



## BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institution Affiliated to VTU, Belagavi)

### Scheme of Teaching and Examinations-2022

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

(Effective from the academic year 2022-23)

II Semester (Electrical & Electronics Engineering Stream)			Dept ETE	(For students who attended 1 <sup>st</sup> semester under Chemistry Group)									
Sl. No	Course and Course Code		Course Title	TD/PSB	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	*ASC(IC)	BMATE201	Mathematics for EES-II	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	BPHYE202	Physics for EES	PHY	2	2	2	0	03	50	50	100	04
3	ESC	BBEE203	##Basic Electronics	EEE/ECE/ETE	3	0	0	0	03	50	50	100	03
4	ESC -II	BESCK204E	Introduction to C Programming	Respective Engg Dept.	2	0	2	0	03	50	50	100	03
5	ETC-II	BETCK205H	Introduction to Internet of Things (IoT)	Any Dept	3	0	0	0	03	50	50	100	03
6	AEC	BPWSK206	Professional Writing Skills in English	Humanities	1	0	0	0	01	50	50	100	01
7	HSMC	BKSKK207/ BKBBK207	Sanskrutika Kannada/ Balake Kannada	Humanities	1	0	0	0	01	50	50	100	01
8	AEC/SDC	BIDTK258	Innovation and Design Thinking	Any Dept	0	2	0	0	02	50	50	100	01
<b>TOTAL</b>										<b>400</b>	<b>400</b>	<b>800</b>	<b>20</b>

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

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

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

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

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

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

<b>(ESC-II) Engineering Science Courses-II</b>					<b>(ETC-II) Emerging Technology Courses-II</b>				
<b>Code</b>	<b>Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Code</b>	<b>Title</b>	<b>L</b>	<b>T</b>	<b>P</b>
BESCK204A	Introduction to Civil Engineering	3	0	0	BETCK205A	Smart materials and Systems	3	0	0
BESCK204B	Introduction to Electrical Engineering	3	0	0	BETCK205B	Green Buildings	3	0	0
BESCK204C	Introduction to Electronics Engineering	3	0	0	BETCK205C	Introduction to Nano Technology	3	0	0
BESCK204D	Introduction to Mechanical Engineering	3	0	0	BETCK205D	Introduction to Sustainable Engineering	3	0	0
BESCK204E	Introduction to C Programming	2	0	2	BETCK205E	Renewable Energy Sources	3	0	0
					BETCK205F	Waste Management	3	0	0
					BETCK205G	Emerging Applications of Biosensors	3	0	0
					BETCK205H	Introduction to Internet of Things (IoT)	3	0	0
					BETCK205I	Introduction to Cyber Security	3	0	0
					BETCK205J	Introduction to Embedded System	3	0	0
<b>(PLC-II) Programming Language Courses-II</b>									
<b>Code</b>	<b>Title</b>	<b>L</b>	<b>T</b>	<b>P</b>					
BPLCK205A	Introduction to Web Programming	2	0	2					
BPLCK205B	Introduction to Python Programming	2	0	2					
BPLCK205C	Basics of JAVA programming	2	0	2					
BPLCK205D	Introduction to C++ Programming	2	0	2					
<b>The course BESCK205E, Introduction to C Programming, and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT</b>									

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



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**II Semester**

Course Title:	<b>Mathematics for EES - II</b>		
Course Code:	<b>BMATE201</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P:S)	2:2:2	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10-12 Lab slots	Credits	04

**Course objectives:** The goal of the course **Mathematics for EES - II (BMATE201)** is to

- **Familiarize** the importance of Vector Calculus, Vector Space and Linear transformation for electronics and electrical engineering.
- **Have an insight** into solving ordinary differential equations by using Laplace transform techniques.
- **Develop** the knowledge of solving electronics and electrical engineering problems numerically.

**Teaching-Learning Process**

**Pedagogy (General Instructions):**

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

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop 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).



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

**Introduction to Vector Calculus in EC & EE engineering applications.**

**Vector Differentiation:** Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.

**Vector Integration:** Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stokes' theorem. Problems.

**Self-Study:** Volume integral and Gauss divergence theorem.

**Applications:** Conservation of laws, Electrostatics, Analysis of streamlines and electric potentials.  
(RBT Levels: L1, L2 and L3)

**Module - 2 : Vector Space and Linear Transformations (8 hours)**

**Importance of Vector Space and Linear Transformations in the field of EC & EE engineering applications.**

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

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

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

**Applications:** Image processing, AI & ML, Graphs and networks, Computer graphics.  
(RBT Levels: L1, L2 and L3)

**Module – 3 : Laplace Transform (8 hours)**

**Importance of Laplace Transform for EC & EE engineering applications.**

Existence and Uniqueness of Laplace transform (LT), transform of elementary functions, region of convergence. Properties–Linearity, Scaling, t-shift property, s-domain shift, differentiation in the s-domain, division by t, differentiation and integration in the time domain. LT of special functions-periodic functions (square wave, saw-tooth wave, triangular wave, full & half wave rectifier), Heaviside Unit step function, Unit impulse function.

**Inverse Laplace Transforms:**

Definition, properties, evaluation using different methods, convolution theorem (without proof), problems and applications to solve ordinary differential equations.

**Self-Study:** Verification of convolution theorem.

**Applications:** Signals and systems, Control systems, LR, CR & LCR circuits.  
(RBT Levels: L1, L2 and L3)

**Module – 4 : Numerical Methods -1 (8 hours)**

**Importance of numerical methods for discrete data in the field of EC & EE engineering applications.**

Solution of algebraic and transcendental equations: Regula-Falsi method and Newton-Raphson method (only formulae). Problems.

Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.

**Numerical integration:** Trapezoidal, Simpson's  $(1/3)^{\text{rd}}$  and  $(3/8)^{\text{th}}$  rules (without proof). Problems.



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**Self-Study:** Bisection method, Lagrange's inverse Interpolation, Weddle's rule.

**Applications:** Estimating the approximate roots, extremum values, area, volume, and surface area.

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

**Module – 5 : Numerical Methods -2 (8 hours)**

**Introduction to various numerical techniques for handling EC & EE applications. Numerical Solution of Ordinary Differential Equations (ODEs):**

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 formula (No derivation of formulae). Problems.

**Self-Study:** Adams-Bashforth method.

**Applications:** Estimating the approximate solutions of ODE for electric circuits.

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

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

**10 lab sessions + 1 repetition class + 1 Lab Assessment**

1	Finding gradient, divergent, curl and their geometrical interpretation and verification of Green's theorem
2	Computation of basis and dimension for a vector space and graphical representation of linear transformation
3	Visualization in time and frequency domain of standard functions
4	Computing inverse Laplace transform of standard functions
5	Laplace transform of convolution of two functions
6	Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson methods
7	Interpolation/Extrapolation using Newton's forward and backward difference formulae
8	Computation of area under the curve using Trapezoidal, Simpson's (1/3) <sup>rd</sup> and (3/8) <sup>th</sup> rules
9	Solution of ODE of first order and first degree by Taylor's series and Modified Euler's methods
10	Solution of ODE of first order and first degree by Runge-Kutta 4 <sup>th</sup> order and Milne's predictor-corrector methods

**Suggested software's:** MATHEMATICA/ MATLAB/ PYTHON/ SCILAB

**Course outcome (Course Skill Set)**

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

CO1	Understand the applications of vector calculus with reference to solenoidal, irrotational vectors, Line integral and surface integral.
CO2	Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation
CO3	To understand the concept of Laplace transform and to solve initial value problems.
CO4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
CO5	Get familiarize with modern mathematical tools namely MATHEMATICA/MATLAB/PYTHON/ SCILAB



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**Suggested Learning Resources:**

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

**Text Books**

**B. S. Grewal:** “Higher Engineering Mathematics”, Khanna Publishers, 44<sup>th</sup> Ed., 2021.

**E. Kreyszig:** “Advanced Engineering Mathematics”, John Wiley & Sons, 10<sup>th</sup> Ed., 2018.

**Reference Books**

**V. Ramana:** “Higher Engineering Mathematics”, McGraw Hill Education, 11<sup>th</sup> Ed., 2017.

**Srimanta Pal & Subodh C.Bhunia:** “Engineering Mathematics”, Oxford University Press, 3<sup>rd</sup> Ed., 2016.

**N.P Bali and Manish Goyal:** “A Textbook of Engineering Mathematics”, Laxmi Publications, 10<sup>th</sup> Ed., 2022.

**C. Ray Wylie, Louis C. Barrett:** “Advanced Engineering Mathematics”, McGraw Hill Book Co., New York, 6<sup>th</sup> Ed., 2017.

**Gupta C.B, Sing S.R and Mukesh Kumar:** “Engineering Mathematic for Semester I and II”, McGraw Hill Education (India) Pvt. Ltd, 2015.

