester Grade Card will be issued only after the required points are earned.**

***** 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.

#- 25BPHXX202 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.

Applied Mathematics-II					**ESC-II: Engineering Science Courses-II**					**PSC: Program Specific Courses**				
Code	Title	L	T	P	Code	Title	L	T	P	Code	Title	L	T	P
25BMACS201	Numerical Methods	3	2	0	**25BESC204A**	Building Sciences & Mechanic	3	0	0	**25BPSC205A**	Engineering Mechanics	3	0	0
25BMAEC201	Calculus, Laplace Transform and Numerical Techniques	3	2	0	**25BESC 204B**	Introduction to Electrical Engineering	3	0	0	**25BPSC205B**	Elements of Mechanical Engineering	3	0	0
25BMAME201	Multivariable Calculus and Numerical Methods	3	2	0	**25BESC 204C**	Introduction to Electronics & Communication Engineering	3	0	0	**25BPSC205C**	Basics of Electrical Engineering	3	0	0
Applied Physics					**25BESC 204D**	Introduction to Mechanical Engineering	3	0	0	**25BPSC205D**	Fundamentals of Electronics & Communication Engineering	3	0	0
25BPHCS202	Quantum Physics and Applications	3	0	2										
25BPHEC202	Quantum Physics and Electronic Sensors	3	0	2	**25BESC 204E**	Essentials of Information Technology	3	0	0	**25BPSC205E**	Principles of Programming Using C	3	0	0
25BPHME202	Physics of Materials	3	0	2	**25BESC 204F**	Introduction to Linux	3	0	0	**PSC Lab: Program Specific Courses Lab**				
CAED: Computer-Aided Engineering Drawing					**25BESC 204G**	Introduction to Engineering Mechanics	3	0	0	**25BPSL207A**	Mechanics & Material Lab	0	0	2
25BCED203A	Computer-Aided Engineering Drawing for CSE stream	2	0	2	**25BESC 204H**	Introduction to Cyber Security	3	0	0	**25BPSL207B**	Elements of Mechanical Engineering Lab	0	0	2
25BCED203B	Computer-Aided Engineering Drawing for ECE stream	2	0	2						**25BPSL207C**	Basics of Electrical Engineering Lab	0	0	2
25BCED203C	Computer-Aided Engineering Drawing for ME stream	2	0	2						**25BPSL207D**	Fundamentals of Electronics & Communication Engineering Lab	0	0	2
										25BPSL207E	C-Programming Lab	0	0	2

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Department of Mathematics

FIRST SEMESTER SYLLABUS

Course : **Applied Mathematics-I for CSE Stream: Calculus And Linear Algebra**		Semester	I
Course Code	**25BMACS101**	CIE Marks	50
Teaching Hours/Week(L:T:P:S)	3:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours Theory+20 Hours Tutorials	Total Marks	100
Credits	04	Exam Hours	03
Examination type(SEE)	**Theory**		

Course Objectives (Course Skill Set)

The goal of the course **Applied Mathematics-I for CSE Stream** is to

1. **Familiarize** the importance of calculus associated with one variable and multivariable for computer science and engineering.
2. **Analyze** Computer science and engineering problems by applying Ordinary Differential Equations.
3. **Learn** vector spaces and linear transformations**.**
4. **Develop** the knowledge of Linear Algebra to solve the system of equations.

Module-1: Calculus

Partial differentiation, Euler's theorem for homogeneous functions, total derivative -differentiation of composite functions, Jacobian.

Statement of Taylor's and Maclaurin's series expansion for two variables. Maxima and minima for the function of two variables.

(Text 1: Ch-5(5.1, 5.2, 5.3, 5.4, 5.5(1), 5.7(1), 5.9, 5.11)

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-2: Vector Calculus

Scalar and vector fields, Gradient, directional derivatives, divergence and curl - physical interpretation, solenoidal vector fields, irrotational vector fields and scalar potential.

Introduction to polar coordinates and polar curves. **Curvilinear coordinates:** Scale factors, base vectors, Cylindrical polar coordinates, Spherical polar coordinates, transformation between cartesian and curvilinear systems, orthogonality.

(Text 1: Ch-8(8.4 to 8.7, 8.18, 8.19 to 8.21))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-3: System of Linear Equations, Eigenvalues and Eigenvectors

Elementary row transformation of a matrix, Echelon form, ranks of a matrix.

Consistency and solution of system of linear equations, Gauss elimination method, Gauss Jordan method. Applications: Traffic flow.

Eigenvalues and Eigenvectors, modal matrix, diagonalization of the matrix.

(Text 1:Ch-2(2.7, 2.10, 2.13, 2.14, 2.16), Ch-28(28.6(1, 2),

Text 2: Ch-4(4.0),Ch-8(8.1), Ch-7(7.3(Problem21))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-4: Vector Space

Vector spaces: definition and examples, subspace: definition and examples.
Linear Combinations, linear span, linearly independent and dependent sets, basis and dimension.
Row space and column space of a matrix, Coordinates, inner products and orthogonality.
(Text 3: Ch-4(4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.11), Ch-7(7.1, 7.2, 7.3, 7.5, 7.6))

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Module-5: Linear Transformation

Definition and examples, algebra of linear transformations, matrix of a linear transformation.
Singular, non-singular linear transformations and invertible linear transformations.
Rank and nullity of linear transformations, rank-nullity theorem. Computer graphics (Rotation, scaling and projection)
(Text 3: Ch-5(5.3, 5.4, 5.5, 5.6, 5.7**))**

Number of Hours: 8 Hours Theory+4 Hours Tutorials

Course outcome (Course Skill Set)

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

CO1: **Apply** the concepts of multivariable calculus and vector calculus to compute derivatives.
CO2: **Analyze** vector fields by optimizing the functions for applications in computer science engineering.
CO3: **Solve** system of linear equations and determine eigenvalues and eigenvectors using direct and iterative methods.
CO4: **Apply** the concepts of vector spaces and linear transformations to problems in computer science engineering.
CO5: **Demonstrate** the applications of computer science and allied engineering Science using modern ICT tools.

Suggested Learning Resources:

Books(Name of the author/Title of the Book/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.
3. Seymour Lipschutz and Marc Lipson, Linear Algebra, Schaum's outlines series, 4th Ed., 2008.

Reference books:

1. B.V. Ramana, Higher Engineering Mathematics, McGraw-Hill Education, 11th Ed., 2017
2. N. P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, 10th Ed., 2022.
3. James Stewart, Calculus, Cengage Publications, 7th Ed., 2019.
4. David Poole, Linear Algebra, a modern introduction, Cengage publishers, 4th Ed., 2014.
5. David C Lay, Linear Algebra and its Applications, Pearson Publishers, 4th Ed., 2018.
6. Gareth Williams, Linear Algebra with applications, Jones Bartlett Publishers Inc., 6th Ed., 2017.

Web links and Video Lectures(e-Resources):

- https://nptel.ac.in/courses/111105121
- https://nptel.ac.in/courses/111105122
- http://academicearth.org/
- VTU e-Shikshana Program
- VTU EDUSAT Program
- https://nptel.ac.in/courses/111106135
- https://nptel.ac.in/courses/111105160

- https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/
- https://ocw.mit.edu/courses/18-02sc-multivariable-calculus-fall-2010/

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching learning process and facilitate the achievement of 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 students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students' for self–study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
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).

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):

- Three Tests each of 25 Marks;
- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively. Average of three tests will be scaled down to 25 marks.
- Continuous Comprehensive Assessments will be conducted with a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

  Learning Activity-1: Practicing problems (Lab Activities/Surprise Test/ Seminar for 15 Marks) Execute the following lab exercises with the aid of any modern technological tool

(Matlab/ Mathematica/ Scilab/ Python/ Maxima, etc).

Learning Activity-2: Assignments (Marks-10)

List of Lab Activities:

1) Finding partial derivatives and Jacobian,

2) Expansion of Taylor's and Maclaurin's series,

3) Finding Gradient, divergence and curl,

4) Finding rank, reduced echelon form, solving system of linear equations using Gauss elimination method,

5) Solving system of linear equations using Gauss-Jordan method,

6) Determine Eigenvalues and Eigenvectors,

7) Linearly Independence and Dependence sets,

8) Basis and dimension,

9) Linear transformation-range space and null space,

10) Verification of the rank nullity theorem.

Total CIE marks will be the sum of average of three tests (25 marks) and continuous comprehensive assessments (25 marks) which will be scaled down to50 marks.

Semester End Examination(SEE):

Theory SEE will be conducted by KSIT as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.
- 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. The student has to answer for 100 marks and marks scored out of 100 shall be proportionally reduced to 50 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

Signatures:

1. Dr. BHASKAR M
2. Dr. VENKATESHWARALU B
3. Dr. A.V. RAGHU
4. Dr. SHILPASHREE S P
5. Dr. RAJASHEKHAR M N
6. Mr. SUJITH THOMAS
7. Mr. SATISH V
8. Dr. KIRAN KUMAR S R
9. Dr. SHASHIKALA B S
10. Mrs. ANURADHA M V
11. Chairperson (Dr. JALAJA P)

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mathematics

FIRST SEMESTER SYLLABUS

Course: Applied Mathematics-I for ECE Stream : Differential Calculus & Linear Algebra		Semester	I
Course Code	**25BMAEC101**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours Theory+20 Hours Tutorials	Total Marks	100
Credits	04	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives(Course Skill Set)

The goal of the course **Applied Mathematics-I for ECE Stream** is to

1. **Familiarize** the importance of calculus associated with one variable and multivariable for ECE.
2. **Analyze** Electronics and Communication Engineering problems by applying Ordinary Differential Equations.
3. **Develop** the knowledge of Linear Algebra to solve the system of equations.

Module-1: Differential Calculus

Polar curves, angle between the radius vector and the tangent, angle between the polar curves, pedal equations. Curvature and radius of curvature in cartesian, polar, parametric and pedal forms. Stress and Strain Analysis.

(Text 1: Ch-4(4.7(1),4.8, 4.10, 4.11 (1,2,4), Reference Book 6: Ch-2)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-2: Power Series Expansions, Indeterminate Forms and Multivariable Calculus

Statement and problems on Taylor's and Maclaurin's series expansion for one variable. Indeterminate forms - L'Hospital's rule. Partial Differentiation: Partial differentiation, total derivative - differentiation of composite functions. Jacobian. Maxima and minima for a function of two variables.

(Text 1: Ch-4(4.4(1,3), 4.5(3)), Ch-5(5.1, 5.2, 5.5(1), 5.7(1), 5.11)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-3: Ordinary Differential Equations (ODEs) of First Order and First Degree and Nonlinear ODE

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 $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$ only. Linear and Bernoulli's differential equations. Orthogonal trajectories, L-R and C-R circuits.

Non-linear differential equations: Introduction to general and singular solutions, solvable for p only, Clairaut's equations, reducible to Clairaut's equations.

(Text 1: Ch-11(11.9, 11.10, 11.11, 11.12(4)), Ch-12(12.3(1,2,3), 12.5), Ch-11(11.13(case 1), 11.14)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-4: Ordinary Differential Equations of Higher Order

Higher-order linear ODEs with constant coefficients, homogeneous and non-homogeneous equations - e^{ax}, $sin(ax+b), cos(ax+b)$, x^nonly. Method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations. L-C-R circuits.

(Text 1: Ch-13(13.4, 13.5, 13.6(1,2,3), 13.8(1), 13.9(1,2)), Ch-14(14.5))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-5: Linear Algebra

Elementary transformations on a matrix, Echelon form, rank of a matrix, consistency of system of linear equations. Gauss elimination, Gauss –Seidel method to solve system of linear equations. Eigen values and Eigen vectors of a matrix, Rayleigh power method to determine the dominant Eigen value of a matrix. Traffic Flow problem.

(Text 1: Ch-2(2.7(1, 2) 2.10(1)), Ch-28(28.6(1) and 28.7(2))

Text 2: Ch-4(4.0) and Ch-20(20.8), Ch-7(7.3(Problem 21))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Course outcome (Course Skill Set)

CO1: **Apply** foundational concepts of calculus and differential equations to analyze geometric properties of curves.

CO2: **Apply** the concepts of multivariable calculus to compute derivatives.

CO3: **Solve** first and higher-order ordinary differential equations, and model physical phenomena in science and engineering.

CO4: **Apply** the principles of linear algebra to solve systems of linear equations, determine eigenvalues and eigenvectors, and analyze real-world problems such as traffic flow.

CO5: **Demonstrate** the applications of electrical engineering and allied engineering science using modern ICT tools.

Suggested Learning Resources:

Books (Name of the author/Title of the Book/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.
3. Gilbert Strang, Linear Algebra and its Applications, Cengage Publications, 4th Ed., 2022.