**H.K. Dass and Er. Rajnish Verma:** “Higher Engineering Mathematics”, S.Chand Publication, 3<sup>rd</sup> Ed., 2014.

**James Stewart:** “Calculus”, Cengage Publications, 7<sup>th</sup> Ed., 2019.

**David C Lay:** “Linear Algebra and its Applications”, Pearson Publishers, 4<sup>th</sup> Ed., 2018.

**Gareth Williams:** “Linear Algebra with applications”, Jones Bartlett Publishers Inc., 6<sup>th</sup> Ed., 2017.

**Gilbert Strang:** “Linear Algebra and its Applications”, Cengage Publications, 4<sup>th</sup> Ed., 2022.

**Web links and Video Lectures (e-Resources):**

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

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

- Quizzes
- Assignments
- Seminar

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

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

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



<b>DEPARTMENT OF PHYSICS</b> <b>Choice Based Credit System (CBCS)</b> SEMESTER - II			
<b>PHYSICS FOR EEE STREAM (2:2:2) 4</b> (SPECIFIC TO ELECTRICAL STREAM BRANCHES) (Effective from the academic year 2022 -2023)			
<b>Course Code</b>	<b>BPHYE 202</b>	<b>CIE Marks</b>	<b>50</b>
<b>Course Type</b>	<b>Integrated</b>	<b>Course Credit</b>	<b>4</b>
<b>Teaching Hours/Week (L:T:P:S)</b>	<b>2:2:2</b>	<b>SEE Marks</b>	<b>50</b>
<b>Total Number of contact Hours Theory/lab sessions</b>	<b>40 hours Theory + 12 lab sessions</b>	<b>Exam Hours</b>	<b>03 + 02</b>
<p><b>Course Objectives:</b> This course will enable students to:</p> <ul style="list-style-type: none"> <li>• Understand the principles of quantum mechanics and its applications.</li> <li>• Study the dielectric and superconducting properties of materials.</li> <li>• Understand the fundamentals of Lasers, optical fibers and their application.</li> <li>• Understand the fundamentals of vector calculus and EM waves, semiconductors and devices.</li> <li>• Apply the concepts required for the measurement of physical parameters related to engineering.</li> <li>• Compare and analyze the results of the experiments.</li> </ul>			
<p><b>Preamble:</b> Introduction, Quantum Mechanics - Applications. Electrical Properties of Solids. Lasers and Optical fibers, Maxwell's equations and EM waves, Semiconductors and devices.</p>			
<b>Module - 1</b>			
<b>Quantum Mechanics</b>			
<p><b>Self-study topics:</b> Dual nature of light and wave particle dualism</p> <p>Introduction, de-Broglie hypothesis and Matter Waves, de-Broglie wavelength and derivation of expression by analogy, Representation of matter waves, Phase Velocity and Group Velocity (qualitative), Heisenberg's Uncertainty Principle and its application (Non-existence of electron inside the nucleus-Relativistic case), Principle of wave particle Complementarity, Wave Function "<math>\psi</math>" and its properties, time dependent (qualitative), time independent Schrodinger wave equation (derivation), Physical significance of a wave function and Born Interpretation, Probability (Expectation value), Eigen functions and Eigen Values, Particle inside a one-dimensional infinite potential well and extended to free particle, Mapping of Wavefunction and probability density, Numerical Problems.</p> <p style="text-align: right;"><b>(8 Hours)</b></p>			
<b>Module - 2</b>			
<b>Electrical Properties of Solids</b>			
<p><b>Self-learning:</b> Basics of dielectrics, Temperature dependence of resistivity of metals.</p> <p><b>Dielectric Properties:</b> Introduction, Polar and non-polar dielectrics, Types of Polarization, internal fields in solid, Clausius-Mossotti equation (Derivation), solid, liquid and gaseous dielectrics. Application of dielectrics in transformers, Capacitors and Electrical Insulation. Numerical problems.</p> <p><b>Superconductivity:</b> Introduction, Meissner's Effect, Critical current, Silsbee Effect, Types of Super Conductors, Temperature dependence of Critical field, BCS theory (Qualitative), High Temperature</p>			

superconductivity. Applications- SQUID, MAGLEV. Numerical problems.	<b>(8 Hours)</b>
<b>Module - 3</b>	
<b>Lasers and Optical Fibers</b>	
<b>Self-learning:</b> Characteristics of LASER, Propagation Mechanism & TIR in optical fiber	
<b>Lasers:</b> Introduction, Interaction of radiation with matter, Expression for energy density equation and its significance. Requisites of a Laser system. Conditions for Laser action. Principle, Construction and working of Nd-YAG laser. Application of Lasers in Defence (Laser range finder) and Laser Printing. Numerical problems.	
<b>Optical Fibers:</b> Introduction, Propagation mechanism, TIR, angle of acceptance, Numerical aperture, fractional index change, Modes of propagation, Number of modes and V parameter, Types of optical fibers. Attenuation and expression for attenuation coefficient (qualitative), Attenuation spectrum of an optical fiber with optical windows, Merits and demerits. Applications: Discussion of the block diagram of point-to-point communication, Intensity-based fiber optic displacement sensor. Numerical problems.	
<b>(8 Hours)</b>	
<b>Module - 4</b>	
<b>Maxwell's Equations and EM waves</b>	
<b>Self-learning:</b> Fundamentals of vector calculus, Description of laws of electrostatics, magnetism and Faraday's laws of EMI, Ampere's circuital law.	
<b>Maxwell's Equations:</b> Introduction, Divergence and curl of electric field and magnetic field (static), Gauss' divergence theorem and Stokes' theorem (qualitative). Derivations of four Maxwell's equations and its significance. Current density & equation of Continuity (with derivation); displacement current (with derivation) Maxwell's equations in vacuum. Numerical problems.	
<b>EM Waves:</b> The wave equation in differential form in free space (Derivation of the equation using Maxwell's equations), Plane electromagnetic waves in vacuum, and their transverse nature. Numerical problems.	
<b>(8 Hours)</b>	
<b>Module - 5</b>	
<b>Semiconductor and Devices</b>	
<b>Self-learning:</b> Basics of Semiconductors, Band Theory of Solids, Photodiode.	
Introduction, Fermi energy and Fermi level, Fermi level in intrinsic semiconductors, Expression for concentration of electrons in conduction band & holes concentration in valance band (qualitative), Law of mass action, Electrical conductivity of a semiconductor (derivation), Hall effect, Expression for Hall coefficient (derivation) and its application.	
Construction and working of Semiconducting Laser, Four probe method to determine resistivity, solar cell, Photodiode and Power Responsivity, Phototransistor. Numerical problems.	
<b>(8 Hours)</b>	
<b>Laboratory component</b>	
(10 experiments have to be completed from the list of experiments)	
<b>List of experiments:</b>	
1. Transistor Characteristics	
2. Photo-Diode Characteristics	
3. Magnetic Field at any point along the axis of a circular coil	

1. Fermi Energy
2. Four Probe Method
3. Black Box
4. Energy Gap of the given Semiconductor
5. Planck's Constant using LEDs
6. Numerical Aperture using optical fiber
7. Wavelength of LASER using Grating
8. Charging and Discharging of a Capacitor
9. Series and Parallel LCR Circuits
10. Dielectric Constant
11. Design the circuit for series/parallel LCR with different given LCR components
12. Determine the wavelength of LED using Planck's relations
13. PHET Interactive Simulations  
(<https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype>)
14. Online Circuit Simulator (<https://www.partsim.com/simulator>)
15. Study of Electrical quantities using spreadsheet.

### Course outcomes (COs):

The students will be able to:

**CO<sub>1</sub>:** Apply the principles of quantum mechanics and superconductivity in Engineering applications.

**CO<sub>2</sub>:** Apply the principles of Lasers, Optical fibres and Maxwell's equations in the field of Photonics.

**CO<sub>3</sub>:** Analyse significant properties semiconductors, dielectrics and its different applications in engineering.

**CO<sub>4</sub>:** Evaluate the physical parameters for the related technology.

**CO<sub>5</sub>:** Evaluate and interpret the obtained experimental result (s) related to engineering fields

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

1. M N Avadhanulu and P G Kshirsagar, "Engineering Physics," S. Chand and company Pvt. Ltd., 11<sup>th</sup> edition, 2014.
2. R K Gaur & S L Gupta, "Engineering Physics," Dhanpat Rai Publications, 8<sup>th</sup> edition, 2018.
3. Vibrations and Waves (MIT introductory Physics Series), A P French, CBS, 2003 Edition
4. Timoshenko, S. and Goodier J.N. "Theory of Elasticity", 2nd Edition, McGraw Hill Book Co, 2001.
5. Sadhu Singh, "Theory of Elasticity", Khanna Publishers, 1997
6. Mechanical Properties of Engineered Materials by Wole Soboyejo, CRC Press; 1st edition, 2002
7. Heat & Thermodynamics and Statistical Physics (XVIII-Edition) – Singhal, Agarwal & Satyaprakash  
– Pragati Prakashan, Meerut, 2006. 4
8. Heat and Thermodynamics (I-Edition) – D.S.Mathur - S. Chand & Company Ltd., New-Delhi, 1991
9. Heat and Thermodynamics, Brijlal & Subramanyam, S. Chand & Company Ltd., New-Delhi.
10. Materials Characterization Techniques-Sam Zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008.
11. Characterization of Materials- Mitra P.K. Prentice Hall India Learning Private Limited.
12. Nanoscience and Nanotechnology: Fundamentals to Frontiers – M.S.Ramachandra Rao & ShubraSingh, Wiley, India Pvt Ltd.
13. Nano Composite Materials-Synthesis, Properties and Applications, J. Parameswaranpillai, N.Hameed, T.Kurian, Y. Yu, CRC Press.

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

14. Shock waves made simple by Chintoo S Kumar, K Takayama and K P J Reddy: Willey India Pvt. Ltd, Delhi, 2014
15. S O Pillai, "Solid State Physics," New Age International publishers, 8<sup>th</sup> edition, 2017.
16. David Jeffery Griffiths, "Introduction to Electrodynamics", Pearson New International Edition, 4<sup>th</sup> edition, 2017
17. B B Laud, "Lasers and Non-Linear Optics," New Age International publishers, 3<sup>rd</sup> edition, 2018.
18. Arthur Beiser, "Concepts of Modern Physics", Tata McGraw-Hill Education, 6<sup>th</sup> edition, 2010.
19. Resnick, Walker and Halliday "Principles of Physics, Wiley publisher, 10<sup>th</sup> edition, 2015.
20. Ben G. Streetman, Sanjay Banerjee, "Solid State Electronic Devices" Pearson Prentice Hall, 6<sup>th</sup> edition, 2010.
21. S. K. Dwivedi, A Textbook of Engineering Physics, I K International Publishing House Pvt. Ltd., 1<sup>st</sup> edition 2010.
22. C L Arora, "B.Sc. Practical Physics", S CHAND and company Ltd. 1<sup>st</sup> edition 2010  
Worsnop and Flint, "Advanced physics practical for students", Metuen and Co, London 2005.
23. D Chattopadhyay and P C Rakshit, "Advanced course in Practical Physics", New central book agency 8<sup>th</sup> edition, 2013.

**Web links and Video Lectures (e-Resources):**

1. Simple Harmonic motion: <https://www.youtube.com/watch?v=k2FvSzWeVxQ>
2. Shock waves: <https://physics.info/shock/>
3. Shock waves and their applications: [https://www.youtube.com/watch?v=tz\\_3M3v3kxk](https://www.youtube.com/watch?v=tz_3M3v3kxk)
4. Stress-strain curves: <https://web.mit.edu/course/3/3.11/www/modules/ss.pdf>
5. Stress curves: <https://www.youtube.com/watch?v=f08Y39UiC-o>
6. Fracture in materials: <https://www.youtube.com/watch?v=x47nky4MbK8>
7. Thermoelectricity: <https://www.youtube.com/watch?v=2w7NBuu5w9c&list=PLtkeUZItwHK5y6>