Reference books:

1. B.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, Laxmi Publications, 10th Ed., 2022.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publication, 3rd Ed., 2014.
5. David C Lay, Linear Algebra and its Applications, Pearson Publishers, 4th Ed., 2018.
6. Warren C. Young, Richard G. Budynas, Roark's Formulas for Stress and Strain, McGraw-Hill, 7th Ed.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/111105121
- https://nptel.ac.in/courses/111106146
- https://nptel.ac.in/courses/111108081
- https://nptel.ac.in/courses/111106051
- https://nptel.ac.in/courses/111106135
- https://nptel.ac.in/courses/111105160
- https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/
- https://ocw.mit.edu/courses/18-02sc-multivariable-calculus-fall-2010
- http://academicearth.org/
- VTU e-Shikshana Program
- VTU EDUSAT Program

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of 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 students' theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students' for self–study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
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).

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):

- Three Tests each of 25 Marks;
- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively. Average of three tests will be scaled down to 25 marks.
- Continuous Comprehensive Assessments will be conducted with a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

  Learning Activity-1: Practicing problems (Lab Activities/Surprise Test/ Seminar for 15 Marks) Execute the following lab exercises with the aid of any modern technological tool (Matlab/ Mathematica/ Scilab/ Python/ Maxima, etc).

  Learning Activity-2: Assignments (Marks-10).

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment

- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

Signatures:

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2. Dr. VENKATESHWARALU B
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Department of Mathematics

FIRST SEMESTER SYLLABUS

Course: Applied Mathematics-I for ME stream : Differential Calculus and Linear Algebra		Semester	I
Course Code	**25BMAME101**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours Theory+20 Hours Tutorials	Total Marks	100
Credits	04	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set):

The goal of the course **Applied Mathematics-I for ME stream** is to

1. **Familiarize** the importance of calculus associated with one variable and two variables for Mechanical engineering.
2. **Analyze** Mechanical engineering problems applying Ordinary Differential Equations.
3. **Develop** the knowledge of Linear Algebra referring to matrices.

Module-1: Polar Curves and Curvature

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. Stress and Strain analysis.

(Text 1:.Ch-4(4.7(1),4.8, 4.10, 4.11 (1,2,4), Reference Book 8(Ch-2))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-2: Series Expansion, Indeterminate Forms and Multivariable Calculus

Statement and problems on Taylor's and Maclaurin's series expansion for one variable. Indeterminate forms - L'Hospital's rule. Partial differentiation, total derivative - differentiation of composite functions. Jacobian. Maxima and minima for the function of two variables.

(Text 1:.Ch-4(4.4(1,3), 4.5(3)), Ch-5(5.1, 5.2, 5.5(1), 5.11, 5.7(1))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-3: Ordinary Differential Equations of First Order

Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations with Integrating factor: $\frac{1}{N}\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)$ and $\frac{1}{M}\left(\frac{\partial N}{\partial x}-\frac{\partial M}{\partial y}\right)$. Orthogonal trajectories, Law of natural growth and decay.

(Text 1:.Ch-11(11.9, 11.10, 11.11 ,11.12(4)), Ch-12(12.3(1,2,3), 12.8, 12.9)

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-4: Linear Algebra -1

Elementary row transformation of a matrix, Row echelon form and Rank of a matrix. Inverse of matrix by Jordan method. Consistency and Solution of system of linear equations - Gauss-elimination method, LU decomposition method and approximate solution by Gauss-Seidel method. Application to traffic flow.

(Text 1:.Ch-2(2.7(1,2,6), 2.10), Ch-28(28.6(1, 2)and 28.7(2), Text 2: Ch-7(7.3 Problem No. 21))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Module-5: Linear Algebra -2

Eigenvalues and Eigenvectors, Rayleigh's power method to find the dominant Eigenvalue and Eigenvector. Model matrix, pseudo random number generator, Diagonalization of the matrix, inverse of a matrix by Cayley-Hamilton theorem, Characteristic and minimal polynomials of block matrices, Moore-Penrose pseudoinverse.

(Text 1:.Ch-2(2.13, 2.15, 2.16), Ch-28(28.9), Text 3: Appendix D, Ch-2(2.4), Ch-1(1.4), Text 2: Ch 8(8.1), Reference book 9(Ch-8(8.1)))

Number of Hours: (8 Hours Theory+4 Hours Tutorials)

Course Outcomes (Course Skill Set)

CO1: Apply foundational concepts of calculus to analyze geometric properties of curves

CO2: Apply foundational concepts of differential equations to solve first order ordinary differential equations, and model physical phenomena in science and engineering.

CO3: Apply the principles of linear algebra to solve systems of linear equations,

CO4: Apply the principles of linear algebra to determine eigenvalues and eigenvectors and analyze real-world problems such as traffic flow.

CO5: Demonstrate the applications of mechanical engineering and allied engineering science using modern ICT tools.

Suggested Learning Resources:

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

Text Books:

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Reference books:

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3) N.P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, 10 Ed., 2022.
4) H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publication, 31 Ed., 2014.
5) Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, McGraw Hill Book Co., New York, 6™ Ed., 2017.
6) David C Lay, Linear Algebra and its Applications, Pearson Publishers, 4th Ed., 2018.
7)Gareth Williams, Linear Algebra with Applications" Jones Bartlett Publishers Inc., 6t Ed., 2017.
8) Roark's Formulas for Stress and Strain, Warren C. Young, Richard G. Budynas, 7th Ed., McGraw Hill
9) Cryptography and Network Security, William Stallings, Pearson Publishers, 8th Ed.

Web links and Video Lectures (e-Resources):

- http://academicearth.org/
- VTU e-Shikshana Program

- VTU EDUSAT Program
- https://nptel.ac.in/courses/111106135
- https://nptel.ac.in/courses/111105160
- https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/
- https://ocw.mit.edu/courses/18-02sc-multivariable-calculus-fall-2010

Teaching-Learning Process (Innovative Delivery Methods)

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3. Support and guide the students for self-study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
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).

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):

- Three Tests each of 25 Marks.
- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively. Average of three tests will be scaled down to 25 marks.
- Continuous Comprehensive Assessments will be conducted with a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

  Learning Activity-1: Practicing problems (Lab Activities/Surprise Test/ Seminar for 15 Marks) Execute the following lab exercises with the aid of any modern technological tool (Matlab/ Mathematica/ Scilab/ Python/ Maxima, etc).

Learning Activity-2: Assignments (Marks-10).

List of Lab activities:

1) 2D plots for Cartesian and polar curves,
2) Finding angle between polar curves,
3) Finding Radius of curvature,
4) Expansion of Taylor's and Maclaurin's series,
5) Finding partial derivatives and Jacobian,
6) Solution of first order ordinary differential equations,
7) Plotting solutions of ODE,
8) Finding rank, reduced echelon form, solving system of linear equations using Gauss elimination method,
9) Solving system of linear equations using Gauss-Seidel method,
10) Determine Eigenvalues and Eigenvectors.

Semester End Examination(SEE):

Theory SEE will be conducted by KSIT as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.
- 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. The student has to answer for 100 marks and marks scored out of 100 shall be proportionally reduced to 50 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to): -

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching - Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

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K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE
Department of Artificial Intelligence & Machine Learning

Course: INTRODUCTION TO AI AND APPLICATIONS		Semester	I/II
Course Code	**25BETCK103/203**	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Class Hours	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course outcomes (Course Skill Set)

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

CO1: Explain the concepts and types of artificial intelligence.

CO2: Illustrate basic machine learning methods for regression, classification and clustering.

CO3: Identify real-world applications across different disciplines.

CO4: Make use of prompt engineering techniques to interact with generative AI tools.

CO5: Outline recent trends in artificial intelligence and machine learning.

Module-1

Introduction to Artificial Intelligence: Artificial Intelligence, How Does AI Work?, Advantages and Disadvantages of Artificial Intelligence, History of Artificial Intelligence, Types of Artificial Intelligence, Weak AI, Strong AI, Reactive Machines, Limited Memory, Theory of Mind, Self-Awareness, Is Artificial Intelligence Same as Augmented Intelligence and Cognitive Computing, Machine Learning and Deep Learning.

Machine Intelligence: Defining Intelligence, Components of Intelligence, Differences Between Human and Machine Intelligence, Agent and Environment, Search, Uninformed Search Algorithms, Informed Search Algorithms: Pure Heuristic Search, Best-First Search Algorithm (Greedy Search).

Knowledge Representation: Introduction, Knowledge Representation, Knowledge-Based Agent, Types of Knowledge.

Textbook 1: Chapter 1 (1.1-1.5), Chapter 3 (3.1-3.7.2), Chapter 4 (4.1-4.4)

Number of Hours: 08

Module-2

Introduction to Prompt Engineering, Introduction to Prompt Engineering, The Evolution of Prompt Engineering, Types of Prompts, How Does Prompt Engineering Work?, Comprehending Prompt Engineering's Function in Communication, The Advantages of Prompt Engineering, The Future of LLM Communication.

Prompt Engineering Techniques for ChatGPT, Introduction to Prompt Engineering Techniques, Instructions Prompt Technique, Zero, One, and Few Shot Prompting, Self-Consistency Prompt.

Prompts for Creative Thinking: Introduction, Unlocking Imagination and Innovation.

Prompts for Effective Writing: Introduction, Igniting the Writing Process with Prompts.

Textbook 2: Chapters 1, 3, 4 & 5

Number of Hours: 08

Module-3

Understanding Data: What is data, Types of data, Data storage and representation, Big Data analytics and types of analytics, Big Data analysis framework, Data collection, Data Preprocessing, Descriptive Statistics, Univariate data analysis, Data visualization, central tendency, dispersion, shape, special Univariate plots

Types of Machine Learning: Supervised, Unsupervised, Semi-Supervised, Reinforcement Learning

Machine Learning: Techniques in AI, Machine learning model, Regression analysis in machine learning, classification techniques, Clustering techniques, Naïve Bayes Classification.

Textbook 4: Chapter 1 (1.4), Chapter 2 (2.1-2.5)
Textbook 1: Chapter 2 (2.1-2.5)

Number of Hours: 08

Module-4

Trends in AI: AI and Ethical Concerns, AI as a Service (AIaaS), Recent trends in AI, Expert System, Internet of Things, Artificial Intelligence of Things (AIoT).

Textbook 1: Chapter 8 (8.1, 8.2, 8.4), Chapter 9 (9.1- 9.3)

Number of Hours: 08

Module-5

Robotics, Robotics-an Application of AI, Drones Using AI, No Code AI, Low Code AI.
Textbook 1: Chapter 8 (8.3), Chapter 1 (1.7, 1.8, 1.10, 1.11)

Industrial Applications of AI: Application of AI in Healthcare, Application of AI in Finance, Application of AI in Retail, Application of AI in Agriculture, Application of AI in Education, Application of AI in Transportation, AI in Experimentation and Multi-disciplinary research.

Textbook 3: Chapter 3, Chapter 5 (5.1)

Number of Hours: 08

Suggested Learning Resources: (Textbook/ Reference Book/ Manuals):

Textbooks:

1. Reema Thareja, Artificial Intelligence: Beyond Classical AI, Pearson Education, 2023.
2. Ajantha Devi Vairamani and Anand Nayyar, Prompt Engineering: Empowering Communication, 1st Edition, CRC Press, Taylor & Francis Group, 2024. (DOI: https://doi.org/10.1201/9781032692319).
3. Saptarsi Goswami, Amit Kumar Das and Amlan Chakrabarti, "AI for Everyone – A Beginner's Handbook for Artificial Intelligence", Pearson, 2024.
4 S Sridhar M Vijayalaksmi "Machine Learning" OXFORD University Press 2021 First Edition

Reference books / Manuals:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach (4th Edition), Pearson Education, 2023.
2. Elaine Rich, Kevin Knight, and Shivashankar B. Nair, Artificial Intelligence, McGraw Hill Education.
3. Tom Taulli, Prompt Engineering for Generative AI: ChatGPT, LLMs, and Beyond, Apress, Springer Nature.
4. Nilakshi Jain, Artificial Intelligence: Making A System Intelligent, First Edition, Wiley.

Web links and Video Lectures (e-Resources):

1. Elements of AI – https://www.elementsofai.com
2. CS50's Introduction to Artificial Intelligence with Python – Harvard
1. https://cs50.harvard.edu/ai/
2. Google Machine Learning Crash Course – https://developers.google.com/machine-learning/crash-course
3. Learn Prompting (Open-Source Guide) – https://learnprompting.org
4. Google AI – Learn with Google AI https://ai.google/education/
5. Coursera – Machine Learning by Andrew Ng (Stanford University)
6. https://www.coursera.org/learn/machine-learning
7. OpenAI Prompt Engineering Guide (for ChatGPT)
8. https://platform.openai.com/docs/guides/gpt-best-practices
9. Prompt Engineering for Developers – DeepLearning.AI + OpenAI
10. https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/
11. 9. Ethics in AI – Google Responsible AI Practices
12. https://ai.google/responsibilities/responsible-ai-practices/
13. 10. Google Teachable Machine (Train AI models visually without code)
14. https://teachablemachine.withgoogle.com

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching Learning process and facilitate the achievement of course outcomes.

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- ICT-Enabled Teaching
- Tool Demonstration

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

• To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks.

• To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks.

• Notwithstanding the above, a student is considered to have passed the course, provided the combined Total of CIE and SEE is at least 40 out of 100 marks.

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course outcomes and promote higher-order thinking and application-based learning.

Learning Activity -1: Practical Assignment on Creating Effective Prompts (Marks- 25)

INSTRUCTIONS:

1. Students must demonstrate the solutions to the course instructor and submit the record containing prompt creation (procedure), prompt execution and results with observations.
2. Course instructor must evaluate the student performance as per the rubrics.

Sl. No	Activity on Creating Effective Prompts
Note: To conduct the activity students can use any of the AI tools such as ChatGPT.	
1	**Basic Prompt writing:** Create two different prompts to ask an AI about the topic "Electricity." The first prompt should be vague, and the second prompt should be clear and specific. Compare the responses you get and describe which prompt gave a better answer and why.
2	**Zero-Shot Prompting**: Create a prompt that asks an AI to explain Ohm's Law without giving any example or background. Evaluate how well the AI explains the concept based on your prompt alone.
3	**One-Shot and Few-Shot Prompting:** Provide the AI with a single example of how to calculate the resistance in a simple circuit. Then write your own prompt asking the AI to solve a similar resistance calculation. After that, add two more examples to your prompt and observe any changes in the AI's response quality.
4	**Chain-of-Thought Prompting:** Develop a prompt that guides the AI step-by-step through calculating current flow in a circuit using Ohm's Law with resistors in series. Then, ask a final question for the AI to solve. Analyze how breaking down the reasoning steps impacts the accuracy of the answer.
5	**Prompt Refinement:** Start with an ambiguous prompt related to the "Water Cycle." Test the AI's response, note the confusion or errors, and then refine your prompt to make it clearer and more specific. Repeat this process twice and record how the AI's responses improve with each refinement. **Role-Based Prompting:** Create three prompts asking the AI to explain "Newton's Laws of Motion," each with a different role instruction: (a) as an expert engineer, (b) as a high school teacher, (c) as a beginner. Compare the tone, detail, and style of the responses.
6	**Creative Engineering Problem Prompts:** Craft a prompt that asks the AI to brainstorm ideas for designing a low-cost water purification system suitable for rural areas. Encourage creativity by adding phrases like "limited resources" and "sustainability".
7	**Ethical Prompt Design Discussion:** Identify a biased prompt related to job descriptions (e.g. language with respect to a gender). Rewrite the prompt to remove bias and create a neutral, inclusive version. Explain why this revision is more ethical.
8	**Simulated Customer Support Chatbot:** Develop a prompt that instructs the AI to play the role of a technical support agent helping a customer troubleshoot a failure in an electronic circuit. Include instructions to keep the tone friendly and professional and to ask diagnostic questions.
9	**Multi-Language Prompting:** Develop a prompt that asks the AI to translate a simple engineering glossary (5 technical terms) from English to your native language. Then modify the prompt to request additional explanations of these terms in the translated language.
10	Review a curated set of different prompt types (e.g., for summarization, information extraction, paraphrasing, question answering) from a "Prompt Gallery." For each prompt type, match it with a real world task (e.g., summarizing a lecture note, extracting names from a project report). Test at least three prompt templates on an AI tool or by role-play (students simulate being the AI), with varied wording. Record the outcomes and discuss which prompt (or template) was most effective for each task, and explain why you think it worked best. Reflect on how changing small parts of a prompt can alter model response quality, completeness, or accuracy.

11	Choose a real engineering challenge or societal problem relevant to your field (e.g., “Reducing plastic waste in campus cafeterias” or “Optimizing solar panel placement on campus rooftops”). Draft an initial prompt that asks an AI to propose practical solutions. Share the AI’s (or peer’s) answer in small groups and identify aspects that are missing, vague, or not actionable. Refine your prompt based on feedback (e.g., specify constraints, ask for step-by-step solutions, or require a list of pros and cons). Repeat the process one more time, refining again for further clarity or specificity. Document the entire prompt-refinement process and share the best solution generated, along with a brief analysis of how prompt improvements led to better responses.

Dr. JAYASHREE. R	Dr. JAYAVRINDA VRINDAVANAM V	Dr. SOWMYA B J
Dr. M.S. DINESH	Mr. SHARANGOUD BIRADAR	Mr. MADHUSUDHAN G L
Dr. BALAJI K	Dr. REKHA B VENKATAUR	Dr Chanda V Reddy

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institute, under Visvesvaraya Technological University, Belagavi
(Approved by AICTE, New Delhi & Government of Karnataka)
Accredited by NAAC with 'A+' Grade, NBA (CSE, ECE)
#14, Raghuvanahalli, Kanakapura Road, Bengaluru-560 109, Karnataka, India.

DETAILS OF ENGINEERING SCIENCE COURSES

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Building Science And Mechanics**		Semester	I/II
Course Code	**25BESC104A / 204A**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	**3:0:0:0**	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1: To introduce students to the fundamentals of building science, civil engineering fields, and basic construction materials and their applications in practice

2: To develop awareness of sustainable building practices, emerging materials, and green building rating systems for environmentally responsible construction.

3: To impart knowledge of basic engineering mechanics concepts such as force systems, resolution and composition of forces, and their applications through problem-solving

4: To enable students to analyze equilibrium conditions, draw free body diagrams, and determine support reactions in statically determinate structures.

5: To train students in determining centroids of simple and composite plane figures using analytical methods and apply the concept to basic structural elements.

Module-1

Introduction to building science:

Importance and Scope of various fields of Civil Engineering: Surveying, Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Transportation Engineering, Environmental Engineering, Construction Planning and Project Management.

Basic Materials of Construction: Types and Uses of Bricks, Stones, Cement, Structural Steel, Wood and Concrete.

Structural Elements of a Building: Concept of Foundation, Plinth, Lintel, Chejja, Masonry wall, Column, Beam, Slab, Flooring and Staircase.

Number of Hours:8

Module-2

Sustainable Built Environment: Emerging materials: Types and Uses of Autoclaved Aerated Concrete (AAC) blocks, Bamboo, Recycled plastics, Material selection criteria, Durability, Sustainability, Smart City concept.

Green Building : Green building materials and rating systems IGBC, LEED, GRIHA (Green Rating for Integrated Habitat Assessment) for new buildings – Purpose - Key highlights - Point System with Differential weightage.

Number of Hours:8

Module-3

Force Systems: Concept of idealization, System of forces, Principles of transmissibility of a force, Resolution and composition of forces, Law of Parallelogram of forces, Concurrent and non-concurrent coplanar force systems, Moment of forces, Couple, Varignon's theorem: Numerical examples.

Number of Hours:8

Module-4

Equilibrium and Support Reactions

Free body diagram, equations of equilibrium, Lami's Theorem, Equilibrium of Coplanar Concurrent and Non -concurrent force systems: Numerical examples. Types of loadings, beams and supports, Concept of Statically determinate and indeterminate structures (Definitions with examples only),

Support reactions: Numerical examples on Statically determinate beams.

Number of Hours:8

Module-5

Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle and quadrant of a circle using method of integration, centroid of composite areas and simple built up sections: Numerical examples.

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: Identify the scope of different fields of Civil Engineering and **describe** basic construction materials and building components.

CO2: Explain the principles of sustainability in construction, including the use of emerging and green building materials, and **interpret** rating systems such as IGBC, LEED, and GRIHA.

CO3: Apply the principles of force systems to **analyze** the resolution, composition, and moments of forces using engineering mechanics concepts.

CO4: Demonstrate the ability to draw free body diagrams, **analyze** equilibrium conditions, and **compute** support reactions for statically determinate beams.

CO5: Calculate the centroid of simple and composite plane areas using integration methods and **apply** the concept in analyzing structural elements.

Suggested Learning Resources:

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

Textbooks:

1. Rangwala, Building Construction,33rd Edition, 2016, Charotar Publishing House Pvt. Ltd., ISBN-10 : 9385039040, ISBN-13 : 978-9385039041
2. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 3rd Edition, 2015, Laxmi Publications, ISBN: 9789380856674.
3. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 11th Edition, 2018, Eastern Book Promoters Belgaum [EBPB], ISBN: 5551234003896

Reference books / Manuals:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers: Statics and Dynamics, 4th Edition, 1987, McGraw Hill, ISBN: 9780070045842
2. Meriam J. L. and Kraige L. G, Engineering Mechanics-Statics, Vol I–6th Edition,2008, Wiley publication.
3. Irving H. Shames, Engineering Mechanics-Statics and Dynamics, 4th Edition, 2002, Prentice-Hall of India(PHI)
4. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press, New Delhi
5. Timoshenko S, Young D. H., Rao J. V., Sukumar Patil, Engineering Mechanics, 5th Edition, 2017,McGraw Hill Publisher, ISBN: 9781259062667
6. Bhavikatti S S, Engineering Mechanics, 4th Edition, 2018, New Age International Publications.
7. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 3rd Edition 2013, BS Publications.

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=nGfVTNfNwnk&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT
- https://www.youtube.com/watch?v=nkg7VNW9UCc&list=PLOSWwFV98rfKXq2KBphJz95rao7

q8PpwT&index=2

- https://www.youtube.com/watch?v=ljDIIMvxeg&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=5
- https://www.youtube.com/watch?v=3YBXteL-qY4
- https://www.youtube.com/watch?v=z95UW4wwzSc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=10
- https://www.youtube.com/watch?v=ksmsp9OzAsI • https://www.youtube.com/watch?v=x1ef048b3CE
- https://www.youtube.com/watch?v=l_Nck-X49qc
- https://www.youtube.com/watch?v=R8wKV0UQtlo
- https://www.youtube.com/watch?v=0RZHHgL8m_A
- https://www.youtube.com/watch?v=Bls5KnQOWkY

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation **(25 Marks)**)

Rubrics for Learning Activity:

Case Study Presentation (25 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry.

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding **(5)**	Good understanding **(4)**	Adequate understanding. **(3)**	Limited understanding **(2)**	No clear understanding. **(0-1)**
Analysis & Critical Thinking (10 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. **(9-10)**	Clear analysis with mostly logical reasoning. **(7-8)**	Basic analysis with some reasoning gaps. **(5-6)**	Weak analysis; mostly descriptive without reasoning. **(3-4)**	No clear analysis or reasoning. **(0-2)**
Documentation & Presentation Skills (10 Marks) (PO 9)	Documentation is complete, accurate, well structured, follows all formatting guidelines. Well-structured, clear, confident delivery;	Documentation is mostly complete and accurate, well organized, follows formatting guidelines with minor deviations. Good	Documentation covers most required elements but has some inaccuracies or omissions. Average structure;	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear.	Documentation is largely missing or irrelevant, lacks structure. Unclear,

	excellent visuals. **(9-10)**	structure, clear delivery; visuals mostly effective. **(7-8)**	delivery clear but lacks engagement. **(5-6)**	**(3-4)**	disorganized presentation. **(0-2)**
Q&A Handling (5 Marks) (PO 9)	Confident, accurate, and concise responses. **(5)**	Good responses with minor gaps. **(4)**	Adequate responses; some uncertainty. **(3)**	Weak or hesitant responses. **(2)**	Unable to answer questions. **(0-1)**

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Electronics & Communication Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Electrical Engineering		Semester	I/II
Course Code	**25BESC 104B /204B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course objectives (Course Skill Set)

1. To explain the laws used in the analysis of DC and AC circuits.
2. To explain the behavior of circuit elements in single-phase AC circuits.
3. To explain the construction and operation of transformers, DC Generators and motors and induction motors.
4. To introduce concepts of circuit protecting devices and earthing.
5. To explain electricity billing, equipment and personal safety measures.

Module-1

DC Circuits: Ohm's Law and its limitations. Series, parallel, series-parallel circuits, KCL & KVL, Simple Numerical.
(Text1: 2.1, 2.2,3.6)

Electromagnetic Induction: Definition, Faradays laws, Fleming's RH rule, Lenz's Law, Statically and Dynamically Induced Emf, Self-Inductance, Mutual Inductance and Coefficient of coupling. Force on current carrying conductor placed in a magnetic field, Fleming's Left hand Rule (Text 2: 8.1-8.14)

Number of Hours:8

Module-2

A.C. Fundamentals:

Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions)

Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical).

(Text1: 4.1 to 4.8, 5.1 to 5.6)

Three Phase Circuits:

Generation of Three phase AC quantity, advantages and limitations; star and delta connection, relationship between line and phase quantities (excluding proof)

(Text1 : 6.1 to 6.5, 6.8) **Number of Hours:8**

Module-3

DC Machines:

DC Generator: Principle of operation, constructional details, induced emf expression.