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<b>DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING</b>			
<b>Choice Based Credit System (CBCS)</b>			
<b>SEMESTER - I/II</b>			
<b>Basic Electronics (3:0:0) 3</b>			
<b>ESC</b>			
(For ECE and Allied Branches)			
(Effective from the academic year 2022-23)			
Course Code	BBEE203	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	03
<b>Course objectives:</b> Students will be taught <ul style="list-style-type: none"><li>• Operation of Semiconductor diode, Zener diode and Special purpose diodes and their applications.</li><li>• Biasing circuits for transistor (BJT) as an amplifier.</li><li>• Study of linear Op-amps and its applications.</li><li>• Logic circuits and their optimization.</li><li>• Principles of Transducers and Communication.</li></ul>			
<b>Teaching-Learning Process</b> <p>These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective.</p> <ol style="list-style-type: none"><li>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.</li><li>2. Show Video/animation films to explain the functioning of various analog and digital circuits.</li><li>3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.</li><li>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.</li><li>5. Discuss how every concept can be applied to the real world - and when that's possible, it Helps improve the students' understanding.</li></ol>			
<b>Module - 1</b>			
<b>Preamble:</b> Evolution of electronics, industrial development, research, impact of electronics on society and its economic growth, scope, and career prospective in the field of electronics. <b>Semiconductor Diodes:</b> Introduction, PN Junction diode, Characteristics and Parameters <b>Diode Applications:</b> Introduction, Half Wave Rectification, Full Wave Rectification, Full Wave Rectifier Power Supply: Capacitor Filter Circuit, RC $\pi$ Filter (includes numerical) <b>Zener Diodes:</b> Junction Breakdown, Circuit Symbol and Package, Characteristics and Parameters, Zener Diode Voltage Regulator. <span style="float: right;">(08 Hours)</span>			
<b>Module - 2</b>			
<b>Bipolar Junction Transistors:</b> Introduction, BJT Voltages & Currents, BJT Amplification, Common Base Characteristics, Common Emitter Characteristics, Common Collector Characteristics, BJT Biasing: Introduction, DC Load line and Bias point <b>Field Effect Transistor:</b> MOSFETs: Enhancement MOSFETs, Depletion Enhancement MOSFETs, CMOS as an inverter <span style="float: right;">(08 Hours)</span>			



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<b>Module - 3</b>
<p><b>Operational Amplifiers:</b> 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 &amp; Non Inverting Amplifier</p> <p><b>Op-Amp Applications:</b> Inverting Configuration, Non-Inverting Configuration, Differential Configuration, Voltage Follower, Integrator, Differentiator (08 Hours)</p>
<b>Module - 4</b>
<p><b>Boolean Algebra and Logic Circuits:</b> Binary numbers, Number Base Conversion, Octal &amp; 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,</p> <p><b>Combinational logic:</b> Introduction, Design procedure, Adders- Half adder, Full adder. (08 Hours)</p>
<b>Module - 5</b>
<p><b>Introduction to Transducers:</b> Introduction, Resistive Transducers, Inductive Transducers, Capacitive Transducers, Thermal transducers, Optoelectronic transducer, and Piezoelectric transducers.</p> <p><b>Communications :</b> Introduction to communication, Communication System, Modulation. (08 Hours)</p>
<p><b>Course outcomes:</b> The students will be able to: CO1: Develop the basic knowledge on construction, operation and characteristics of semiconductor devices CO2: Apply the acquired knowledge to construct small scale circuits consisting of semiconductor devices CO3: Develop competence knowledge to construct basic digital circuit by make use of basic gate and its function CO4: Construct the conceptual blocks for basic communication system. CO5: Apply the knowledge of various transducers principle in sensor system.</p>



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**Suggested Learning Resources:**

**Books**

1. Electronic Devices and Circuits, David A Bell, 5<sup>th</sup> Edition, Oxford, 2016
2. Op-amps and Linear Integrated Circuits, Ramakanth A Gayakwad, Pearson Education, 4<sup>th</sup> Edition
3. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-8
4. Electronic Instrumentation and Measurements (3rd Edition) – David A. Bell, Oxford University Press, 2013
5. Electronic Communication Systems, George Kennedy, 4<sup>th</sup> Edition, TMH

**Web links and Video Lectures (e-Resources):**

- <https://nptel.ac.in/courses/122106025>
- <https://nptel.ac.in/courses/108105132>
- <https://nptel.ac.in/courses/117104072>

<b>B.E COMPUTER SCIENCE AND ENGINEERING</b>			
<b>Choice Based Credit System (CBCS)</b>			
<b>SEMESTER – II</b>			
<b>ESC – II: Introduction to C Programming (2:0:2) 3</b>			
(Effective from the academic year 2022-2023)			
Course Code	<b>BESCK204E</b>	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:0:2	SEE Marks	50
Total Number of Contact Hours	26(L) + 26(T)	Exam Hours	03
<b>Course Objectives:</b>			
<ol style="list-style-type: none"> <li>1. Elucidate the basic architecture and functionalities of a computer.</li> <li>2. Apply programming constructs of C language to solve the real-world problems.</li> <li>3. Explore user-defined data structures like arrays, structures, and pointers in implementing solutions to problems.</li> <li>4. Design and Develop Solutions to problems using modular programming constructs such as functions and procedures.</li> </ol>			
<b>Module – I</b>			
<b>Introduction to C:</b> Introduction to computers, input and output devices, designing efficient programs. Introduction to C, Structure of C program, Files used in a C program, Compilers, Compiling and executing C programs, variables, constants, Input/output statements in C.			
<b>Textbook: Chapter 1.1-1.9, 2.1-2.2, 8.1 – 8.6, 9.1-9.14</b>			<b>(6 Hours)</b>
<b>Module – II</b>			
Operators in C, Type conversion and typecasting.			
<b>Decision control and Looping statements:</b> Introduction to decision control, Conditional branching statements, iterative statements, nested loops, break and continue statements, goto statement.			
<b>Textbook: Chapter 9.15-9.16, 10.1-10.6</b>			<b>(6 Hours)</b>
<b>Module – III</b>			
Functions: Introduction using functions, Function definition, function declaration, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive functions.			
<b>Arrays:</b> Declaration of arrays, accessing the elements of an array, storing values in arrays, Operations on arrays, Passing arrays to functions.			
<b>Textbook: Chapter 11.1-11.13, 12.1-12.</b>			<b>(6 Hours)</b>



### Module – IV

Two dimensional arrays, operations on two-dimensional arrays, two-dimensional arrays to functions, multidimensional arrays.