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

(Text1: 9.1 to 9.7, 9.9 to 9.13)

Speed control (armature & field) of DC motors (series & shunt only).

(Text2 : 13.1 to 13.3)

Special Electrical Machines and Its Applications: Construction and working principle of BLDC Motor, stepper motor and servo motor and their applications.

(Text3: 39.1-39.4, 39.22-39.24) **Number of Hours:8**

Module-4

Transformers:
Applications of transformer, principle of operation, Types and construction of single phase transformers, EMF equation, losses, variation of losses with respect to load. Efficiency and simple numerical.(Text1: 10.1-10.4, 10.6,10.11)

Three-phase induction Motors:
Concept of rotating magnetic field, Principle of operation, Constructional features of motor, types – squirrel cage and wound rotor. Slip and its significance Simple numerical.
(Text1: 12.1 to 12.5, Text 3: 34.7)

Number of Hours:8

Module-5

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

Electricity Bill:
Power rating of household appliances including air conditioners, PCs, laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.(Text 4)

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

Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.
(Text1: 8.18.6 to 8.12) **Number of Hours:8**

Course outcome (Course Skill Set)
At the end of the course, the student will be able :

- To understand and apply various laws used for analysis of DC and AC circuits.
- To understand the behaviour of circuit elements in single-phase circuits and analyse it's working.
- To understand and interpret the construction and operation of transformers, DC Machines and induction motors.
- To interpret and analyse concepts of circuit protecting devices and earthing.
- To understand and outline the concepts of electricity billing, equipment and personal safety measures.

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

1. Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019.
2. Fundamentals of Electrical Engineering and Electronics by B.L. Theraja, S Chand and Company, reprint edition 2012.
3. A text book of Electrical Technology- by B.L. Theraja, S Chand and Company Vol.2 reprint edition 2007
4. Principles of Electrical Engineering & Electronics by V. K. Mehta, Rohit Mehta, S. Chand and Company Publications, 2nd edition, 2015.

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill 4th edition, 2019.

2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI, 3rd edition, 2014.

3. K Venkataratnam – Special Electrical Machines, Universities Press, 2014

Web links and Video Lectures (e-Resources): www.nptel.ac.in

(1)Principle of Electrical Sciences, Prof Sanjay Agrawal, Indira Gandhi National Open University.

(2)Electricity and Electrical Wiring, Dr. Antara Mahanta Barua, Krishna Kanta Handiqui State Open University, Guwahati.

. **Teaching-Learning Process (Innovative Delivery Methods):**

. The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching learning process and facilitate the achievement of course outcomes.

. 1. Technology Integration, 2. Collaborative Learning, 3. Flipped Classroom, 4. Visual Based Learning

Assessment Structure:

- The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.
- To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks.
- To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks.
- Not- withstanding the above, a student is considered to have passed the course, provided the combined total of CIE and SEE is at least 40 out of 100 marks.

Continuous Comprehensive Assessments (CCA): CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity -1: (Marks- 15)

Learning Activity -2 (optional): (Marks-10)

Signatures:

1. Dr. SUREKHA MANOJ : 23/8/25
2. Dr. GURUPRASAD A S:
3. Dr. PARAMESHACHARI B D
4. Dr. ABDUL HAQ NALBAND 23/8/25
5. Mr. SOMASHEKAR YAMANI
6. One Senior Member
7. Chair Person

K. S. INSTITUTE OF TECHNOLOGY

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Department of Electronics & Communication Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Electronics and Communication Engineering		Semester	I/II
Course Code	**25BESC 104C /204C**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

1. Understand the working of the basic electronic circuits using the principles of rectifiers, voltage regulators, and amplifiers.
2. Analyze the behaviour of analog circuits including oscillators and operational amplifiers in signal generation and conditioning applications.
3. Illustrate the fundamental concepts of analog and digital modulation techniques based on their characteristics and suitability for communication systems.
4. Interpret the structure and functionality of embedded systems and digital logic components such as microcontrollers, sensors, and logic gates.
5. Understand number system conversions and Boolean algebra to design and implement basic combinational logic circuits.

Module-1

Semiconductor Diodes and Transistors: Introduction, PN Junction diode, Characteristics and Parameters, Half-wave rectifier, Full-wave rectifiers and filters. Introduction to Bipolar Junction Transistors and its Applications.
(Text 1)

Power Supplies and Amplifiers – Block diagram, Voltage regulators, Improved Ripple Filter Output resistance and voltage regulation.
(Text 2: Page No: 117-128, 139-146)

Types of amplifiers, Gain, Input and output resistance, Frequency response, Bandwidth, Phase shift, Negative feedback, multi-stage amplifiers.
(Text 2) **Number of Hours:8**

Module-2

Oscillators –Introduction, Types of Oscillators, Positive feedback, Barkhausen criterion, Wein bridge oscillator, Ladder network, Multivibrators, Single-stage a stable oscillator**,** Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)
(Text 1: Page No:179-186, 165-169, 171-175)

Operational amplifiers - Introduction, Block Diagram Representation of Typical Op-Amp, Schematic Symbol, Operational amplifier parameters, characteristics, configurations, and circuits.
(Text 3) **Number of Hours:8**

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.
(Text 4: 1.2, 1.3, 1.4, 1.5,2.1, 2.2, 2.3, 2.4, 2.5, 2.5, 2.5, 2.6, 2.7)

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

(Text 4: 1.2, 1.3, 1.4, 1.5, 2.1, 2.3, 2.4, 2.5, 2.7, 4.1, 4.2, 4.3.) **Number of Hours:8**

Module-4

Embedded Systems – Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Purpose of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor Vs ASIP, Microcontroller, Microprocessor vs Microcontroller, DSP,RISC vs CISC.

Memory: R O M , Sensors, Actuators, LED, 7-Segment LED Display.

(Text 5: 1.1, 1.2, 1.4, 1.5, 1.6, 2.1.1.1-2.1.1.6, 2.2.1, 2.3.1, 2.3.2, 2.3.3.1, 2.3.3.2.)

Number of Hours:8

Module-5

Analog Communication Schemes – Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM, Angle Modulation, Concept of Radio wave propagation (Ground, space, sky).

Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK.

(Text 6: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.9, 1.12, 1.15, 2.2.1, 3.2.1, 6.11, 6.12, 6.13, 6.15, 6.16)

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: Analyze the characteristics of semiconductor devices (diodes and transistors) and evaluate their applications in rectifiers, filters, power supplies, and amplifiers.

CO2: Explain the operation of oscillators and operational amplifiers, and apply feedback concepts to design and evaluate practical amplifier and oscillator circuits.

CO3: Apply Boolean algebra theorems to simplify logic expressions and design basic combinational logic circuits such as adders.

CO4: Describe the structure and classification of embedded systems, and demonstrate the role of memory, sensors, actuators, and display devices in real-time applications.

CO5: Explain the principles of analog and digital communication systems and differentiate among modulation techniques, multiplexing methods, noise effects, and propagation modes.

Suggested Learning Resources:

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

1. Electronic Devices and Circuits, David A Bell, 5th Edition, Oxford, 2016
2. Electronics Circuits : Fundamentals and applications, Mike Tooley,5th Edition
3. Op-amps and Linear Integrated Circuits, Ramakanth A Gayakwad, Pearson Education, 4th Edition
4. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-8
5. K V Shibu, 'Introduction to Embedded Systems', 2nd Edition, McGraw Hill Education (India), Private Limited, 2016.
6. S L Kakani and Priyanka Punglia, 'Communication Systems', New Age International Publisher, 2017.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/122106025
- https://nptel.ac.in/courses/108105132

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Lecture 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. Show Video/animation films to explain the functioning of various analog and digital circuits.
3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
4. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
5. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.

Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Evaluation (CCE):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity 1: (Marks 25): Two assignments (for 10marks and 15marks) related to simulation of simple circuits (using any simulation tool such as LT Spice, KI Cad etc.), at RBL3, RBL4, or RBL5 levels, assignment reports should include circuit design, schematic, and simulation results.

Suggested Learning Activities may include (but are not limited to):

- **Learning Activity -1:** Course Project
- **Learning Activity -2:** Open Book Test (preferably at RBL4 and RBL5 levels)
- **Learning Activity -3:** Assignment (at RBL3, RBL4, or RBL5 levels)
- **Learning Activity -4:** Any other relevant and innovative academic activity
- **Learning Activity -5:** Use of MOOCs and Online Platforms

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits

Signatures:

1. Dr. SUREKHA MANOJ :
2. Dr. GURUPRASAD A S:
3. Dr. PARAMESHACHARI B D
4. Dr. ABDUL HAQ NALBAND
5. Mr. SOMASHEKAR YAMANI
6. One Senior Member
7. Chair Person

K. S. INSTITUTE OF TECHNOLOGY

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Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Mechanical Engineering		Semester	I/II
Course Code	**25BESC104/204D**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3-0-0-0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1: Identify real-world problems with social relevance and apply fundamental mechanical engineering concepts to propose viable engineering solutions.

2: Explain the construction, working principles, and performance parameters of internal combustion engines and various power transmission systems and to Evaluate emerging technologies in future mobility vehicles, such as electric and hybrid systems.

3: Classify different engineering materials, including metals, polymers, ceramics, and composites, and explain their key properties. Illustrate the applications and advantages of advanced materials such as composites and smart materials in modern engineering.

4: Describe the operating principles of common manufacturing processes (casting, machining, forming, joining, additive manufacturing, etc.) and their industrial applications.

5: Summarize recent advances in mechanical engineering technologies and discuss their potential impact on industry and society

Module-1

Introduction: Streams in mechanical engineering and their relevance/significance, role of mechanical engineers in solving the real case problems (with examples), careers in mechanical engineering. Realization of some of the engineering solutions through principles of mechanical engineering(with a schematic diagram):

Introduction to Renewable energy sources: Solar, wind and biomass

Vehicle systems: Identification of parts of vehicle systems such as steering system, brake system, gear system, working principle of Power steering.

Flying machines: Classification, basic parts involved in drone making, working principle of Drones.

Number of Hours:8

Module-2

Engines: Introduction, petrol engine, diesel engines, Working of four Stroke engines, applications.

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

Power Transmission systems: Classification of gears, simple & compound gear trains, concepts of automatic and CVT transmission.

Number of Hours:8

Module-3

Engineering materials: Introduction, Classification, Ferrous and Non-Ferrous metals: Types, Properties and their applications.
Composite materials: Introduction, Constituents of a composite, Classification, Types of Matrix and Reinforcement materials, Advantages, Disadvantages and Applications of composite materials.
Smart materials: Introduction, Types - Piezoelectric materials, MR fluids, Shape memory alloys and Advantages, Disadvantages and Applications.
Nano material: Introduction. Application in semi-conductor chips

Number of Hours:8

Module-4

Manufacturing overview, classification of manufacturing processes, process selection criterion.
Principles of Welding, soldering, brazing.
Introduction to machine tools – lathe, drilling and milling machine.
Lathe operations: Turning, facing, knurling,
Drilling machine operations: Drilling, reaming, tapping.
Milling machine operations: End milling, face milling.
Finishing operations: Grinding machine
Basic principles of 3D printing.

Number of Hours:8

Module-5

Advances in mechanical engineering
Automation technology: Definition of automation, types of automation, basic elements of automation. Introduction to CNC, components, advantages and applications.
Mechatronic systems: Definition of mechatronics, elements of mechatronics systems, examples.
Elementary sensors: Working principle and applications of Potentiometer, capacitive sensor and optical encoders.
Integrated system: Need for integration of technologies, ADAS (Advanced Driver Assistance System), PLC

Number of Hours:8

Course outcome (Course Skill Set)
At the end of the course, the student will be able to:

CO1: **Recognize** the significance of mechanical engineering principles to solve the problems of social relevance.
CO2: **Understand** the working of I.C. engines, power transmission elements and future mobility vehicles.
CO3: **Discuss** the properties and applications of engineering materials, composite materials and smart materials.
CO4: **Describe** the working principles and applications of various manufacturing processes.
CO5: **Explain** the advances in mechanical engineering in the field of manufacturing of semi-conductor devices.

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

1. Elements of Mechanical Engineering, K R Gopala Krishna, Subhash Publications, 2008
2. An Introduction to Mechanical Engineering, Jonathan Wickert and Kemper Lewis, Third Edition, 2012

Reference books / Manuals:

1. Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rd Ed., 2003.
2. William D. Callister, Materials Science & Engineering, An Introduction, John Wiley & Sons Inc, 2010.
3. V. Ganesan, Internal Combustion Engines, Tata McGraw Hill Education; 4th edition, 2017.
4. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1
5. Groover M. P.(2008). Automation, production systems, and computer integrated manufacturing, 3rd ed. Prentice Hall.
6. Dr SRN Reddy, Rachit Thukral and Manasi Mishra, "Introduction to Internet of Things: A Practical Approach", ETI Labs.

Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/112104526
- https://nptel.ac.in/courses/112104616
- https://nptel.ac.in/courses/112104769
- https://theconstructor.org/practical-guide/pelton-turbine-parts-working-design-aspects/2894/
- https://www.mechstudies.com/centrifugal-pump/
- https://cfdflowengineering.com/working-principle-and-components-of-drone/
- https://youtu.be/i1ojp09VXHY
- https://www.theengineerspost.com/automatic-transmission/
- https://learnmech.com/continuously-variable-transmission-components-working-types

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

• To qualify and become eligible to appear for SEE, in the **CIE, a student must score at least 40% of 50 marks, i.e., 20 marks (Average of 3 CIE Test will be scale down to 25 Marks**

• To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks.**

• Notwithstanding the above, a student is considered to **have passed the course**, provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA shall be conducted for 25 marks. It is evaluated through the learning activity which is aimed at enhancing the holistic development of students. The activity should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation (Marks - 25)

Rubrics for Learning Activity:

Case Study Presentation (25 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry.

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding (5)	Good understanding (4)	Adequate understanding. (3)	Limited understanding (2)	No clear understanding. (0-1)
Analysis & Critical Thinking (10 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. (9-10)	Clear analysis with mostly logical reasoning. (7-8)	Basic analysis with some reasoning gaps. (5-6)	Weak analysis; mostly descriptive without reasoning. (3-4)	No clear analysis or reasoning. (0-2)
Documentation & Presentation Skills (5 Marks) (PO 9)	Documentation is complete, accurate, well-structured, follows all formatting guidelines. Well-structured, clear, confident delivery; excellent visuals. (5)	Documentation is mostly complete and accurate, well-organized, follows formatting guidelines with minor deviations. Good structure, clear delivery; visuals mostly effective. (4)	Documentation covers most required elements but has some inaccuracies or omissions. Average structure; delivery clear but lacks engagement. (3)	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear. (2)	Documentation is largely missing or irrelevant, lacks structure. Unclear, disorganized presentation. (0-1)
Q&A Handling (5 Marks) (PO 9)	Confident, accurate, and concise responses. (5)	Good responses with minor gaps. (4)	Adequate responses; some uncertainty. (3)	Weak or hesitant responses. (2)	Unable to answer questions. (0-1)

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

K. S. INSTITUTE OF TECHNOLOGY, BENGALURU

An Autonomous Institution under VTU, Approved by AICTE

Department of Computer Science and Engineering

FIRST/ SECOND SEMESTER SYLLABUS

Course : Essentials Of Information Technology		Semester	I/II
Course Code	**25BESK104E/25BESK204E**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	3	Exam Hours	3
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

1. Understand the fundamentals of data storage, manipulation, and computer architecture to represent and process information effectively.
2. Analyse the role of operating systems and algorithms in managing resources, coordinating processes, and solving computational problems.
3. Illustrate the principles of networking, internet protocols, cybersecurity practices, and ethical issues related to information technology.
4. Apply software engineering concepts and database management techniques for efficient design and handling of information systems.
5. Develop basic skills in web development, computer graphics, and IT applications for real-world problem-solving and communication.

Module-1

Data Storage: Bits and Their Storage, Main Memory, Mass Storage, Representing Information as Bit Patterns, The Binary System, Storing Integers, Storing Fractions.

Data Manipulation: Computer Architecture, Machine Language, Program Execution, Arithmetic/Logic Instructions, Communicating with Other Devices.

Textbook 1: Chapter-1 (1.1-1.7), Chapter-2 (2.1-2.5)

Number of Hours: 8

Module-2

Operating Systems: The History of Operating Systems, Operating System Architecture, Coordinating the
Machine's Activities, Handling Competition Among Processes, Security.

Algorithms: The Concept of an Algorithm, Algorithm Representation, Algorithm Discovery.

Textbook 1: Chapter-3, Chapter-5 (5.1-5.3)

Number of Hours: 8

Module-3

Networking and the Internet: Network Fundamentals, The Internet, The World Wide Web, Internet Protocols, Security.

Cybersecurity: Overview—What is Cybersecurity?, Brief History of Cybersecurity Events, The Basic Information Security Model, Cyber Hygiene, Teams in Cybersecurity.

Ethical Issues in Information Technology: Overview, Ownership Rules, Ethics and Online Content.

Textbook 1: Chapter-4
Textbook 2: Chapter-16, Chapter-17

Number of Hours: 8

Module-4

Software Engineering: The Software Engineering Discipline, The Software Life Cycle, Software Engineering Methodologies, Modularity, Tools of the Trade.

Database Systems: Database Fundamentals, The Relational Model.

Textbook 1: Chapter-7 (7.1-7.5), Chapter-9 (9.1-9.2)

Number of Hours: 8

Module-5

Introduction to HTML and Website Development: What is HTML?, Cascading Style Sheets (CSS), Website Design and Storyboarding, Structure of a Website.

Computer Graphics: The Scope of Computer Graphics, Overview of 3D Graphics, Modeling, Rendering.

Textbook 2: Chapter-12.
Textbook 1: Chapter-10 (10.1-10.4)

Number of Hours: 8

Course outcomes (Course Skill Set)

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

CO1: Illustrate different information representation and manipulation schemes.
CO2: Make use of Information Technology (IT) infrastructure for information exchange.
CO3: Apply basic software engineering concepts for Website and application development.
CO4: Develop queries for quick insert, access and updating of structured information.
CO5: Identify role of cybersecurity and ethics issues in Information Technology (IT).

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Textbooks:

1. J. Glenn Brookshear and Dennis Brylow, Computer Science: An Overview, 12th Edition, Pearson Education Limited, 2017.
2. Roy, Shambhavi; Daniel, Clinton; and Agrawal, Manish, "Fundamentals of Information Technology", Digital Commons at The University of South Florida (2023). https://digitalcommons.usf.edu/dit_tb_eng/19

Reference books :

1. V. Rajaraman, “Introduction to Information Technology”, Third Edition, PHI Learning, 2018.
2. Pelin Aksoy, Information Technology in Theory, First Edition, Cengage.

Web links and Video Lectures (e-Resources):

- Information Technology: https://onlinecourses.swayam2.ac.in/cec20_cs05/preview
- Computer Organization and Architecture: https://nptel.ac.in/courses/106103068
- Introduction To Internet: https://nptel.ac.in/courses/106105084

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Flipped Classroom
2. Problem-Based Learning (PBL)
3. Case-Based Teaching
4. Simulation and Virtual Labs
5. ICT-Enabled Teaching

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Evaluation (CCE):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity 1: (Marks 25): Two assignments (for 10 marks and 15 marks) related to practical applications of Information Technology (such as file management, spreadsheets, word processing, presentation tools, database queries, or basic web development), at RBL3, RBL4, or RBL5 levels**.** Assignment reports should include the problem statement, procedure/steps, screenshots of implementation, and output/results**.**

Suggested Learning Activities may include (but are not limited to):

- **Learning Activity -1:** File Management, Word Processors, Introduction to Spreadsheets and Introduction to Presentation Applications.
- **Learning Activity -2:** Open Book Test (preferably at RBL4 and RBL5 levels)
- **Learning Activity -3:** Assignment (at RBL3, RBL4, or RBL5 levels)
- **Learning Activity -4:** Course Project
  Refer Textbook 2: Chapter-6, Chapter-8, Chapter-9, Chapter-10.
- **Learning Activity -5:** Use of MOOCs and Online Platforms

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FIRST / SECOND SEMESTER SYLLABUS

Course: Introduction to Linux Programming		Semester	I/II
Course Code	**25BESC104F/25B BESC204F**	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

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

1. Interpret the features of UNIX and basic commands.
2. Demonstrate different UNIX files and permissions
3. Understand UNIX command syntax and semantics.
4. To provide a comprehensive introduction & Implement shell programming
5. Use awk for advanced text processing and filtering.

Module-1

Introduction to UNIX –

Introduction,

The UNIX operating System, The UNIX Architecture & command usage: Architecture, Features of UNIX , The PATH, Internal & External commands, Command Strucrture.

General purpose Utilities: Basic commands, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, bc

Textbook : Chapter 1(1.2)2(2.1,2.2,2.5,2.6),3(3.1-3.13)

Number of Hours: 08

Module-2

The File System-

The file, what's in a filename? The parent-child relationship, The HOME variable,pwd, the Home directory, absolute pathnames, cd, mkdir, rmdir, Relative pathnames,ls The UNIX file system.ls |

Handling Ordinary Files: cat, cp, rm, mv,file,

Textbook : Chapter 4(4.1-4.12)5(5.1-5.5)

Number of Hours: 08

Module-3

Basic File Attributes

- Is – l, the –d option, File ownership, File Permissions, chmod,

The vi Editor: vi Basics, Input mode, Saving text and quitting, Editing, Repeating last Editing Command(.),Searching for a pattern(/ and ?),Substitution –search & replace(:s)

Textbook 1: Chapter 6(6.1-6.5),7(7.1-7.9)

Number of Hours:08

Module-4

Introduction to the Shell Scripting –

The shell: the shell's Interpretive Cycle,Pipes,tee:creating a tee, shell variables.

Essential Shell Programming: Shell Scripts, read, Command Line Arguments, The Logical Operators && and ||, exit, if, and case conditions, while, for,The here document, set, trap,

Textbook 1: Chapter 8(8.1,8.7-8.10),14(14.1-14.12)

Number of Hours: 08

Module-5

awk-an advanced filter

Simple awk Filtering, printf, variables & Expressions, the Comparisons Operators, variables, the –f Option: storing awk programs in a file, Arrays, Functions , Control flow -if statement, looping with for, while.

Textbook 1: Chapter 18(18.1-18.15)

Number of Hours: 08

Course Outcomes (Course Skill Set):

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

CO1: Identify the architecture and features of UNIX Operating System and distinguish it from other Operating System.

CO2: Demonstrate UNIX commands for file handling.

CO3: Define basic file attributes ,permissions and Write expressions for pattern matching and apply them to various commands for a specific task.

CO4: Illustrate Shell Programming and to write Shell Scripts.

CO5: Make use of awk to filter and process text data, and write simple awk programs with variables and loops.

Suggested Learning Resources

Textbooks:

1. Unix Concepts & Applications 4rth Edition, Sumitabha Das, Tata McGraw Hill .

Reference books

2. Unix Shell Programming, Yashwant Kanetkar
3. Introduction to UNIX by M G Venkatesh Murthy

Web links and Video Lectures (e-Resources): www.nptel.ac.in

1. https://www.youtube.com/watch?v=ffYUfAqEamY
2. https://www.youtube.com/watch?v=Q05NZiYFcD0
3. https://www.youtube.com/watch?v=8GdT53KDIyY
4. https://youtube.com/playlist?list=PLVlQHNRLflP8WncRgkwFqTOzRf_GSgl00&si=VEqSWlmzeqtHDMZg

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Technology Integration, 2. Collaborative Learning, 3. Flipped Classroom, 4. Visual Based Learning

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Not- withstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity -1: Marks- 15

Learning Activity -2 : Marks-10

Suggested Learning Activities may include (but are not limited to):

-**Learning Activity -1:** Course Project
-**Learning Activity -2:** Open Book Test (preferably at RBL4 and RBL5 levels)
-**Learning Activity -3:** Assignment (at RBL3, RBL4, or RBL5 levels)
-**Learning Activity -4:** Any other relevant and innovative academic activity
-**Learning Activity -5:** Use of MOOCs and Online Platforms

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits

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Department of Mechanical Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : **Introduction to Engineering Mechanics**		Semester	I/II
Course Code	**25BESC104/ 204G**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3-0-0-0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory		

Course Objectives (Course Skill Set)

1: To develop student's ability to analyse the problems involving forces, moments with their applications.

2: To analyse the member forces in trusses.

3: To make students to learn the effect of friction on different planes

4: To develop the student's ability to find out the centre of gravity and moment of inertia and their applications.

5: To make the students learn about kinematics and kinetics and their applications.

Module-1

System of forces: Resultant of coplanar concurrent and non-concurrent forces

Resultant of coplanar force system: Basic dimensions and units, Idealisations, Classification of force system, principle of transmissibility of a force, composition of forces, resolution of a force, Free body diagrams, moment, Principle of moments, couple, Resultant of coplanar concurrent force system, Resultant of coplanar non-concurrent force system- Numerical examples

Number of Hours:8

Module-2

System of forces: Equilibrium concepts, Support reactions and Truss analysis

Equilibrium of coplanar force system: Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, types of beams, types of loadings, types of supports, Equilibrium of coplanar non-concurrent force system, support reactions of statically determinate beams subjected to various types of loads, Numerical examples. Analysis of Trusses: Introduction, Classification of trusses, analysis of plane perfect trusses by the method of joints and method of sections- Numerical examples **Number of Hours:8**

Module-3

Friction

Friction: Introduction, laws of Coulomb friction, equilibrium of blocks on horizontal plane, equilibrium of blocks on inclined plane, ladder friction, wedge friction - Numerical examples

Number of Hours:8

Module-4

Centroid and Moment of Inertia

Centroid of Plane areas: Introduction, Locating the centroid of rectangle, triangle, circle, semicircle, quadrant and sector of a circle using method of integration, centroid of composite areas and simple built up sections, Numerical examples. Moment of inertia of plane areas: Introduction, Rectangular moment of inertia, polar moment of inertia, product of inertia, radius of gyration, parallel axes theorem, perpendicular axis theorem, moment of inertia of rectangular, triangular and circular areas from the method of integration, moment of inertia of composite areas and simple built up sections- Numerical examples.

Number of Hours:8

Module-5

Kinematics

Kinematics: Linear motion: Introduction, Displacement, speed, velocity, acceleration, acceleration due to gravity, Numerical examples on linear motion Projectiles: Introduction, numerical examples on projectiles. Kinetics: Introduction, D 'Alembert's principle of dynamic equilibrium and its application in-plane motion and connected bodies including pulleys- Numerical examples

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1. Apply the concepts of statics for the analysis of coplanar force systems.

CO2. Apply the concept of equilibrium of forces to resolve the forces on a truss element.

CO3. Apply the principles of static equilibrium for solving problems involving friction

CO4. Apply the centroid concepts and evaluate second moment of area of plane composite and built-up areas.

CO5. Apply the concepts of dynamics to solve problems related to kinematics and kinetics of particles.

Textbooks:

1. Bhavikatti S S, Engineering Mechanics, 2019, New Age International
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2018, EBPB
3. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015, Laxmi Publications.

Reference books / Manuals:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill
2. Irving H. Shames, Engineering Mechanics, 2019, Prentice-Hall.
3. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication
4. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press
5. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.

Web links and Video Lectures (e-Resources):

- NPTEL: Engineering Mechanics https://archive.nptel.ac.in/courses/112/106/112106286/
- https://www.iitg.ac.in/rkbc/me101/Presentation/L16-18.pdf

Assessment Structure:

Assessment Structure:

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Continuous Comprehensive Assessments (CCA):

CCA shall be conducted for 25 marks. It is evaluated through the learning activity which is aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity : Case Study Presentation **(15 Marks)**

Learning activity 2- 1 Assignment covering all syllabus for (**10 Marks)**

Rubrics for Learning Activity:

Case Study Presentation (25 Marks)

Case Study topic should relate to key learning area from the syllabus and allow exploration of practical applications, challenges, and innovations relevant to engineering education and industry

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Understanding of Case (5 Marks) (PO 1)	Demonstrates deep understanding **(5)**	Good understanding **(4)**	Adequate understanding. **(3)**	Limited understanding **(2)**	No clear understanding. **(0-1**)
Analysis & Critical Thinking (5 Marks) (PO 2)	Thorough, logical analysis with strong reasoning and innovative insights. **(5)**	Clear analysis with mostly logical reasoning. **(4)**	Basic analysis with some reasoning gaps. **(3)**	Weak analysis; mostly descriptive without reasoning. **(2)**	No clear analysis or reasoning. **(0-1)**
Documentation & Presentation Skills & QA Handling (5 Marks) (PO 9)	Documentation is complete, accurate, well structured, follows all formatting guidelines. Well-structured, clear, confident delivery; excellent visuals. Confident, accurate, and concise responses **(5)**	Documentation is mostly complete and accurate, well organized, follows formatting guidelines with minor deviations. Good structure, clear delivery; visuals mostly effective. Good responses with minor gaps. **(4)**	Documentation covers most required elements but has some inaccuracies or omissions. Average structure; delivery clear but lacks engagement. Adequate responses; some uncertainty. **(3)**	Documentation is incomplete with noticeable inaccuracies. Poor organization; visuals unclear. Weak or hesitant responses. **(2)**	Documentation is largely missing or irrelevant, lacks structure. Unclear, disorganized presentation. Unable to answer questions. **(0-1)**

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

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Department of Computer Science and Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to Cyber Security		Semester	I/II
Course Code	**25BESC104H/ 204H**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course objectives

- To familiarize cybercrime terminologies and perspectives
- To understand Cyber Offenses and Botnets
- To gain knowledge on tools and methods used in cybercrimes
- To understand phishing and computer forensics

Module-1

Introduction to Cybercrime:

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

Textbook:1 Chapter 1 (1.1 to 1.5, 1.7-1.9)

Number of Hours: 08

Module-2

Cyber Offenses:

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

Botnets: The fuel for cybercrime, Attack Vector. Textbook:1 Chapter 2 (2.1 to 2.7)

Number of Hours: 08

Module-3

Tools and Methods used in Cybercrime: Introduction, Proxy Servers, Anonymizers, Phishing, Password Cracking, Key Loggers and Spy ways, Virus and Worms, Trozen Horses and Backdoors, Steganography, DoS and DDOS Attacks, Attacks on Wireless networks.

Textbook:1 Chapter 4 (4.1 to 4.9, 4.12)

Number of Hours:08

Module-4

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

Textbook:1 Chapter 5 (5.1. to 5.3) Number of Hours: 08

Module-5

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

Textbook:1 Chapter 7 (7.1. to 7.5, 7.7 to 7.9) Number of Hours: 08

Suggested Learning Resources

Textbooks:

Sunit Belapure and Nina Godbole,"CyberSecurity: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, 2011, First Edition (Reprinted 2018

Course outcome (Course Skill Set)

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

CO1: Define and explain key terminologies related to cybercrime.
CO2: Describe Cyber offenses and Botnets
CO3: Illustrate Tools and Methods used on Cybercrime
CO4: Explain the concepts of phishing and identity theft with relevant examples.
CO5: Describe the need of computer forensics in investigating and preventing cybercrime.

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=nzZkKoREEGo&list=PL9ooVrP1hQOGPQVeapGsJCktzIO4DtI4_
- https://www.youtube.com/watch?v=6wi5DI6du-4&list=PL_uaeekrhGzJlB8XQBxU3zhDwT95xlk
- https://www.youtube.com/watch?v=KqSqyKwVuA8

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

- Illustration of standard case study of cyber crime
- Setup a cyber-court at Institute level

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.

Not- withstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity -1: **Marks- 15**

Learning Activity -2 : **Marks-10**

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An Autonomous Institute, under Visvesvaraya Technological University, Belagavi
(Approved by AICTE, New Delhi & Government of Karnataka)
Accredited by NAAC with 'A+' Grade, NBA (CSE, ECE)
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DETAILS OF PROGRAM LANGUAGE COURSES

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Computer Science and Engineering

FIRST/SECOND SEMESTER SYLLABUS

Course: Introduction to Python Programming		Semester	I/II
Course Code	**25BPLC105A/205A**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

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

Module-1

The way of the program: The Python programming language, what is a program? What is debugging? Syntax errors, Runtime errors, Semantic errors, Experimental debugging.

Variables, Expressions and Statements: Values and data types, Variables, Variable names and keywords, Statements, Evaluating expressions, Operators and operands, Type converter functions, Order of operations, Operations on strings, Input, Composition, The modulus operator.

Iteration: Assignment, Updating variables, the for loop, the while statement, The Collatz 3n + 1 sequence, tables, two-dimensional tables, break statement, continue statement, paired data, Nested Loops for Nested Data.

Functions: Functions with arguments and return values.

Chapters: 1.1-1.7, 2.1-2.12, 3.3, 4.4, 4.5 Number of Hours:8

Module-2

Strings: Working with strings as single things, working with the parts of a string, Length, Traversal and the for loop, Slices, String comparison, Strings are immutable, the in and not in operators, A find function, Looping and counting, Optional parameters, The built-in find method, The split method, Cleaning up your strings, The string format method.

Tuples: Tuples are used for grouping data, Tuple assignment, Tuples as return values, Composability of Data Structures.

Lists: List values, accessing elements, List length, List membership, List operations, List slices, Lists are mutable, List deletion, Objects and references, Aliasing, cloning lists, Lists and for loops, List parameters, List methods, Pure functions and modifiers, Functions that produce lists, Strings and lists, list and range, Nested lists, Matrices.

Chapter: 5.1, 5.2, 5.3 Number of Hours: 8

Module-3

Dictionaries: Dictionary operations, dictionary methods, aliasing and copying.

Numpy: About, Shape, Slicing, masking, Broadcasting, dtype.

Files: About files, writing our first file, reading a file line-at-a-time, turning a file into a list of lines, Reading the whole file at once, working with binary files, Directories, fetching something from the Web.

Chapter: 5.4, 6.1-6.5, 7.1-7.8 Number of Hours:8

Module-4

Modules: Random numbers, the time module, the math module, creating your own modules, Namespaces, Scope and lookup rules, Attributes and the dot Operator, Three import statement variants.

Mutable versus immutable and aliasing

Object oriented programming: Classes and Objects — The Basics, Attributes, Adding methods to our class, Instances as arguments and parameters, Converting an instance to a string, Instances as return values.

Chapter: 8.1-8.8, 9.1, 11.1 Number of Hours: 8

Module-5

Object oriented programming: Objects are mutable, Sameness, Copying.

Inheritance: Pure functions ,Modifiers, Generalization, Operator Overloading, Polymorphism.

Exceptions: Catching Exceptions, Raising your own exceptions.

Chapter: 11.2.2-11.2.4, 11.3.2-11.3.9, 12.1, 12.2

Number of Hours:8

Course outcome (Course Skill Set)

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

CO1: Demonstrate proficiency in handling loops and creation of functions.
CO2: Develop python programs using core data structure.
CO3: Make use of file operations and Python standard libraries for programming.
CO4: Apply concepts of Python modules and examine the OOP concepts for Application using python.
CO5: Illustrate the concepts of Object-Oriented Programming as used in Python.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers- How to think like a computer scientist: learning with python 3. Green Tea Press, Wellesley, Massachusetts,2020 https://media.readthedocs.org/pdf/howtothink/latest/howtothink.pdf

Reference books / Manuals:

1. Al Sweigart," Automate the Boring Stuff with Python, 2nd Edition: Practical Programming for Total Beginners",2nd Edition, No Starch Press, 2022. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/)
2. Kyla McMullen, Elizabeth Matthews and June Jamrich Parsons, Programming with Python, Cengage, 2023

Web links and Video Lectures (e-Resources):

https://www.learnbyexample.org/python/

https://www.learnpython.org/

https://pythontutor.com/visualize.html#mode=edit

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

1. Chalk and talk
2. PPT presentation
3. Demonstration
4. Problem-Based Learning (PBL)
5. Case-Based Teaching

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course outcomes and promote higher-order thinking and application-based learning.

Learning Activity -1: Programming Assignment **(Marks- 25)**

INSTRUCTIONS:

1. Course instructor will refer to HackerRank/HackerEarth/LeetCode or any other platform to derive the questions for problem-solving.
2. Course Instructor must identify programming problems from these sections: Statements (control), Arrays, Strings, Structures & Unions and Functions.
3. Courser instructor will assign THREE questions from each section to the students for design of algorithm, program and coding/execution.
4. Students must demonstrate the solutions to the course instructor and submit the record containing algorithm, program, debugging/execution and results with observations.

Course instructor must evaluate the student performance as per the rubrics.

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K. S. INSTITUTE OF TECHNOLOGY

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Department of Electronics & Communication Engineering

FIRST / SECOND SEMESTER SYLLABUS

Course : Introduction to C++ Programming		Semester	I/II
Course Code	**25BPLC105B/205B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

1. Understanding object-oriented programming and Gain knowledge about the capability to store information together in an object.
2. Understand the capability of a class to rely upon another class and functions.
3. Understand about constructors which are special type of functions.
4. Create and process data in files using file I/O functions.
5. Use the generic programming features of C++ including Exception handling

Module-1

Introduction to Object Oriented Programming: Computer programming background- C++ overview. First C++ Program -Basic C++ syntax, Object Oriented Programming: What is an object, Classes, methods. abstraction and encapsulation, inheritance, abstract classes, polymorphism.

Textbook 1: Chapter 1 (1.1 to 1.8) **Number of Hours:8**

Module-2

Functions in C++: Tokens – Keywords – Identifiers and constants – Operators in C++ – Scope resolution operator – Expressions and their types – Special assignment expressions – Function prototyping – Call by reference – Return by reference – Inline functions -Default arguments – Function overloading, Operator Overloading.

Textbook 2: Chapter 3 (3.2,3.3,3.4,3.13,3.14,3.19,3.20,3.22), Chapter 4 (4.3,4.4.4,4.5,4.6,4.7,4.9) **Number of Hours:8**

Module-3

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

Textbook 2: Chapter 6 (6.2,6.11) chapter 8 (8.1 to8.8) **Number of Hours:8**

Module-4

I/O Streams: C++ Class Hierarchy- File Stream-Text File Handling- Binary File Handling during file operations.

Textbook 1:Chapter 12 (12.5), Chapter 13 (13.6,13.7) **Number of Hours:8**

Module-5

Exception Handling: Introduction to Exception - Benefits of Exception handling- Try and catch block Throw statement- pre-defined exceptions in C++.

Textbook 2: Chapter 13 (13.2 to13.6) **Number of Hours:8**

Course outcome (Course Skill Set)

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

CO1: Illustrate and design the solution to a problem using object-oriented programming concepts.

CO2: Develop reusability of the code with extensible Class types, User-defined operators and Function Overloading.

CO3: Make use of Inheritance and Polymorphism to obtain code reusability and extensibility.

CO4: Build the features of C++ including templates, exceptions and file handling to provide programmed solutions to complex problems.

CO5: Identify the use of Exception handling feature in C++ for handling errors at runtime.

Suggested Learning Resources:

1. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
2. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd, Fourth Edition 2010.

Reference books

1. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill
2. Education Pvt.Ltd., Sixth Edition 2016.
3. Bhave, "Object Oriented Programming with C++", Pearson Education, 2004.

Web links and Video Lectures (e-Resources):

1. Basics of C++ - https://www.youtube.com/watch?v=BClS40yzssA.
2. Functions of C++ - https://www.youtube.com/watch?v=p8ehAjZWjPw.

Tutorial Link:

1. https://www.w3schools.com/cpp/cpp_intro.asp.
2. https://www.edx.org/course/introduction-to-c-3.

Teaching-Learning Process (Innovative Delivery Methods)

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching- learning process and facilitate the achievement of course outcomes.

1. Lecture 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. Show Video/animation films to explain the functioning of various analog and digital circuits.
3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
4. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.

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

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.

Notwithstanding the above, a student is considered to have **passed the course,** provided the combined total of **CIE and SEE is at least 40 out of 100 marks**.

Continuous Comprehensive Evaluation (CCE):

CCE will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity 1: (Marks 25): Two assignments (for 10marks and 15marks) related to simulation of simple circuits (using any simulation tool such as LT Spice, KI Cad etc.), at RBL3, RBL4, or RBL5 levels, assignment reports should include circuit design, schematic, and simulation results.

Suggested Learning Activities may include (but are not limited to):

- **Learning Activity -1:** Course Project
- **Learning Activity -2:** Open Book Test (preferably at RBL4 and RBL5 levels)
- **Learning Activity -3:** Assignment (at RBL3, RBL4, or RBL5 levels)
- **Learning Activity -4:** Any other relevant and innovative academic activity
- **Learning Activity -5:** Use of MOOCs and Online Platforms

Suggest Innovative Deliver Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits

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Department of Computer Science and Engineering
FIRST / SECOND SEMESTER SYLLABUS

Introduction to Web Programming		Semester	I/II
Course Code	**225BPLC105C /205C**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course objectives

- To use the syntax and semantics of HTML and XHTML
- To develop different parts of a web page
- To understand how CSS can enhance the design of a webpage.
- To create and apply CSS styling to a webpage
- To get familiarity with the JavaScript language and understand Document Object Model handling of Java Script

Module-1

Module-1: Traditional HTML and XHTML:

First Look at HTML and XHTML, Hello HTML and XHTML World, HTML and XHTML: Version History, HTML and XHTML DTDs: The Specifications Up Close, (X)HTML Document Structure, Browsers and (X)HTML, The Rules of (X)HTML, Major Themes of (X)HTML, The Future of Markup—Two Paths?

TextBook1: Chapter 1

Number of Hours: 08

Module-2

Module-2: HTML5:

Hello HTML5, Loose Syntax Returns, XHTML5, HTML5: Embracing the Reality of Web Markup, Presentational Markup Removed and Redefined, HTML5 Document Structure Changes, Adding Semantics, HTML5's Open Media Effort, Client-Side Graphics with <canvas>, HTML5 Form Changes, Emerging Elements and Attributes to Support Web Applications

TextBook1: Chapter 2

Number of Hours: 08

Module-3

Module-3: Cascading Style Sheets (CSS) Introduction, CSS Overview, CSS Rules, Example with Type Selectors and the Universal Selector, CSS Syntax and Style, Class Selectors, ID Selectors, span and div Elements, Cascading, style Attribute, style Container, External CSS Files, CSS Properties, Color Properties, RGB Values for Color, Opacity Values for Color, HSL and HSLA Values for Color, Font Properties, line-height
Property, Text Properties, Border Properties, Element Box, padding Property, margin Property Case Study: Description of a Small City's Core Area.

TextBook2-: Chapter 3

Module-4

Module-4: Tables and CSS, Links and Images Table Elements, formatting a Data Table: Borders, Alignment, and Padding, CSS Structural Pseudo- Class Selectors, thead and tbody Elements, Cell Spanning, Web Accessibility, CSS display Property with Table Values, a Element, Relative URLs, Navigation Within a Web Page, CSS for Links, Bitmap Image Formats: GIF, JPEG, PNG, img Element, Responsive Images, Positioning Images, Shortcut Icon, iframe Element.

TextBook2: 5.2 to 5.8, 6.2, 6.3, 6.6., 6.7, 6.9, 6.10, 6.12, 7.2 to 7.4 **Number of Hours: 08**

Module-5

Module-5: Introduction to JavaScript: Functions, DOM, Forms, and Event Handlers History of JavaScript, Hello World Web Page, Buttons, Functions, Variables, Identifiers, Assignment Statements and Objects, Document Object Model, Forms and How They're Processed: Client-Side Versus Server-Side, form Element, Controls, Text Control, accessing a Form's Control Values, reset and focus Methods

TextBook2: 8.2 to 8,13, 8.15, 8.16 **Number of Hours: 08**

Suggested Learning Resources Textbooks:

TextBook-1: HTML & CSS: The Complete Reference Thomas A. Powell, , Fifth Edition, Tata McGraw Hill,

Course outcome (Course Skill Set)

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

CO1: Explain the historical context and justification for HTML over XHTML

CO2: Develop HTML5 documents and adding various semantic markup tags

CO3: Apply Cascading Style Sheets (CSS) to control layout, typography, colors, and box model properties

CO4: Design and style web pages using tables, links, and images with appropriate CSS properties to ensure accessibility, responsiveness, and visual appeal.

CO5: Apply JavaScript concepts such as functions, DOM manipulation, forms, and event handling to develop dynamic and interactive web applications.

Web links and Video Lectures (e-Resources

https://onlinecourses.swayam2.ac.in/aic20_sp11/preview

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

1. Use https://pythontutor.com/visualize.html#mode=edit in order to visualize the operations of Javascripts
2. Chalk and talk
3. Onine demonstration
4. Hands on problem solving

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):

The Total CIE marks :50 marks

Continuous Comprehensive Assessments (CCA):

CCA will be conducted for a total of 25 marks. It is recommended to include a maximum of two learning activities aimed at enhancing the holistic development of students. These activities should align with course objectives and promote higher-order thinking and application-based learning.

Learning Activity -1: **Marks- 15**

Learning Activity -2 : **Marks-10**

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Department of Applied Science and Humanities

FIRST / SECOND SEMESTER SYLLABUS

Course : **Communication Skills and Professional Writing Skills in English**		Semester	I/II
Course Code	**25BCPSK106/206**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	01	Exam Hours	01

Course Learning Objectives: The students will be able to

- Identify common errors in spoken and written communication
- Get familiarized with English vocabulary and language proficiency
- Improve nature and style of sensible writing and acquire employment and work place communication skill.
- Improve the Technical Communication skills through Technical reading and writing practices
- Perform well in campus recruitment, engineering and all other general competitive examinations

Module-1

Fundamentals of Communicative English, Process of communication, Types of Communication., Barriers to effective Communication, Listening to English Pronunciation, Phonetics Intelligible Accent, Speech : Organs-Syllable Structures, Intonation and Practice. Grammar: Parts of Speech, Articles. Question Tags, Vocabulary, Vocabulary –Homophones and Homonyms One Word Substitutes

Number of hours:3 hours

Module-2

Role play Exercises based on Workplace contexts Introducing oneself Personal Empowerment and Professionalism Talk, Participating in Group discussion and debates. Technical Presentation according to Industry needs, Reading the interview of an achiever. Writing a short Biography of an Achiever (Case studies)

Grammar sentence patterns Vocabulary : Idioms and Phrases

Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence

Number of hours:3 hours

Module-3

Formal Letter Writing- Official and Business letters(Enquiry, order and complaint), Job advertisements, Job Applications, Resume v/s Bio Data, Profile CV, Email Etiquettes, Structure, writing and responding to emails, Blog writing, Proof reading(Spelling, Punctuation and Grammar) Grammar: Tenses Reported speech and voice**.**

Number of hours:3 hours

Module-4

Framing of search terms/keywords in search engines/Commands for search on open AI-Tools to support synchronous communication such as webinar platforms. Online Communication Types Pros and cons of online communication. Acceptable online roles and behavior. Netiquettes-Etiquettes of social media. Problems and opportunities in handling digital resources. Tools to check grammar. Citing information accurately from source material-Plagiarism-Infringement,, .Importance of academic integrity-(3 hours)

Number of hours:3 hours

Module-5

TED talks,. Group Discussion and Professional/Job interviews, Mock Interviews, Telephone Interviews, Language used in formal professional settings, formal v/s informal tone, non-verbal cues in interviews, Statement of purpose, Company Profile.

Number of hours:3 hours

Course outcome (Course Skill Set)

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

CO1 Understand and apply the Fundamentals of Communication Skills in their communication skills and demonstrate improved proficiency in English language skills relevant to work place.
CO2 Apply effective Verbal and written communication strategies in academic and career-related situations
CO3 Develop active listening and speaking skills to participate confidently in discussions, presentations and interviews..
CO4 Understand and use essential life skills and interpersonal communication techniques for personal and professional growth.
CO5 Practice key elements of business communications, including formal writing, email etiquette and team work communication..

Suggested Learning Resources:

Textbook:

- **Communication Skills** by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
- **A Textbook of English Language Communication Skills,** (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference Books:

1. Communication Skills by Sanjay Kumar &PushpLata, Oxford University Press India Pvt Ltd - 2019.
2. Kumar A.R (2008) English for Engineers and technologists. Orient Black Swan
3. Raman M and Sharma S (2015)Technical Communication Principles and Practice (3rd edition)Oxford University press.
4. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

Reference Books:

5.Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.

6. English for Engineers by N. P. Sudharshana and C. Savitha, Cambridge University Press – 2018.
7. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
8. A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press –2020.
9. Practical English Usage by Michael Swan, Oxford University Press – 2016
10. Yadav, DP (2022) A course in English pronunciation Notion Publication

11. Wren and Martin High school English grammar

Teaching-Learning Process Pedagogy (General Instructions):

These are sample Strategies; 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 students' theoretical and applied skills.
2. Support and guide the students for self–study.
3. You will assign homework, grading assignments and quizzes, and documenting students' progress.
4. Encourage the students to group learning to improve their creative and analytical skills.
5. 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).

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):

Three Unit Tests each of 25 Marks (duration 01 hour)

- First test after the completion of 20-30 % of the syllabus
- Second test after completion of 50-60% of the syllabus
- Third test after completion of 100% 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 25 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.

Signatures:

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7. Mr. SATISH V
8. Dr. KIRAN KUMAR S R
9. Dr. SHASHIKALA B S
10. Mrs. ANURADHA M V
11. Chairperson (Dr. JALAJA P)

K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Applied Science and Humanities

FIRST / SECOND SEMESTER SYLLABUS

Course : : INDIAN CONSTITUTION AND ENGINEERING ETHICS		Semester	I/II
Course Code	**25BICOK107/207**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	SEE Marks	-
Total Hours of Pedagogy	15	Total Marks	100

Course Learning Objectives (Course Skill Set)

1. To know about the basic structure of Indian Constitution.
2. To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
3. To know about our Union Government, political structure & codes, procedures.
4. To know the State Executive & Elections system of India.
5. To learn the Amendments and Emergency Provisions, other important provisions given by the constitution.

Module-1

Introduction to Indian Constitution: Necessity of the Constitution, The Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly. Preamble of Indian Constitution & Key concepts of the Preamble. Salient features of the Indian Constitution.

(3 hours)

Module-2

Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. **Directive Principles of State Policies**(DPSP's) and its present relevance in Indian society with examples Fundamental Duties
and its Scope and significance in Nation building.

(3 hours)

Module-3

Parliamentary System Union Executive : Union Executive – President, Prime Minister, Union Cabinet. LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism

(3 hours)

Module-4

State Executive and Elections, Amendments and Emergency Provisions Election Commission, Elections and Electoral Process, Amendment to Constitution (How and Why) and important Constitutional Amendments till date. Emergency provisions **(3 hours)**

Module-5

Ethics and Values , Types of Ethics, Scope and aims of Professional and Engineering Ethics, Positive and negative faces of Engineering Ethics, Clash of Ethics, Conflicts of Interest. The impediments to responsibility. Trust and Reliability in Engineering. IPRs (Intellectual property Rights), Risks, Safety and liability in Engineering. (**3 hours)**

Course outcome (Course Skill Set) :

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

- CO1 Analyse the basic structure of Indian Constitution.
- CO2 Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.

- CO3 know about our Union Government, political structure & codes, procedures.
- CO4 Understand our State Executive & Elections system of India.
- CO5 Remember the Amendments and Emergency Provisions, other important provisions given by the constitution**.**

Suggested Learning Resources:

Textbook:

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

Reference Books:

- **"Constitution of India, Professional Ethics and Human Rights"** by Shubham Singles, Charles E. Haries, and et al: published by Cengage Learning India, Latest Edition – 2019.
- **"The Constitution of India"** by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
- **"Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.**
- M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "**Engineering Ethics**", Prentice –Hall, 2004.

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 and software's to meet the present requirements of the Global employment market.

(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) learning through discussion, (vii) Following the method of expeditionary learning Tools and techniques,

Assessment Details (CIE)

The weightage of Continuous Internal Evaluation (CIE) is 100%. The minimum passing mark for the CIE is 40% of the maximum marks .A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject

Continuous Internal Evaluation(CIE):

Three Unit Tests each of 25 Marks (duration 01 hour)

- First test after the completion of 20-30 % of the syllabus
- Second test after completion of 50-60% of the syllabus
- Third test after completion of 100% 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 25 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

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DETAILS OF
PROGRAM LANGUAGE LABS

K. S. INSTITUTE OF TECHNOLOGY

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Department of Computer Science and Engineering

FIRST/SECOND SEMESTER SYLLABUS

Course: Python Programming Lab		Semester	I/II
Course Code	**25BPLL109A/209A**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	24	Total Marks	100
Credits	1	Exam Hours	3
Examination type (SEE)	Practical		

Course Objectives (Course Skill Set)

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

Note:

1. The laboratory syllabus consists of PART-A. The maximum marks for the laboratory course are 100.
2. PART-A are considered for CIE and SEE.
3. Students have answer 1(one) question from PART-A. The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 100 marks out of the maximum 100 marks.

List of Experiments

1. a. Develop a python program to read 2 numbers from the keyboard and perform the basic arithmetic operations based on the choice. (1-Add, 2-Subtract, 3-Multiply, 4-Divide).

   b. Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.
2. a. Develop a program to generate Fibonacci sequence of length (N). Read N from the console.

   b. Write a python program to create a list and perform the following operations
   - Inserting an element
   - Removing an element
   - Appending an element
   - Displaying the length of the list
   - Popping an element
   - Clearing the list
3. a. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.

   b. Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with a suitable message.

4. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use a dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order of frequency and display the dictionary slice of the first 10 items.
5. Develop a program to read 6 subject marks from the keyboard for a student. Generate a report that displays the marks from the highest to the lowest score attained by the student. [Read the marks into a 1-Dimesional array and sort using the Bubble Sort technique].
6. 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()].
7. Develop a function named DivExp which takes TWO parameters a, b, and returns a value c (c=a/b). Write a suitable assertion for a>0 in the function DivExp and raise an exception for when b=0. Develop a suitable program that reads two console values and calls the function DivExp.
8. Define a function that takes TWO objects representing complex numbers and returns a new complex number with the sum of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N (N >=2) complex numbers and to compute the addition of N complex numbers.
9. Text Analysis Tool: Build a tool that analyses a paragraph: frequency of each word, longest word, number of sentences, etc.
10. Develop Data Summary Generator: Read a CSV file (like COVID data or weather stats), convert to dictionary form, and allow the user to run summary queries: max, min, average by column.
11. Develop Student Grade Tracker: Accept multiple students' names and marks. Store them in a list of tuples or dictionaries. Display summary reports (average, topper, etc.).
12. Develop a program to display contents of a folder recursively (Directory) having sub-folders and files (name and type).

Course outcome (Course Skill Set)

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

CO1: Demonstrate proficiency in handling loops and creation of functions.
CO2: Develop python programs using core data structure.
CO3: Make use of file operations and Python standard libraries for programming.
CO4: Apply concepts of Python modules and examine the OOP concepts for Application using python.
CO5: Illustrate the concepts of Object-Oriented Programming as used in Python.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers- How to think like a computer scientist: learning with python 3. Green Tea Press, Wellesley, Massachusetts,2020 https://media.readthedocs.org/pdf/howtothink/latest/howtothink.pdf

Reference books / Manuals:

1. Al Sweigart," Automate the Boring Stuff with Python, 2nd Edition: Practical Programming for Total Beginners",2nd Edition, No Starch Press, 2022. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/)
   Kyla McMullen, Elizabeth Matthews and June Jamrich Parsons, Programming with Python, Cengage, 2023.

Web links and Video Lectures (e-Resources):

https://www.learnbyexample.org/python/ https://www.learnpython.org/

https://pythontutor.com/visualize.html#mode=edit

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

1. Engineering tool usage for the conduction of experiment
2. Demonstration through ICT tools
3. Use of virtual labs (https://www.vlab.co.in/)

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).
The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 20 marks. For both CIE and SEE, the student is required to conduct one experiment each from Part A .

- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.

A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**

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Department of Computer Science & Engineering
FIRST / SECOND SEMESTER SYLLABUS

Course : C++ Programming Lab		Semester	I/II
Course Code	**25BPLL109/209B**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	24	Total Marks	100
Credits	01	Exam Hours	03
Examination type (SEE)	**Practical**		

Course Objectives (Course Skill Set)

1. Understanding about object oriented programming and Gain knowledge about the capability to store information together in an object.
2. Understand the capability of a class to rely upon another class and functions.
3. Understand about constructors which are special type of functions.
4. Create and process data in files using file I/O functions
5. Use the generic programming features of C++ including Exception handling

1. Students have answer 1(one) question from list of Experiments.
   a. The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks.
2. For continuous internal evaluation, during the semester, classwork, and any other similar questions to enhance the skill of the students

List of Experiments

Note: Students must write the algorithm & flowchart for experiments in the Record book

1. Write a C++ program to sort the elements in ascending and descending order.
2. Write a C++ program to find the sum of all the natural numbers from 1 to n.
3. Write a C++ program to swap 2 values by writing a function that uses call by reference technique.
4. Write a C++ program to demonstrate function overloading for the following prototypes.
   add (int a, int b)
   add (double a, double b)
5. Create a class named Shape with a function that prints "This is a shape". Create another class named Polygon inheriting the Shape class with the same function that prints "Polygon is a shape". Create two other classes named Rectangle and Triangle have the same function which prints "Rectangle is a polygon" and "Triangle is a polygon" respectively.

Again, make another class named Square having the same function which prints "Square is a rectangle". Now, try calling the function by the object of each of these classes.

6. Suppose we have three classes Vehicle, Four-Wheeler, and Car. The class Vehicle is the Base class,The class Four-Wheeler is derived from it, and the class Car is derived from the class Four Wheeler. Class Vehicle has a method 'vehicle' that prints 'I am a vehicle', class Four-Wheeler has a method 'four-Wheeler' that prints 'I have four wheels', and class Car has a method 'car' that prints 'I am a car'. So, as this is a multi-level inheritance; we can have access to all the other classes methods from the object of the class Car. We invoke all the methods from a Car object and print the corresponding outputs of the methods. So, if we invoke the methods in this order, car (), four-Wheeler (), and vehicle (), then the

Output will be

I am a car

I have four wheels

I am a vehicle

Write a C++ program to demonstrate multilevel inheritance using this.

7. Write a C++ program to create a text file, check file created or not, if created it will write some text into the file and then read the text from the file.

8. Write a C++ program to write and read time in/from binary file using fstream

9. Write a function which throws a division by zero exception and catch it in catch block. Write a C++ program to demonstrate usage of try, catch and throw to handle exception.

10. Write a C++ program function which handles array of bounds exception using C++.

Course outcome (Course Skill Set)

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

CO1: Explain and demonstrate basic C++ constructs such as loops, arrays, and functions.

CO2: Develop and implement C++ programs to solve simple computational problems.

CO3: Utilize C++ derived data types (structures, classes, files) to model and solve simple real-world problems.

CO4: Apply the concepts of function overloading and call by reference to design efficient solutions.

CO5: Illustrate inheritance and polymorphism through class hierarchies to analyse object-oriented relationships.

Suggested Learning Resources: (Textbook/ Reference Book/ Manuals):

Textbooks:

1. Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
2. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd, Fourth Edition 2010.

Reference books

1. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill
2. Education Pvt.Ltd., Sixth Edition 2016.
   Bhave, "Object Oriented Programming with C++", Pearson Education, 2004.

Web links and Video Lectures (e-Resources):

1. Basics of C++ - https://www.youtube.com/watch?v=BClS40yzssA.
2. Functions of C++ - https://www.youtube.com/watch?v=p8ehAjZWjPw.

Tutorial Link:

1. https://www.w3schools.com/cpp/cpp_intro.asp.

   https://www.edx.org/course/introduction-to-c-3

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

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Use of virtual labs (https://www.vlab.co.in/)

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 20 marks. For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.

A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.

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Department of Computer Science and Engineering

	Web Programming lab	Semester	I/II
Course Code	**25BPLKL209C**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	24	Total Marks	100
Credits	1	Exam Hours	3
Examination type (SEE)	Practical		

Course Objectives

- To understand and apply the syntax and semantics of HTML and XHTML
- To design and develop various components of a web page.
- To comprehend the role of CSS in enhancing the layout and aesthetics of web pages.
- To create, implement, and apply CSS styling for effective web design.
- To gain familiarity with the JavaScript language and effectively utilize the Document Object Model (DOM) for interactive web applications.

Note:

1. Students have answer 1(one) question from list of Experiments.
   a. The questions set for SEE shall be from among the experiments. It is evaluated for the maximum 100 marks.
2. For continuous internal evaluation, during the semester, classwork, and any other similar questions to enhance the skill of the students

List of Experiments

1. **Basic HTML/XHTML Document Creation**
   a) Create a simple webpage with a title, heading, paragraph, and a list.
   b) Save one version as `.html` and another as `.xhtml`, then open both in different browsers to compare rendering differences.

2. Exploring DTD and Document Structure

   c) Write two web pages: one using HTML 4.01 Transitional DTD and the other using XHTML 1.0 Strict DTD.
   d) Validate both documents using W3C Validator and note the structural differences and errors.

3. Semantic HTML5 Page

   a) Design a webpage using semantic tags like `<header>`, `<article>`, `<section>`, `<footer>`, and `<nav>`.
   b) Compare it with a traditional `<div>`-based layout.

4. HTML5 Media and Canvas

   a) Create a webpage embedding a video using `<video>` and audio using `<audio>`.
   b) Add a simple `<canvas>` drawing (e.g., rectangle, circle) using JavaScript.

5. CSS Selectors and Properties

   a) Create a webpage with multiple headings, paragraphs, and lists.

b) Apply class selectors, ID selectors, and universal selectors with different styles (color, font, margin, padding).

6. Typography and Box Model Experiment

a) Design a webpage showing the effect of `font-size`, `line-height`, and `color` (RGB, HSL, opacity).
b) Add a bordered box with padding and margin to visualize the CSS box model.

7 Table Formatting with CSS

a) Create a table of student marks with `<thead>`, `<tbody>`, and `<tfoot>`.
b) Use CSS for borders, padding, alternating row colors, and hover effects.

8 Links and Responsive Images

a) Insert navigation links styled differently for normal, hover, active, and visited states.
b) Add an image using `<img>` with `max-width: 100%` to demonstrate responsiveness, and link it as a favicon/shortcut icon.

9. Basic JavaScript Functions and DOM

a) Create a button that, when clicked, changes the text color of a paragraph using DOM manipulation.
b) Add another button that displays an alert with the current date and time.

10. Form Validation with JavaScript

a) Design a form with fields: Name, Email, and Password.
b) Write JavaScript to validate that:
- Name is not empty,
- Email contains "@",
- Password is at least 6 characters.
- Use `focus()` and `reset()` methods to enhance form interaction.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Textbook:

WEB PROGRAMMING with HTML5, CSS and JavaScript, John Dean, Jones & Bartlett Learning, First Edition

Course outcome

CO1: Demonstrate an understanding of traditional HTML and XHTML structures, document types, rules, and their role in the evolution of web markup.

CO2: Apply HTML5 semantic elements, media tags, forms, and canvas features to design standards-compliant, interactive, and user-friendly web pages.

CO3: Utilize Cascading Style Sheets (CSS) effectively for styling, layout management, typography, and responsive design in web development.

CO4: Design and implement structured web pages with tables, links, and images using appropriate CSS properties to ensure accessibility and responsiveness.

CO5: Develop dynamic and interactive web applications through JavaScript functions, DOM manipulation, event handling, and client-side form validation.

Web links and Video Lectures (e-Resources):

1. https://onlinecourses.swayam2.ac.in/aic20_sp11/preview

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Assessment Structure:

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- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.

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