**Applications of arrays and introduction to strings:** Applications of arrays, case study with sorting techniques.

**Introduction to strings:** Reading strings, writing strings, summary of functions used to read and write characters. Suppressing input using a Scan set.

**Textbook: Chapter 12.7-12.12**

**(6 Hours)**

### Module – V

**Strings:** String taxonomy, operations on strings, Miscellaneous string and character functions, arrays of strings.

**Pointers:** Understanding the Computer's Memory, Introduction to Pointers, Declaring Pointer Variables

**Structures:** Introduction to structures.

**Textbook: Chapter 13.1-13.6, 14.1-14.3, 15.1**

**(6 Hours)**

### List of Laboratory experiments (2 hours/week per batch/ batch strength 36)

1	C Program to find Mechanical Energy of a particle using $E = mgh + \frac{1}{2}mv^2$ .
2	C Program to convert Kilometers into Meters and Centimeters.
3	C Program To Check the Given Character is Lowercase or Uppercase or Special Character.
4	Program to balance the given Chemical Equation values x, y, p, q of a simple chemical equation of the type: The task is to find the values of constants b1, b2, b3 such that the equation is balanced on both sides and it must be the reduced form.
5	Implement Matrix multiplication and validate the rules of multiplication.
6	Compute $\sin(x)/\cos(x)$ using Taylor series approximation. Compare your result with the built-in library function. Print both the results with appropriate inferences.
7	Sort the given set of N numbers using Bubblesort.
8	Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
9	Implement structures to read, write and compute average-marks and the students scoring above and below the average marks for a class of N students.
10	Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.

**Suggested software's :** gcc compiler, Ubuntu Operating System

**Course Outcomes**

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

- C01.** Elucidate the basic architecture and functionalities of a computer and recognize the hardware parts.
- C02.** Apply programming constructs of C language to solve the real-world problem.
- C03.** Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting.
- C04.** Explore user-defined data structures like structures, unions and pointers in implementing solutions.
- C05.** Design and Develop Solutions to problems using modular programming constructs using functions.

**Text books:**

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

**References:**

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGowan-Hill.
2. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, Prentice Hall of India.

**Web links and Video Lectures (e-Resources):**

1. [Elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html](http://elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html)
2. <https://nptel.ac.in/courses/106/105/106105171/> MOOC courses can be adopted for more clarity in understanding the topics and verities of problem solving methods.

<b>B.E COMPUTER SCIENCE AND ENGINEERING</b> <b>Choice Based Credit System (CBCS)</b> <b>SEMESTER – II</b>			
<b>ETC- 1Introduction to Internet of Things (IOT) (3:0:0)</b> (Effective from the academic year 2022 -2023)			
Course Code	BETCK205H	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3
<b>Course objectives:</b> This course will enable students to:			
<ol style="list-style-type: none"> <li>1. Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics.</li> <li>2. Understand the recent application domains of IoT in everyday life.</li> <li>3. Gain insights about the current trends of Associated IOT technologies and IOT analytics.</li> </ol>			
<b>Module – I</b>			
<b>Basics of Networking:</b> Introduction, Network Types, Layered network models			
<b>Emergence of IoT:</b> Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components <b>(8 Hours)</b>			
<b>Module – II</b>			
<b>IoT Sensing and Actuation:</b> Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics. <b>(8 Hours)</b>			
<b>Module – III</b>			
<b>IoT Processing Topologies and Types:</b> Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading. <b>(8 Hours)</b>			
<b>Module – IV</b>			
<b>Associated IoT Technologies:</b> Cloud Computing: Introduction, Virtualization, Cloud Models, Service-Level Agreement in Cloud Computing, Cloud Implementation, Sensor -Cloud: Sensors-as-a-Service.			
<b>IOT Case Studies</b> Agricultural IoT – Introduction and Case Studies <b>(8 Hours)</b>			
<b>Module – V</b>			
<b>IOT Case Studies and Future Trends:</b> Vehicular IoT – Introduction, Healthcare IoT – Introduction, Case Studies IoT Analytics – Introduction. <b>(8 Hours)</b>			

**Textbooks**

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

**References**

2. S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press.
3. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
4. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
1. Computer fundamentals and programming in c, "Reema Thareja", Oxford University, Second edition, 2017

**References:**

1. E. Balaguruswamy, Programming in ANSI C, 7th Edition, Tata McGowan-Hill.
2. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, Prentice Hall of India

**Web links and Video Lectures (e-Resources):**

1. [Elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html](http://elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html)
2. <https://nptel.ac.in/courses/106/105/106105171/> MOOC courses can be adopted for more clarity in understanding the topics and verities of problem solving methods.

<b>Department of Humanities and Social Sciences</b> <b>Choice Based Credit System (CBCS)</b> <b>SEMESTER –II</b>			
<b>Professional Writing skills in English (1:0:0) 1</b> (Common to all Branches) (Effective from the academic year 2022-2023)			
Course Code	BPWSK206	CIE Marks	50
Teaching Hours/Week (L: T:P)	1:0:0	SEE Marks	50
Total Number of Lecture Hours	15	Exam Hours	01
<p><b>Course objectives:</b> This course will enable students to</p> <ol style="list-style-type: none"> <li>1. Identify the Common Errors in Writing and Speaking English.</li> <li>2. Improve their technical writing and Presentation skills for employment.</li> <li>3. Acquire Employment and Workplace communication skills.</li> <li>4. Learn about Techniques of Information Transfer through presentation in different level.</li> </ol>			
<b>Module – 1</b>			
<p><b>Preamble: Importance of English grammar, Vocabulary and Communication skills enhancing the employability skills of Engineering graduates.</b></p> <p><b>Identifying Common Errors in Spoken and Written English:</b> Common Errors identification in Parts of Speech, Use of Verbs and Phrasal Verbs, Auxiliary Verbs and their forms, Subject Verb Agreement (identification of common errors), Words Confused\Misused, Error identification in Sequence of Tenses. <span style="float: right;"><b>3 hours</b></span></p>			
<b>Module – 2</b>			
<p><b>Nature and Style of Sensible Writing:</b> Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of proper Punctuation, Precise Writing, Techniques in Essay Writing, Sentence agreements and correction activities, Misplaced Modifiers, Word order, Errors due to the confusion of words. <span style="float: right;"><b>3 hours</b></span></p>			
<b>Module – 3</b>			
<p><b>Practises of Technical Reading and Writing:</b> Introduction to Technical Writing Process, Report Writing, Significance of Reports, Types of Reports. Introduction to Technical Proposal Writings, Types and characteristics. Scientific Writing Process. Grammar- Voices and Reported Speech, Spotting errors and Sentence Improvement. Cloze test and Theme Detection-Exercises. <b>3 hours</b></p>			
<b>Module -4</b>			
<p><b>Professional Communication for Employment:</b> Listening comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for Effective Reading, Job Applications, Types of Official\employment\business Letters, Bio-Data vs Resume, Profile, CV writing, Emails, Blog writing and Memos. <span style="float: right;"><b>3 hours</b></span></p>			
<b>Module – 5</b>			
<p><b>Professional communication at Workplace:</b> Group Discission and Professional Interviews, Intra and interpersonal Communication Skills at Workplace, Non-Verbal Communication Skills and its importance in GD and Interview, Presentation skills and formal Presentations by Students, Strategies of Presentation skills. <span style="float: right;"><b>3 hours</b></span></p>			

**Course outcomes:**

The students will be able to:

1. Understand and identify the Common Errors in Writing and Speaking.
2. Enhance Technical writing and Presentation skills.
3. Exhibit Employment and Workplace communication skills.
4. Analyse and apply various Techniques of Information Transfer through presentation in different levels

**Textbooks**

1. "Professional Writing Skills in English" published by Phillip Learning – Education (ILS), Bangalore – 2022.
2. "Functional English" (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019

**References**

1. Gajendra Singh Chauhan, Technical Communication, Cengage Learning India Pvt Limited, Latest Revised Edition, 2019
2. N.P. Sudharshana and C. Savitha, English for Engineers, Cambridge University Press ,2018.
3. Meenakshi Raman and Sangeetha Sharma, Technical Communication – Principles and Practice, Oxford University Press, Third Edition 2017.

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

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

Course Code	BIDTK258	CIE Marks	50
Teaching Hours/Week (L:T:P)	0:2:0	SEE Marks	50
Total Number of Lecture Hours	26	Exam. Hours	01

**Course objectives:**

This course will enable students to:

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

**Module - 1**

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

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

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

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

Case studies on PESTEL-Analysis. (5 Hours)

**Module – 2**

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

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

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

Case studies on Empathetic design. (5 Hours)

**Module – 3**

**Evaluation of ideas:** Checklists/Proc-Cons lists, assessment areas of innovations, PPCO method,

SWOT analysis for ideas, theory of inventive problem solving(TRIZ), principle of evolution, innovation checklist, resource analysis.

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

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

Case studies on SWOT analysis.

(5 Hours)

#### Module – 4

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

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

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

(5 Hours)

#### Module – 5

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

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

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

(5 Hours)

**Course Outcomes:** The students will be able to:

1. Demonstrate the concept of Design thinking for real world problems.
2. Illustrate empathy, define and ideate for design thinking problems.
- 3: Describe evaluation of ideas, design interaction and collaborations.
- 4: Discuss innovation process & culture and strategic innovations.
- 5: Illustrate prototyping and business process modelling for products and services.



**Textbooks:**

1. Christian Mueller-Roterberg, Handbook of Design Thinking, Tips & Tools for how to design thinking, Kindle Direct Publishing, 2018.
2. A Nil Hasso Plattner, Christoph Meinel and Larry Leifer, Design Thinking: Understand – Improve – Apply, Springer, 2011.

**References:**

3. Idris Mootee, Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School, John Wiley & Sons 2013.
4. Jeanne Liedtka , Andrew King , Kevin Bennett, Solving Problems with Design Thinking - Ten Stories of What Works ,Columbia Business School Publishing, 2013.
5. Gavin Ambrose Paul Harris, Basics of Design Thinking, AVA Publishing, Switzerland, 2009.

**Web links and Video Lectures (e-Resources):**

1. [www.tutor2u.net/business/presentations/. /productlifecycle/default.html](http://www.tutor2u.net/business/presentations/. /productlifecycle/default.html)
2. [https://docs.oracle.com/cd/E11108\\_02/otn/pdf/. /E11087\\_01.pdf](https://docs.oracle.com/cd/E11108_02/otn/pdf/. /E11087_01.pdf)
3. [www.bizfilings.com](http://www.bizfilings.com) › Home › Marketing › Product Development
4. <https://www.mindtools.com/brainstm.html>
5. <https://www.quicksprout.com/. /how-to-reverse-engineer-your-competit>
6. [www.vertabelo.com/blog/documentation/reverse-engineering](http://www.vertabelo.com/blog/documentation/reverse-engineering)
6. <https://support.microsoft.com/en-us/kb/273814>
7. <https://support.google.com/docs/answer/179740?hl=en>
8. <https://www.youtube.com/watch?v=2mjSDIBaUIM>
7. [thevirtualinstructor.com/foreshortening.html](http://thevirtualinstructor.com/foreshortening.html)
8. <https://dschool.stanford.edu/.../designresources/.../ModeGuideBOOTCAMP2010L.pdf>
9. <https://dschool.stanford.edu/use-our-methods/> 6.  
<https://www.interactiondesign.org/literature/article/5-stages-in-the-design-thinking-process>
10. <http://www.creativityatwork.com/design-thinking-strategy-for-innovation/> 49 8.
11. <https://www.nngroup.com/articles/design-thinking/> 9.
12. <https://designthinkingforeducators.com/design-thinking/> 10.
13. [www.designthinkingformobility.org/wp-content/.../10/NapkinPitch\\_Worksheet.pdf](http://www.designthinkingformobility.org/wp-content/.../10/NapkinPitch_Worksheet.pdf)
14. NPTEL : Design Thinking - A Primer - Course (nptel.ac.in)

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

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

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

**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ Samskrutika Kannada (1:0:0):1**  
 (Effective from the academic year 2022-2023)

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

**Course Objectives: ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:**

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

**ಘಟಕ-1**

ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು:

ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಜಯ್ಯ

ಕರ್ನಾಟಕ ಏಕೀಕರಣ: ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ-ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ-ಡಾ.ಎಲ್.ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ.ವಿ.ಕೇಶವಮೂರ್ತಿ

**3 ಗಂಟೆಗಳು**

**ಘಟಕ-2**

ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ:

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

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

ತತ್ವಪದಗಳು: ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

**3 ಗಂಟೆಗಳು**

**ಘಟಕ-3**

ಆಧುನಿಕ ಕಾವ್ಯ ಭಾಗ:

ಡಿ.ವಿ.ಜಿ.ಯವರ ಮಂಕು ತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು.

ಕುರುಡು ಕಾಂಚಾಣ: ದಾ. ರಾ. ಬೇಂದ್ರೆ ಹೊಸ ಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು	3 ಗಂಟೆಗಳು
<b>ಘಟಕ-4</b>	
ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ: ಡಾ.ಸರ್.ಎಂ.ವಿಶ್ವೇಶ್ವರಯ್ಯ:ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ-ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್ ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ-ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ	3 ಗಂಟೆಗಳು
<b>ಘಟಕ-5</b>	
ಸಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ: ಯುಗಾದಿ: ವಸುಧೇಂದ್ರ ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ	3 ಗಂಟೆಗಳು
Course outcome (course skills set)	
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (BKSkk107/207) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ:	
<ol style="list-style-type: none"> <li>1. ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.</li> <li>2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕುರಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ.</li> <li>3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯತ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.</li> <li>4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.</li> <li>5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.</li> </ol>	
<b>Textbook:</b>	
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ, ಪ್ರಸಾರಾಂಗ ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ	

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

**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ Samskrutika Kannada (1:0:0):1**  
 (Effective from the academic year 2022-2023)

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

**Course Objectives: ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:**

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

**ಘಟಕ-1**

ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು:

ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಜಯ್ಯ

ಕರ್ನಾಟಕ ಏಕೀಕರಣ: ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ-ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ-ಡಾ.ಎಲ್.ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ.ವಿ.ಕೇಶವಮೂರ್ತಿ

**3 ಗಂಟೆಗಳು**

**ಘಟಕ-2**

ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ:

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

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

ತತ್ವಪದಗಳು: ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

**3 ಗಂಟೆಗಳು**

**ಘಟಕ-3**

ಆಧುನಿಕ ಕಾವ್ಯ ಭಾಗ:

ಡಿ.ವಿ.ಜಿ.ಯವರ ಮಂಕು ತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಆಯ್ದ ಕೆಲವು ಭಾಗಗಳು.

ಕುರುಡು ಕಾಂಚಾಣ: ದಾ. ರಾ. ಬೇಂದ್ರೆ ಹೊಸ ಬಾಳಿನ ಗೀತೆ: ಕುವೆಂಪು	3 ಗಂಟೆಗಳು
<b>ಘಟಕ-4</b>	
ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ: ಡಾ.ಸರ್.ಎಂ.ವಿಶ್ವೇಶ್ವರಯ್ಯ:ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ-ಎ.ಎನ್.ಮೂರ್ತಿರಾವ್ ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ-ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ	3 ಗಂಟೆಗಳು
<b>ಘಟಕ-5</b>	
ಸಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ: ಯುಗಾದಿ: ವಸುಧೇಂದ್ರ ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ: ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ	3 ಗಂಟೆಗಳು
Course outcome (course skills set)	
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (BKSkk107/207) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ:	
<ol style="list-style-type: none"> <li>1. ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.</li> <li>2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕುರಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ.</li> <li>3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯತ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.</li> <li>4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕತೆ ಹೆಚ್ಚಾಗುತ್ತದೆ.</li> <li>5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.</li> </ol>	
<b>Textbook:</b>	
ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಡಾ.ಹಿ.ಚಿ ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ, ಪ್ರಸಾರಾಂಗ ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ	