

## Visvesvaraya Technological University, Belagavi

## Scheme of Teaching and Examinations-2022

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

(Effective from the academic year 2022-23)

1 Semester (CSE Stream)				(Effective from the academic year 2022-23)									
Sl. No	Course and Course Code		Course Title	TD/P5B	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	*ASC(IC)	BMATS101	Mathematics-I for CSE Stream	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	BCHE102	Applied Chemistry for CSE Stream	Chemistry	2	2	2	0	03	50	50	100	04
3	ESC	BCEDK103	Computer-Aided Engineering Drawing	Civil/Mech Engg dept	2	0	2	0	03	50	50	100	03
4	ESC-I	BESCK104x	Engineering Science Course-I	Respective Engg Dept	3	0	0	0	03	50	50	100	03
5	ETC-I	BETCK105x	Emerging Technology Course-I	Any Dept	3	0	0	0	03	50	50	100	03
	OR												
	PLC-I	BPLCK105x	Programming Language Course-I		2	0	2	0	03				
6	AEC	BPWSK106	Professional Writing Skills in English	Humanities	1	0	0	0	01	50	50	100	01
		OR											
		BENGK106	Communicative English										
7	HSMS	BICOK107	Indian Constitution	Humanities	1	0	0	0	01	50	50	100	01
		OR											
		BKSKK107/ BKBKK107	Sanskrutika Kannada/ Balake Kannada		1	0	0	0					
8	HSMS	BSFHK158	Scientific Foundations of Health	Any Dept	1	0	0	0	01	50	50	100	01
		OR											
		BIDTK158	Innovation and Design Thinking		1	0	0	0	02				
TOTAL										400	400	800	20

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 Dept. Of Information Science & Engineering  
 Alva's Institute of Engg. & Technology  
 Mijar, MOODBIDRI - 574 225

**I Semester**

Course Title:	<b>Mathematics-I for Computer Science and Engineering stream</b>		
Course Code:	<b>BMATS101</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated )	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours Theory + 10 to 12 Lab slots	Credits	04

**Course objectives:** The goal of the course **Mathematics-I for Computer Science and Engineering stream (22MATS11)** is to

- **Familiarize** the importance of calculus associated with one variable and multivariable for computer science and engineering.
- **Analyze** Computer science and engineering problems by applying Ordinary Differential Equations.
- **Apply** the knowledge of modular arithmetic to computer algorithms.
- **Develop** the knowledge of Linear Algebra to solve the system of equations.

**Teaching-Learning Process****Pedagogy (General Instructions):**

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

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

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

**Introduction to polar coordinates and curvature relating to Computer Science and Engineering.**

Polar coordinates, Polar curves, angle between the radius vector and the tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Problems.

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

**Applications:** Computer graphics, Image processing.

(RBT Levels: L1, L2 and L3)

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



**Introduction of series expansion and partial differentiation in Computer Science & Engineering applications.**

Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms - L'Hospital's rule-Problems.

Partial differentiation, total derivative - differentiation of composite functions, Jacobian and problems. Maxima and minima for a function of two variables. Problems.

**Self-study:** Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint.

**Applications:** Series expansion in computer programming, Computing errors and approximations. (RBT Levels: L1, L2 and L3)

### Module-3: Ordinary Differential Equations (ODEs) of First Order (8 hours)

**Introduction to first-order ordinary differential equations pertaining to the applications for Computer Science & Engineering.**

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

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

**Self-Study:** Applications of ODEs, Solvable for x and y.

**Applications of ordinary differential equations:** Rate of Growth or Decay, Conduction of heat. (RBT Levels: L1, L2 and L3)

### Module-4: Modular Arithmetic (8 hours)

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

**Self-Study:** Divisibility, GCD, Properties of Prime Numbers, Fundamental theorem of Arithmetic.

**Applications:** Cryptography, encoding and decoding, RSA applications in public key encryption. (RBT Levels: L1, L2 and L3)

### Module-5: Linear Algebra (8 hours)

**Introduction of linear algebra related to Computer Science & Engineering.**

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

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

**Applications:** Boolean matrix, Network Analysis, Markov Analysis, Critical point of a network system. Optimum solution.

(RBT Levels: L1, L2 and L3).

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

1	2D plots for Cartesian and polar curves
2	Finding angle between polar curves, curvature and radius of curvature of a given curve
3	Finding partial derivatives and Jacobian
4	Applications to Maxima and Minima of two variables
5	Solution of first-order ordinary differential equation and plotting the solution curves
6	Finding GCD using Euclid's Algorithm
7	Solving linear congruences $ax \equiv b \pmod{m}$
8	Numerical solution of system of linear equations, test for consistency and graphical representation
9	Solution of system of linear equations using Gauss-Seidel iteration
10	Compute eigenvalues and eigenvectors and find the largest and smallest eigenvalue by Rayleigh power method.

**Suggested software:** Mathematica/MatLab/Python/Scilab**Course outcome (Course Skill Set)**

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

CO1	apply the knowledge of calculus to solve problems related to polar curves and learn the notion of partial differentiation to compute rate of change of multivariate functions
CO2	analyze the solution of linear and nonlinear ordinary differential equations
CO3	get acquainted and to apply modular arithmetic to computer algorithms
CO4	make use of matrix theory for solving the system of linear equations and compute eigenvalues and eigenvectors
CO5	familiarize with modern mathematical tools namely MATHEMATICA/MATLAB/ PYTHON/ SCILAB

**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 total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

**Continuous Internal Evaluation(CIE):**

The CIE marks for the theory component of the IC shall be 30 marks and for the laboratory component 20 Marks.

**CIE for the theory component of the IC**

- Three Tests each of 20 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90-100% respectively.
- Two Assignments/two quizzes/ seminars/one field survey and report presentation/one-course project totalling 20 marks.

Total Marks scored (test + assignments) out of 80 shall be scaled down to 30 marks

**CIE for the practical component of the IC**



- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The **15 marks** are for conducting the experiment and preparation of the laboratory record, the other **05 marks shall be for the test** conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to 15 marks.
- The laboratory test (**duration 03 hours**) at the end of the 15<sup>th</sup> week of the semester/after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to **05 marks**.

Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IC/IPCC for **20 marks**.

- The minimum marks to be secured in CIE to appear for SEE shall be 12 (40% of maximum marks) in the theory component and 08 (40% of maximum marks) in the practical component. The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 25 questions is to be set from the practical component of IC/IPCC, the total marks of all questions should not be more than 25 marks.

The theory component of the IC shall be for both CIE and SEE.

#### Semester End Examination(SEE):

Theory SEE will be conducted by University 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/Kannada). 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 Resources:

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

##### Text Books

1. B. S. Grewal: "Higher Engineering Mathematics", Khanna Publishers, 44<sup>th</sup> Ed., 2021.
2. E. Kreyszig: "Advanced Engineering Mathematics", John Wiley & Sons, 10<sup>th</sup> Ed., 2018.
3. David M Burton: "Elementary Number Theory" Mc Graw Hill, 7<sup>th</sup> Ed., 2017.

##### Reference Books

4. V. Ramana: "Higher Engineering Mathematics" McGraw-Hill Education, 11<sup>th</sup> Ed., 2017
5. Srimanta Pal & Subodh C. Bhunia: "Engineering Mathematics" Oxford University Press, 3<sup>rd</sup> Ed., 2016.
6. N.P Bali and Manish Goyal: "A Textbook of Engineering Mathematics" Laxmi

Publications, 10<sup>th</sup> Ed., 2022.

7. C. Ray Wylie, Louis C. Barrett: "Advanced Engineering Mathematics" McGraw – Hill Book Co., New York, 6<sup>th</sup> Ed., 2017.
8. Gupta C.B, Sing S.R and Mukesh Kumar: "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
9. H. K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics" S. Chand Publication, 3<sup>rd</sup> Ed., 2014.
10. James Stewart: "Calculus" Cengage Publications, 7<sup>th</sup> Ed., 2019.
11. David C Lay: "Linear Algebra and its Applications", Pearson Publishers, 4<sup>th</sup> Ed., 2018.
12. Gareth Williams: "Linear Algebra with Applications", Jones Bartlett Publishers Inc., 6<sup>th</sup> Ed., 2017.
13. Gilbert Strang: "Linear Algebra and its Applications", Cengage Publications, 4<sup>th</sup> Ed. 2022.
14. William Stallings: "Cryptography and Network Security" Pearson Prentice Hall, 6<sup>th</sup> Ed., 2013.
15. Kenneth H Rosen: "Discrete Mathematics and its Applications" McGraw-Hill, 8<sup>th</sup> Ed. 2019.
16. Ajay Kumar Chaudhuri: "Introduction to Number Theory" NCBA Publications, 2<sup>nd</sup> Ed., 2009.
17. Thomas Koshy: "Elementary Number Theory with Applications" Harcourt Academic Press, 2<sup>nd</sup> Ed., 2008.

**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

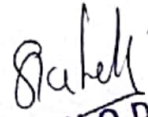
**Activity Based Learning (Suggested Activities in Class)/ Practical Based Learning**

- Quizzes
- Assignments
- Seminar

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

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

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

  
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## Computer Science and Engineering and allied branches(Chemistry group)

<b>Course Title:</b>	<b>Applied Chemistry for Computer Science &amp; Engineering stream</b>		
<b>Course Code:</b>	<b>BCHES102/202</b>	<b>CIEMarks</b>	<b>50</b>
<b>Course Type(Theory/Practical/Integrated)</b>	<b>Integrated</b>	<b>SEEMarks</b>	<b>50</b>
		<b>Total Marks</b>	<b>100</b>
<b>TeachingHours/Week(L:T:P:S)<sup>1</sup></b>	<b>2:2:2:0</b>	<b>Exam Hours</b>	<b>03</b>
<b>TotalHoursofPedagogy</b>	<b>40hoursTheory+ 10to12Labslots</b>	<b>Credits</b>	<b>04</b>
<b>Courseobjectives</b> <ul style="list-style-type: none"> <li>Toenablestudentstoacquireknowledgeonprinciplesofchemistryforengineeringapplications.</li> <li>Todevelopanintuitiveunderstandingofchemistrybyemphasizingtherelatedbranchesofengineering.</li> <li>Toprovidestudentswithasolidfoundationinanalyticalreasoningrequiredtosolvesocietalproblems.</li> </ul>			
<b>Teaching-LearningProcess</b> Thesearesamplestrategies,whichteachercanusetoacceleratetheattainmentofthevariouscourseoutcomesandmakeTeaching-Learningmoreeffective <ul style="list-style-type: none"> <li>Tutorial&amp;remedialclassesforneedytudents(notregularT/R)</li> <li>ConductingMakeupclasses/Bridgecourses forneedytudents</li> <li>Demonstrationofconceptseitherbybuildingmodelsorbyindustryvisit</li> <li>Experimentsinlaboratoriesshallbeexecutedinblendedmode(conventionalornon-conventionalmethods)</li> <li>UseofICT-Onlinevideos,onlinecourses</li> <li>Useofonlineplatformsforassignments/Notes/Quizzes(Ex.Googleclassroom)</li> </ul>			
<b>MODULE1:SensorsandEnergySystems(8hr)</b>			
<b>Sensors:</b> Introduction,working,principleandapplicationsofConductometricsensors,Electrochemical sensors,Thermometricsensors (Flame photometry)andOpticalsensors (colorimetry).Sensorsforthemeasurement of dissolved oxygen (DO). Electrochemical sensors for the pharmaceuticals.ElectrochemicalgassensorsforSO <sub>x</sub> andNO <sub>x</sub> .Disposableensorsin thedetectionofbiomoleculesandpesticides.			
<b>EnergySystems:</b> Introductiontobatteries,construction,workingandapplicationsofLithiumionandSodiumionbatteries.QuantumDotSensitizedSolarCells(QDSSC's)-Principle, PropertiesandApplications.			
<b>Self-learning:</b> Types of electrochemical sensor, Gas sensor - O <sub>2</sub> sensor, Biosensor - Glucosensorsensors.			
<b>MODULE2:MaterialsforMemoryandDisplaySystems(8hr)</b>			
<b>Memory Devices:</b> Introduction, Basic concepts of electronic memory, History of organic/polymerelectronicmemorydevices,Classificationofelectronicmemorydevices,			

1.NOTE:Whereverthecontact hoursisnotsufficient,tutorialhourcanbeconvertedto theoryhours

types of organic memory devices (organic molecules, polymeric materials, organic-inorganic hybrid materials).

**Display Systems:** Photoactive and electroactive materials, Nanomaterials and organic materials used in optoelectronic devices. Liquid crystals (LC's) - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's) and Quantum Light Emitting Diodes (QLED's), Light emitting electrochemical cells.

**Self-learning:** Properties and functions of Silicon (Si), Germanium (Ge), Copper (Cu), Aluminium (Al), and Brominated flame retardants in computers.

### MODULE 3: Corrosion and Electrode System (8hr)

**Corrosion Chemistry:** Introduction, electrochemical theory of corrosion, types of corrosion - differential metal and differential aeration. Corrosion control - galvanization, anodization and sacrificial anode method. Corrosion Penetration Rate (CPR) - Introduction and numerical problem.

**Electrode System:** Introduction, types of electrodes. Ion selective electrode - definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode - Introduction, calomel electrode - construction, working and applications of calomel electrode. Concentration cell - Definition, construction and Numerical problems.

**Analytical Techniques:** Introduction, principle and instrumentation of Conductometry; its application in the estimation of weak acid. Potentiometry; its application in the estimation of iron.

**Self-learning:** IR and UV-Visible spectroscopy.

### MODULE 4: Polymers and Green Fuels (8hr)

**Polymers:** Introduction, Molecular weight -

Number average, weight average and numerical problems. Preparation, properties, and commercial applications of kevlar.

Conducting polymers - synthesis and conducting mechanism of polyacetylene and commercial applications.

**Green Fuels:** Introduction, construction and working of solar photovoltaic cell, advantages, and disadvantages. Generation of energy (green hydrogen) by electrolysis of water and its advantages.

**Self-learning:** Regenerative fuel cells

### MODULE 5: E-Waste Management (8hr)

**E-Waste:** Introduction, sources of e-waste, Composition, Characteristics, and Need of e-waste management. Toxic materials used in manufacturing electronic and electrical products, health hazards due to exposure to e-waste. Recycling and Recovery: Different approaches of recycling (separation, thermal treatments, hydrometallurgical extraction, pyrometallurgical methods, direct recycling). Extraction of gold from E-waste. Role of stakeholders in environmental management of e-waste (producers, consumers, recyclers, and statutory bodies).

**Self-learning:** Impact of heavy metals on environment and human health.

### PRACTICAL MODULE

A - Demonstration (any two) offline/virtual:

A1. Chemical Structure drawing using software: ChemDraw or ACD/ChemSketch



A2. Determination of strength of an acid in Pb-acid battery  
 A3: Synthesis of Iron-oxide Nanoparticles  
 A4. Electrolysis of water

**B-Exercise (compulsorily any 4 to be conducted):**

B1. Conductometric estimation of acid mixture  
 B2. Potentiometric estimation of FAS using  $K_2Cr_2O_7$   
 B3. Determination of pKa of vinegar using pH sensor (Glass electrode)  
 B4. Determination of rate of corrosion of mild steel by weight loss method  
 B5. Estimation of total hardness of water by EDTA method

**C-Structured Enquiry (compulsorily any 4 to be conducted):**

C1. Estimation of Copper present in electroplating effluent by optical sensor (colorimetry)  
 C2. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer)  
 C3. Estimation of iron in TMT bar by diphenyl amine/external indicator method  
 C4. Estimation of Sodium present in soil/effluent sample using flame photometry  
 C5. Determination of Chemical Oxygen Demand (COD) of industrial wastewater sample

**D-Open Ended Experiments (any two):**

D1: Evaluation of acid content in beverages by using pH sensors and simulation.  
 D2. Construction of photovoltaic cell.  
 D3. Design an experiment to identify the presence of proteins in given sample.  
 D4. Searching suitable PDB file and target for molecular docking

**Course outcome (Course Skill Set)**

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

<b>CO1.</b>	Identify the terms processes involved in scientific and engineering and applications
<b>CO2.</b>	Explain the phenomena of chemistry to describe the methods of engineering processes
<b>CO3.</b>	Solve the problems in chemistry that are pertinent in engineering applications
<b>CO4.</b>	Apply the basic concepts of chemistry to explain the chemical properties and processes
<b>CO5.</b>	Analyze properties and multi processes associated with chemical substances in disciplinary situations

**Assessment Details (both CIE and SEE)**

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Total Marks scored (test + assignments) out of 80 shall be scaled down to 30 marks

**CIE for the practical component of the IC**

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The **15 marks** are for conducting the experiment and preparation of the laboratory record, the other **05 marks shall be for the test** conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to 15 marks.
- The laboratory test (**duration 03 hours**) at the end of the 15<sup>th</sup> week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to **05 marks**.

Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IC/IPCC for **20 marks**.

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The theory component of the IC shall be for both CIE and SEE.

#### Semester End Examination(SEE):

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- The question paper shall be set for 100 marks. The medium of the question paper shall be English/Kannada). 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 Resources:

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

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



12. Linden's Handbook of Batteries, Kirby W. Beard, Fifth Edition, McGraw Hill, 2019.
13. OLED Display Fundamentals and Applications, Takatoshi Tsujimura, Wiley-Blackwell, 2012
14. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, Elzbieta Frackowiak, Wiley-VCH; 1st edition, 2013.
15. "Handbook on Electroplating with Manufacture of Electrochemicals", ASIAPACIFIC BUSINESS PRESS Inc., 2017. Dr. H. Panda,
16. Expanding the Vision of Sensor Materials. National Research Council 1995, Washington, DC: The National Academies Press. doi:10.17226/4782.
17. Engineering Chemistry, Edited by Dr. Mahesh Band Dr. Roopashree B, Sunstar Publisher, Bengaluru, ISBN 978-93-85155-70-3, 2022
18. High Performance Metallic Materials for Cost Sensitive Applications, F.H. Froes, et al. John Wiley & Sons, 2010
19. Instrumental Methods of Analysis, Dr. K.R. Mahadik and Dr. L. Sathiyarayanan, Nirali Prakashan, 2020
20. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler, Stanley R. Crouch Seventh Edition, Cengage Learning, 2020
21. Polymer Science, VR Gowariker, NV Viswanathan, Jayadev, Sreedhar, Newage Int. Publishers, 4th Edition, 2021
22. Engineering Chemistry, PC Jain & Monica Jain, Dhanpat Rai Publication, 2015-16<sup>th</sup> Edition.
23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press, 1<sup>st</sup> Edition, 2002.
24. Nanotechnology Principles and Practices, Sulabha Kulkarni, Capital Publishing Company, 3<sup>rd</sup> Edition 2014
25. Principles of nanotechnology, Phanikumar, Scitech publications, 2<sup>nd</sup> Edition, 2010.
26. Chemistry for Engineering Students, B.S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa lyengar., Subash Publications, 5<sup>th</sup> Edition, 2014
27. "Engineering Chemistry", O.G. Palanna, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint, 2015.
28. Chemistry of Engineering materials, Malini S, KS Anantha Raju, CBS publishers Pvt Ltd.,
29. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

#### Weblinks and Video Lectures (e-Resources):


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

**ActivityBasedLearning(SuggestedActivitiesinClass)/PracticalBasedlearning**

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

**COsandPOsMapping(Individualteacherhastofillup)**

PO												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1				1					
CO2	3	1	1				1					
CO3	3	1	1				1					
CO4	3	1	1				1					
CO5	3	1	1				1					

  
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Course Title:	Computer Aided Engineering Drawing (Common to All)		
Course Code	BCEDK203/203	CIE Marks	50
Teaching Hour/Week (L:T:P:S)	2:0:2:0	SEE Marks	50
Total Hours of Teaching - Learning	40	Total Marks	100
Credits	03	Exam Hours	03

**Course Learning Objectives:**

- CLO1: To understand the basic principles and conventions of engineering drawing  
 CLO2: To use drawing as a communication mode  
 CLO3: To generate pictorial views using CAD software  
 CLO4: To understand the development of surfaces  
 CLO5: To visualize engineering components

**Teaching-Learning (General Instructions):**

- Students should be made aware of powerful engineering communication tool –Drawing.
- Simple Case studies can be suitably selected by the teacher for hands on practice to induce the feel of fruitfulness of learning.
- Appropriate Models, Power Point presentation, Charts, Videos, shall be used to enhance visualization before hands on practice.
- For application problems use very generally available actual objects. (Example: For rectangular prism / object; matchbox, carton boxes, book, etc can be used. Similarly for others shapes)
- Use any CAD software for generating orthographic and pictorial views.
- Make use of sketch book with graph sheets for manual / preparatory sketching

**Module-1****Introduction: for CIE only**

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 1<sup>st</sup> and 3<sup>rd</sup> quadrants.

Orthographic projections of lines (Placed in First quadrant only).

Orthographic projections of planes viz triangle, square, rectangle, pentagon, hexagon, and circular laminae (Placed in First quadrant only using change of position method).

**Application on projections of Lines & Planes (For CIE only)****Module-2****Orthographic Projection of Solids:**

Orthographic projection of right regular solids (Solids Resting on HP only): Prisms & Pyramids (triangle, square, rectangle, pentagon, hexagon), Cylinders, Cones, Cubes & Tetrahedron.

**Projections of Frustum of cone and pyramids (For practice only, not for CIE and SEE).**

**Isometric Projections:**

Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres. Isometric projection of combination of two simple solids.

**Conversion of simple isometric drawings into orthographic views.**

Problems on applications of Isometric projections of simple objects / engineering components.

**Introduction to drawing views using 3D environment (For CIE only).**

**Module-4****Development of Lateral Surfaces of Solids:**

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

Development of lateral surfaces of their frustums and truncations.

Problems on applications of development of lateral surfaces like funnels and trays.

**Problems on applications of development of lateral surfaces of transition pieces connecting circular duct and rectangular duct (For CIE Only)**

**Module-5****Multidisciplinary Applications & Practice (For CIE Only):**

**Free hand Sketching;** True free hand, Guided Free hand, Roads, Buildings, Utensils, Hand tools & Furniture's etc  
**Drawing Simple Mechanisms;** Bicycles, Tricycles, Gear trains, Ratchets, two-wheeler cart & Four-wheeler carts to dimensions etc

**Electric Wiring and lighting diagrams;** Like, Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software

**Basic Building Drawing;** Like, Architectural floor plan, basic foundation drawing, steel structures- Frames, bridges, trusses using Auto CAD or suitable software,

**Electronics Engineering Drawings-** Like, Simple Electronics Circuit Drawings, practice on layers concept.

**Graphs & Charts:** Like, Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or any suitable software.

**Course Outcomes**

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

- CO 1. Draw and communicate the objects with definite shape and dimensions
- CO 2. Recognize and Draw the shape and size of objects through different views
- CO 3. Develop the lateral surfaces of the object
- CO 4. Create a Drawing views using CAD software.
- CO 5. Identify the interdisciplinary engineering components or systems through its graphical representation.



### 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) and that for SEE minimum passing marks is 35% of the maximum marks (18 marks). 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 of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

### Continuous Internal Evaluation (CIE)

- CIE shall be evaluated for max. marks of 100 and later the same shall be scaled-down to 50 marks as detailed below:
- CIE component should comprise of Continuous evaluation of Drawing work of students as and when the Modules are covered based on below detailed weightage.

Module	Max. Marks Weightage	Evaluation Weightage in marks	
		Computer display and print out (a)	Sketching (b)
Module 1	15	10	05
Module 2	20	15	05
Module 3	20	20	00
Module 4	20	20	00
Module 5	25	15	10
<b>Total</b>	<b>100</b>	<b>80</b>	<b>20</b>
<b>Consideration of Class work</b>		<b>Total of [(a) + (b)] = 100 Scaled down to 30 Marks</b>	

- 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 20 Marks.
- The final CIE = Class work marks + Test marks

### Semester End Examination (SEE)

- SEE shall be conducted and evaluated for maximum marks 100. Marks obtained shall be accounted for SEE final marks, reducing it by 50%
- Question paper shall be set jointly by both Internal and External Examiner and made available for each batch as per schedule. *Questions are to be set preferably from Text Books.*
- Related to Module-1:** One full question can be set either from "points & lines" or "planes".
- Evaluation shall be carried jointly by both the examiners.
- Scheme of Evaluation: *To be defined by the examiners jointly and the same shall be submitted to the university along with question paper.*
- One full question shall be set from each of the Module from Modules 1, 2, 3 and 4 as per the below table weightage details. However, the student may be awarded full marks, if he/she completes solution on computer display without sketch.

Module	Max. Marks Weightage	Evaluation Weightage in marks	
		Computer display and print out (a)	Preparatory sketching (b)
Module 1	20	15	05
Module 2	30	25	05
Module 3	25	20	05
Module 4	25	20	05
<b>Total</b>	<b>100</b>	<b>80</b>	<b>20</b>
<b>Consideration of SEE Marks</b>		<b>Total of (a) + (b) ÷ 2 = Final SEE marks</b>	

#### Suggested Learning Resources:

##### Text Books

- S.N. Lal, & T Madhusudhan., Engineering Visulisation, 1<sup>st</sup> Edition, Cengage.Publication
- Parthasarathy N. S., Vela Murali, Engineering Drawing, Oxford University Press,2015.

##### Reference Books

- Bhattacharya S. K., Electrical Engineering Drawing, New Age International publishers, second edition 1998 reprint2005.
- Chris Schroder, Printed Circuit Board Design using AutoCAD, Newnes,1997.
- K S Sai Ram Design of steel structures, . Third Edition byPearson
- Nainan p kurian Design of foundation systems, Narosapublications
- A S Pabla, Electrical power distribution, 6th edition, Tata Mcgrawhill
- Bhatt, N.D., *Engineering Drawing: Plane and Solid Geometry*, 53<sup>rd</sup> edition, Charotar Publishing House Pvt. Limited, 2019.
- K. R. Gopalakrishna, & Sudhir Gopalakrishna: Textbook Of Computer Aided Engineering Drawing, 39<sup>th</sup> Edition, Subash Stores, Bangalore,2017

#### COs and POs Mapping (CO-PO mappings are only Indicative)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
C01	3	2			3	1		1	1	3		2
C02	3	2			3	1		1	1	3		2
C03	3	2			3	1		1	1	3		2
C04	3	3			3	1	1		1	3		1
C05	3	2			3				1	3		2

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

  
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Course Title:	<b>Introduction to Civil Engineering</b>		
Course Code:	BESCK104A/204	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:0	Total Marks	100
Total Hours of Pedagogy	25 hrs Lecture+25 hrs Tutorial = 50 hrs	Exam Hours	03
		Credits	03

**Course objectives**

- To make students learn the scope of various specializations of civil engineering.
- To make students learn the concepts of sustainable infrastructure
- To develop students' ability to analyse the problems involving forces, moments with their applications.
- To develop the student's ability to find out the center of gravity and moment of inertia and their applications.
- To make the students learn about kinematics

**Teaching-Learning Process**

These are sample Strategies; which teachers can use to accelerate the attainment of the various 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. Arrange visits to nearby sites to give brief information about the Civil Engineering structures.
3. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
4. Encourage collaborative (Group) Learning in the class.
5. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
6. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
7. Topics will be introduced in multiple representations.
8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
9. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
10. Individual teachers can devise innovative pedagogy to improve teaching-learning.

**Module-1 (10)****Civil Engineering Disciplines and Building Science**

**Introduction to Civil Engineering:** Surveying, Structural Engineering, Geotechnical Engineering, Hydraulics & Water Resources, Transportation Engineering, Environmental Engineering, Construction planning & Project management.

**Basic Materials of Construction:** Bricks, Cement & mortars, Plain, Reinforced & Pre-stressed Concrete, Structural steel, Construction Chemicals.

**Structural elements of a building:** foundation, plinth, lintel, chejja, Masonry wall, column, beam, slab and staircase

**Module-2 (10)****Societal and Global Impact of Infrastructure**

**Infrastructure:** Introduction to sustainable development goals, Smart city concept, clean city concept,

Safe city concept

**Environment:** Water Supply and Sanitary systems, urban air pollution management, Solid waste management, identification of Landfill sites, urban flood control

**Built-environment:** Energy efficient buildings, recycling, Temperature and Sound control in buildings, Security systems; Smart buildings.

#### Module-3(10)

**Analysis of force systems:** Concept of idealization, system of forces, principles of superposition and transmissibility, Resolution and composition of forces, Law of Parallelogram of forces, Resultant of concurrent and non-concurrent coplanar force systems, moment of forces, couple, Varignon's theorem, free body diagram, equations of equilibrium, equilibrium of concurrent and non-concurrent coplanar force systems

#### Module-4(10)

**Centroid:** Importance of centroid and centre of gravity, methods of determining the centroid, locating the centroid of plane laminae from first principles, centroid of built-up sections. Numerical examples

#### Module-5 (10)

**Moment of inertia:** Importance of Moment of Inertia, method of determining the second moment of area (moment of inertia) of plane sections from first principles, parallel axis theorem and perpendicular axis theorem, section modulus, radius of gyration, moment of inertia of built-up sections, Numerical Examples.

#### Course outcome (Course Skill Set)

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

CO1	Understand the various disciplines of civil engineering
CO2	Understand the infrastructure requirement for sustainable development
CO3	Compute the resultant and equilibrium of force systems.
CO4	Locate the centroid of plane and built-up sections
CO5	Compute the moment of inertia of plane and built-up sections.



**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination(SEE):**

Theory SEE will be conducted by University 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 Resources:****Text Books**

1. Bansal R. K., Rakesh Ranjan Beohar and Ahmad Ali Khan, Basic Civil Engineering and Engineering Mechanics, 2015, Laxmi Publications.
2. Kolhapure B K, Elements of Civil Engineering and Engineering Mechanics, 2014, EBPB

**Reference Books:**

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. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.
4. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press.

5. Bhavikatti S S, Engineering Mechanics, 2019, New Age International  
 6. Reddy Vijaykumar K and Suresh Kumar K, Engineering Mechanics, 2011, BS publication

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

- <https://www.youtube.com/watch?v=nGtVTNfNwnk&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT>
- <https://www.youtube.com/watch?v=nkg7VNW9UCc&list=PLOSWwFV98rfKXq2KBphJz95rao7q8PpwT&index=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=atoP5_DeTPE)
- <https://www.youtube.com/watch?v=ksmsp9OzAsI>
- <https://www.youtube.com/watch?v=x1ef048b3CF>
- [https://www.youtube.com/watch?v=1\\_Nck-X49qc](https://www.youtube.com/watch?v=1_Nck-X49qc)
- [https://play.google.com/store/apps/details?id=appinventor.ai\\_jgarc322.Resultant\\_Force](https://play.google.com/store/apps/details?id=appinventor.ai_jgarc322.Resultant_Force)
- <https://www.youtube.com/watch?v=RIBeW1DSZg>
- <https://www.youtube.com/watch?v=R8wKV0UQtlo>
- [https://www.youtube.com/watch?v=0RZHHgL8m\\_A](https://www.youtube.com/watch?v=0RZHHgL8m_A)
- <https://www.youtube.com/watch?v=Bl55KnQOWkY>

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

- [https://www.youtube.com/watch?v=Zrc\\_gB1YYS0](https://www.youtube.com/watch?v=Zrc_gB1YYS0)
- <https://play.google.com/store/apps/details?id=vn.edu.best4u.com.bieudonoiluc>
- [https://www.youtube.com/watch?v=Hn\\_iozUo9m4](https://www.youtube.com/watch?v=Hn_iozUo9m4)
- <https://play.google.com/store/apps/details?id=com.teobou>
- <https://www.youtube.com/watch?v=WOHRp3V-QA0>

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

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	1					1						
CO2	1					1	1					
CO3	2	3										
CO4	2	3										
CO5	2	3										

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

**Note:** Depending on the assessment tool used, higher order POs can be identified by the concerned course instructor.

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Introduction to Electrical Engineering			
Course Code:	BESCK104B	CIE Marks	50
Course Type (Theory/Practical /Integrated )	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Total Marks	100
Total Hours of Pedagogy	40 hours	Exam Hours	03
		Credits	03
<b>Course objectives</b> <ul style="list-style-type: none"> <li>To explain the laws used in the analysis of DC and AC circuits.</li> <li>To explain the behavior of circuit elements in single-phase circuits.</li> <li>To explain the construction and operation of transformers, DC generators and motors and induction motors.</li> <li>To introduce concepts of circuit protecting devices and earthing.</li> <li>To explain electric power generation, transmission and distribution, electricity billing, equipment and personal safety measures.</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective <ol style="list-style-type: none"> <li>1. Chalk and talk</li> <li>2. Animated/NPTEL videos</li> <li>3. Cut sections</li> <li>4. PPTs</li> </ol>			
<b>Module-1 (08 Hrs)</b>			
<b>Introduction:</b> Conventional and non-conventional energy resources; General structure of electrical power systems using single line diagram approach. <b>Power Generation:</b> Hydel, Nuclear, Solar & wind power generation (Block Diagram approach). <b>DC Circuits:</b> Ohm's Law and its limitations. KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical.			
<b>Module-2 (08 Hrs)</b>			
<b>A.C. Fundamentals:</b> 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). <b>Three Phase Circuits:</b> Generation of Three phase AC quantity, advantages and limitations; star and delta connection, relationship between line and phase quantities (excluding proof)			
<b>Module-3 (08 Hrs)</b>			
<b>DC Machines:</b> <b>DC Generator:</b> Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical. <b>DC Motor:</b> Principle of operation, back emf and its significance. Torque equation, types of motors, characteristics and speed control (armature & field) of DC motors (series & shunt only). Applications of DC motors. Simple numerical.			

**Module-4(08 Hrs)**

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

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

**Module-5 (08 Hrs)**

**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.

**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.

**Course outcome (Course Skill Set)**

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

CO1	Understand the concepts of various energy sources and Electric circuits.
CO2	Apply the basic Electrical laws to solve circuits.
CO3	Discuss the construction and operation of various Electrical Machines.
CO4	Identify suitable Electrical machine for practical implementation.
CO5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.



**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination (SEE):**

Theory SEE will be conducted by University 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/Kannada). 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 Resources:**

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

**Text Books:**

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

**Reference Books:**

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill 4th edition, 2019.
2. Principles of Electrical Engineering & Electronics by V. K. Mehta, Rohit Mehta, S. Chand and Company Publications, 2nd edition, 2015.
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI, 3<sup>rd</sup> edition, 2014.

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

- [www.nptel.ac.in](http://www.nptel.ac.in)

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

- 

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	0	1	1	1	1	0	0	0	1
CO2	3	3	2	1	1	1	0	0	0	0	0	1
CO3	3	2	1	1	1	1	1	1	0	0	0	1
CO4	3	2	2	1	0	1	1	1	0	0	0	1
CO5	3	1	2	0	1	2	1	1	0	0	1	1

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

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Course Title:	<b>Introduction to Electronics &amp; Communication</b>		
Course Code:	<b>BESCK104C/204C</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated )	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03
<b>Course objectives</b> <ol style="list-style-type: none"> <li>1. To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.</li> <li>2. To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.</li> <li>3. Professionalism &amp; Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career.</li> </ol>			
<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. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.</li> <li>2. Arrange visits to nearby PSUs such as BHEL, BEL, ISRO, etc., and small-scale hardware Industries to give brief information about the electronics manufacturing industry.</li> <li>3. Show Video/animation films to explain the functioning of various analog and digital circuits.</li> <li>4. Encourage collaborative (Group) Learning in the class</li> <li>5. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking</li> <li>6. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.</li> <li>7. Topics will be introduced in multiple representations.</li> <li>8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.</li> <li>9. 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 (8 hours )</b>			
<b>Power Supplies</b> –Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers. <b>Amplifiers</b> – Types of amplifiers, Gain, Input and output resistance, Frequency response, Bandwidth, Phase shift, Negative feedback, multi-stage amplifiers (Text 1)			
<b>Module-2(8 hours )</b>			

**Oscillators** – Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator, Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)  
**Operational amplifiers** -Operational amplifier parameters, Operational amplifier characteristics, Operational amplifier configurations, Operational amplifier circuits.  
 Text 1)

### Module-3 ( 8 hours)

**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 2: 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7)  
**Combinational logic:** Introduction, Design procedure, Adders- Half adder, Full adder (Text 2: 4.1, 4.2, 4.3)

### Module-4 ( 8 hours)

**Embedded Systems** – Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC  
**Sensors and Interfacing** – Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display. (Text 3)

### Module-5 ( 8 hours)

**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 , FM, Concept of Radio wave propagation (Ground, space, sky)  
**Digital Modulation Schemes:** Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques. ( Text 4)



**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination(SEE):**

Theory SEE will be conducted by University 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 Resources:

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

1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015.  
DOI <https://doi.org/10.4324/9781315737980>. eBook ISBN 9781315737980

2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-84.

3. K V Shibu, 'Introduction to Embedded Systems', 2nd Edition, McGraw Hill Education (India), Private Limited, 2016

4. S L Kakani and Priyanka Punglia, 'Communication Systems', New Age International Publisher, 2017.

  
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Course Title:	<b>INTRODUCTION TO MECHANICAL ENGINEERING</b>		
Course Code:	<b>BESCK104D/204D</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated )	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:2:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03
<b>Course Learning Objectives</b> <ul style="list-style-type: none"> <li>To develop basic Knowledge on Mechanical Engineering, Fundamentals and Energy Sources.</li> <li>Understand the concept of different types of Machine tool operations and Modern Manufacturing Processes like CNC, 3D printing.</li> <li>To know the concept of IC engines and Future Mobility vehicles.</li> <li>To give exposure in the field of Engineering Materials and Manufacturing Processes Technology and its applications</li> <li>To acquire a basic understanding role of Mechanical Engineering in the Robotics and Automation in industry.</li> </ul>			
<b>Teaching-Learning Process</b> <ul style="list-style-type: none"> <li>Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations or Simulations.</li> <li>Arrange visits to show the live working models other than laboratory topics.</li> <li>Adopt collaborative (Group Learning) Learning in the class.</li> <li>Adopt Problem Based Learning (PBL), which fosters students Analytical skills and develops thinking skills such as evaluating, generalizing, and analyzing information.</li> </ul>			
<b>Module-1 (8 hours)</b>			
<b>Introduction:</b> Role of Mechanical Engineering in Industries and Society- Emerging Trends and Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors. <b>Energy:</b> Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel, Solar, wind, and bio-fuels, Environmental issues like Global warming and Ozone depletion			
<b>Module-2 (8 hours)</b>			
<b>Machine Tool Operations:</b> Working Principle of lathe, Lathe operations: Turning, facing, knurling. Working principles of Drilling Machine, drilling operations: drilling, boring, reaming. Working of Milling Machine, Milling operations: plane milling and slot milling. (No sketches of machine tools, sketches to be used only for explaining the operations). <b>Introduction to Advanced Manufacturing Systems:</b> Introduction, components of CNC, advantages and applications of CNC, 3D printing.			
<b>Module-3 (8 hours)</b>			
<b>Introduction to IC Engines:</b> Components and Working Principles, 4-Stroke Petrol and Diesel Engines, Application of IC Engines. <b>Insight into Future Mobility;</b> Electric and Hybrid Vehicles, Components of Electric and Hybrid Vehicles. Advantages and disadvantages of EVs and Hybrid vehicles.			
<b>Module-4 (8 hours)</b>			
<b>Engineering Materials:</b> Types and applications of Ferrous & Nonferrous Metals, silica, ceramics, glass, graphite, diamond and polymer. Shape Memory Alloys. <b>Joining Processes:</b> Soldering, Brazing and Welding, Definitions, classification of welding process, Arc welding, Gas welding and types of flames.			
<b>Module-5 (8 hours)</b>			

**Introduction to Mechatronics and Robotics:** open-loop and closed-loop mechatronic systems. Classification based on robotics configuration: polar cylindrical, Cartesian coordinate and spherical. Application, Advantages and disadvantages.  
**Automation in industry:** Definition, types – Fixed, programmable and flexible automation, basic elements with block diagrams, advantages.  
**Introduction to IOT:** Definition and Characteristics, Physical design, protocols, Logical design of IoT, Functional blocks, and communication models.

**Course Outcome (Course Skill Set)**

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

C01	Explain the concepts of Role of Mechanical Engineering and Energy sources.
C02	Describe the Machine Tool Operations and advanced Manufacturing process.
C03	Explain the Working Principle of IC engines and EV vehicles.
C04	Discuss the Properties of Common Engineering Materials and various Metal Joining Processes.
C05	Explain the Concepts of Mechatronics, Robotics and Automation in IoT



### 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 **20 Marks**;

- 1<sup>st</sup>, 2<sup>nd</sup>. and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of **40 Marks**.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to **50 marks**

#### Semester End Examination(SEE):

Theory SEE will be conducted by University 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/Kannada). 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 Resources:****Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)****Text Books:**

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:**

1. Elements of Workshop Technology (Vol. 1 and 2), Hazra Choudhry and Nirzar Roy, Media Promoters and Publishers Pvt. Ltd., 2010.
2. Manufacturing Technology- Foundry, Forming and Welding, P.N.Rao Tata McGraw Hill 3rdEd., 2003.
3. Internal Combustion Engines, V. Ganesan, Tata McGraw Hill Education; 4th edition, 2017
4. Robotics, Appu Kuttan KK K. International Pvt Ltd, volume 1
5. Dr SRN Reddy, Rachit Thukral and Manasi Mishra, " Introduction to Internet of Things: A Practical Approach", ETI Labs
6. Raj kamal, " Internet of Things: Architecture and Design", McGraw hill.

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

- <https://rakhoh.com/en/applications-and-advantages-of-steam-in-manufacturing-and-process-industry/>
- Videos | Makino (For Machine Tool Operation)

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

- Demonstration of lathe/milling/drilling operations
- Demonstration of working of IC Engine.
- Study arc welding, oxy-acetylene gas flame structure.
- Video demonstration of latest trends in mobility robotics and Automation
- Demonstration of developing models on machine tools

**COs and POs Mapping (CO-PO mappings are only Indicative)**

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3					1	2			1		1
CO2	3					1	1			1		1
CO3	3					1	1			1		1
CO4	3					1	1			1		1
CO5	3					1	1			1		1

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

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Course Title		Introduction to C Programming		
Course Code:		BESCK104E/204E	CIE Marks	50
Course Type (Theory/Practical /Integrated )		Integrated	SEE Marks	50
Teaching Hours/Week (L:T:P: S)		2:0:2:0	Total Marks	100
Total Hours of Pedagogy		40 hours	Exam Hours	03
Credits				03
<b>Course Objectives:</b>				
CLO 1. Elucidate the basic architecture and functionalities of a Computer				
CLO 2. Apply programming constructs of C language to solve the real-world problems				
CLO 3. Explore user-defined data structures like arrays, structures and pointers in implementing solutions to problems				
CLO 4. Design and Develop Solutions to problems using modular programming constructs such as functions and procedures				
<b>Teaching-Learning Process (General Instructions)</b>				
These are sample strategies, which teachers can use to accelerate the attainment of the various course outcomes.				
1. Lecturer method (L) need not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.				
2. Use of Video/Animation to explain functioning of various concepts.				
3. Encourage collaborative (Group Learning) Learning in the class.				
4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.				
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.				
6. Introduce Topics in manifold representations.				
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.				
8. Discuss how every concept can be applied to the real world-and when that's possible, it helps to improve the students' understanding.				
9. Use <a href="https://pythontutor.com/visualize.html#mode=edit">https://pythontutor.com/visualize.html#mode=edit</a> in order to visualize the operations of C Programs				
<b>Module-1 (6 Hours of Pedagogy)</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>				
Teaching-Learning Process		Chalk and talk method/PowerPoint Presentation		
<b>Module-2 (6 Hours of Pedagogy)</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>				
Teaching-Learning Process		Chalk and talk method/PowerPoint Presentation		
<b>Module-3 (6 Hours of Pedagogy)</b>				
Functions: Introduction using functions, Function definition, function declaration, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive functions.				
Arrays: Declaration of arrays, accessing the elements of an array, storing values in arrays, Operations on arrays.				



Passing arrays to functions.

**Textbook: Chapter 11.1-11.13, 12.1-12.6**

Teaching-Learning Process	Chalk and talk method/PowerPoint Presentation
Module-4 (6 Hours of Pedagogy)	

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 Scanset.

**Textbook: Chapter 12.7-12.12**

Teaching-Learning Process	Chalk and talk method/PowerPoint Presentation
Module-5 (6 Hours of Pedagogy)	

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

**Pointers:** Understanding the Computers Memory, Introduction to Pointers, Declaring Pointer Variables

**Structures:** Introduction to structures

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

Teaching-Learning Process	Chalk and talk method/PowerPoint Presentation
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**Course Outcomes (Course Skill Set)**

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

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

CO 2. Apply programming constructs of C language to solve the real world problem

CO 3. Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting

CO 4. Explore user-defined data structures like structures, unions and pointers in implementing solutions

CO5. Design and Develop Solutions to problems using modular programming constructs using functions

**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 CIE marks for the theory component of the IC shall be **30 marks** and for the laboratory component **20 Marks**.

**CIE for the theory component of the IC**

- Three Tests each of 20 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90-100% respectively.
- Two Assignments/two quizzes/ seminars/one field survey and report presentation/one-course project totaling 20 marks.

Total Marks scored (test + assignments) out of 80 shall be scaled down to **30 marks**

#### **CIE for the practical component of the IC**

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The **15 marks** are for conducting the experiment and preparation of the laboratory record, the other **05 marks shall be for the test** conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to 15 marks.
- The laboratory test (**duration 03 hours**) at the end of the 15<sup>th</sup> week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to **05 marks**.

Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IC/IPCC for **20 marks**.

- The minimum marks to be secured in CIE to appear for SEE shall be 12 (40% of maximum marks) in the theory component and 08 (40% of maximum marks) in the practical component. The laboratory component of the IC/IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 05 questions is to be set from the practical component of IC/IPCC, the total marks of all questions should not be more than 25 marks.

The theory component of the IC shall be for both CIE and SEE.

#### **Semester End Examination (SEE):**

##### **SEE for IC**

Theory SEE will be conducted by University as per the scheduled time table, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. 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.
3. The students have to answer 5 full questions, selecting one full question from each module.

**The theory portion of the Integrated Course shall be for both CIE and SEE, whereas the practical portion**

will have a CIE component only. Questions mentioned in the SEE paper shall include questions from the practical component).

#### Passing standard:

- The minimum marks to be secured in CIE to appear for SEE shall be 12 (40% of maximum marks-30) in the theory component and 08 (40% of maximum marks -20) in the practical component. The laboratory component of the IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 04/05 questions to be set from the practical component of IPCC, the total marks of all questions should not be more than 30 marks.
- SEE will be conducted for 100 marks and students shall secure 35% of the maximum marks to qualify for the SEE. Marks secured will be scaled down to 50.

#### Suggested Learning Resources:

##### Textbooks

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

##### Reference Books:

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

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


- Quizzes
- Assignments
- Seminars

##### Lab Assignments

1	C Program to find Mechanical Energy of a particle using $E = mgh + 1/2 mv^2$ .
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 $b_1, b_2, b_3$ 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 Bubble sort.
8	Write functions to implement string operations such as compare, concatenate, string length. Convince the parameter passing techniques.
9	Implement structure to read, write and compute average marks and the student's scoring above and below the average marks for a class of N students.
10	Develop a program using pointer to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.

  
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Course Title:	<b>Smart Materials and systems</b>		
Course Code:	<b>BETCK105A/205A</b>	CIE Marks	50
Course Type (Theory/Practical /Integrated )	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Total Marks	100
Total Hours of Pedagogy	40 Hours	Exam Hours	03
		Credits	03
<b>Course objectives</b> <ul style="list-style-type: none"> <li>To develop the students ability to learn emerging materials.</li> <li>To make students to learn prefabricated building components</li> <li>To understand the sensors deployed in smart buildings</li> <li>To learn building information modelling for building design</li> <li>To learn the concepts of 3-D printing</li> </ul>			
<b>Teaching-Learning Process</b> <p>These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.</p> <ol style="list-style-type: none"> <li>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>Arrange visits to nearby sites to give brief information about the Civil Engineering structures.</li> <li>Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.</li> <li>Encourage collaborative (Group) Learning in the class.</li> <li>Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.</li> <li>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>Topics will be introduced in multiple representations.</li> <li>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>Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.</li> <li>Individual teachers can device innovative pedagogy to improve teaching-learning.</li> </ol>			
<b>Module-1 (08)</b>			
<b>Emerging Materials</b> Honey comb structure (Carbon composites), Nano-materials, engineered polymers, emerging sustainable by products (Fly ash and GGBS) and construction chemicals			
<b>Module-2 (08)</b>			
<b>Prefabricated/ Manufactured building components</b> Definition, types of prefabricated/ manufactured building components and infrastructure, modular coordination, standardization, materials, systems, production, transportation and installation.			
<b>Module-3(08)</b>			
<b>Smart Materials</b> Definition, Principles of Piezo-electricity, materials (Polymers and Ceramics), sensors (Piezo-electric sensor, strain gauge, shear sensor, in-plane and out of plane sensor, accelerometer), smart composites			

Module-4(08)	
<b>BIM and IBMS</b>	
BIM: Definition, Necessity, advantages, BIM in building design, infrastructure design and construction	
IBMS – Definition, Necessity, advantages, Types of IBMS	
Module-5 (08)	
<b>3-D Printing</b>	
Importance, Historic development, advantages, common terminologies, classification, Process chain, 3 – D modelling, Data conversion and transmission, checking and preparation, Building, Post processing, Applications	
<b>Course outcome (Course Skill Set)</b>	
At the end of the course the student will be able to:	
C01	Make use emerging materials for construction
C02	Decide the proper prefabricated building component
C03	Use smart materials and methods in building construction
C04	Implement BIM in building design
C05	Prepare 3-D modelling and manufacture building component



### 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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

#### Semester End Examination (SEE):

Theory SEE will be conducted by University 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 Resources:

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

1. Donald R. Askeland and Pradeep P. Fulay, Essentials of Materials Science and Engineering, 2009, Cengage Laerning.
- 2.
- 3.
- 4.
- 5.

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

- YouTube Videos.
- 

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

- Site visits to understand the prefabricated building components.
- Visit to Smart material manufacturing facilities
- Visit to 3-D printing facility

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

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	3										
CO2	2	3										
CO3	2	3										
CO4	2	3										
CO5	2	3										

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

**Note:** Depending on the assessment tool used, higher order POs can be identified by the concerned course instructor.

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Course Title:	<b>GREEN BUILDINGS</b>		
Course Code:	<b>BETCK105B/205B</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Total Marks	100
Total Hours of Pedagogy	40 hours	Exam Hours	03
		Credits	03

**Course objectives:** This course will enable students to:

- Understand the Definition, Concept & Objectives of the terms cost effective construction and green building
- Apply cost effective techniques in construction
- 3. Apply cost effective Technologies and Methods in Construction
- Understand the Problems due to Global Warming
- State the Concept of Green Building
- Understand Green Buildings

#### Teaching-Learning Process

These are sample Strategies; which teachers can use to accelerate the attainment of the various 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. Arrange visits to nearby sites to give brief information about the Civil Engineering structures.
3. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
4. Encourage collaborative (Group) Learning in the class.
5. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
6. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
7. Topics will be introduced in multiple representations.
8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
9. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
10. Individual teachers can devise innovative pedagogy to improve teaching-learning.

#### Module-1 (08)

**Introduction to the concept of cost effective construction** -Uses of different types of materials and their availability -Stone and Laterite blocks- Burned Bricks- Concrete Blocks- Stabilized Mud Blocks- LimePozzolana Cement- Gypsum Board- Light Weight Beams- Fiber Reinforced Cement Components- Fiber Reinforced Polymer Composite- Bamboo- Availability of different materials- Recycling of building materials – Brick- Concrete- Steel- Plastics - Environmental issues related to quarrying of building materials.

#### Module-2 (08)



**Environment friendly and cost effective Building Technologies** - Different substitute for wall construction Flemish Bond - Rat Trap Bond - Arches - Panels - Cavity Wall - Ferro Cement and Ferro Concrete constructions - different pre cast members using these materials - Wall and Roof Panels - Beams - columns - Door and Window frames - Water tanks - Septic Tanks - Alternate roofing systems - Filler Slab - Composite Beam and Panel Roof -Pre-engineered and ready to use building elements - wood products - steel and plastic - Contributions of agencies - Costford - Nirmithi Kendra - Habitat

#### Module-3(08)

**Global Warming** - Definition - Causes and Effects - Contribution of Buildings towards Global Warming - Carbon Footprint - Global Efforts to reduce carbon Emissions Green Buildings - Definition - Features- Necessity - Environmental benefit - Economical benefits - Health and Social benefits - Major Energy efficient areas for buildings - Embodied Energy in Materials Green Materials - Comparison of Initial cost of Green V/s Conventional Building - Life cycle cost of Buildings.

#### Module-4(08)

**Green Building rating Systems-** BREEAM - LEED - GREEN STAR -GRIHA ( Green Rating for Integrated Habitat Assessment) for new buildings - Purpose - Key highlights - Point System with Differential weight age. Green Design - Definition - Principles of sustainable development in Building Design - Characteristics of Sustainable Buildings - Sustainably managed Materials - Integrated Lifecycle design of Materials and Structures (Concepts only)

#### Module-5 (08)

#### Utility of Solar Energy in Buildings

Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings.

#### Green Composites for Buildings

Concepts of Green Composites. Water Utilisation in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment.

#### Course outcome (Course Skill Set)

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

C01	Select different building materials for construction
C02	Apply effective environmental friendly building technology
C03	Analyze global warming due to different materials in construction
C04	Analyse buildings for green rating
C05	Use alternate source of energy and effective use water

### 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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

#### Semester End Examination (SEE):

Theory SEE will be conducted by University 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 Resources:

##### Text Books

1. HarharaIyer G, Green Building Fundamentals, Notion Press
2. Dr. Adv. HarshulSavla, Green Building: Principles & Practices

Course Title:	Introduction to Nano Technology		
Course Code:	BETCK105C/205C	CIE Marks	50
Course Type (Theory/Practical /Integrated )	ETC (Integrated)	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	02:00:02:00	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03
Teaching Department	NT/Chem/Phys/Any Engg. Branch	QP setting	NT/Chem/Phys
<b>Course objectives</b> <ul style="list-style-type: none"> <li>To provide a comprehensive overview of synthesis and characterization of nanoparticles, nanocomposites and hierarchical materials with nanoscale features.</li> <li>To provide the engineering students with necessary background for understanding various nanomaterials characterization techniques</li> <li>To develop an understanding of the basis of the choice of material for device applications</li> <li>To give an insight into complete systems where nanotechnology can be used to improve our everyday life</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective <ol style="list-style-type: none"> <li>Chalk and Talk</li> <li>Powerpoint presentation</li> <li>Video Lecturing</li> <li>E-sources</li> <li>Self learning</li> </ol>			
<b>Module-1 (07 hours of pedagogy)</b>			
<b>Introduction to Nanomaterials</b> Nanotechnology, Frontier of future-an overview, Length Scales, Variation of physical properties from bulk to thin films to nanomaterials, Confinement of electron in 0D, 1D, 2D and 3D systems, Surface to Volume Ratio, Synthesis of Nanomaterials: Bottom-Up approach: Chemical Routes for Synthesis of nanomaterials-Sol-gel, Precipitation, Solution Combustion synthesis, Hydrothermal, SILAR, Chemical Bath Deposition. Top-Down approach- Ball milling technique, Sputtering, Laser Ablation			
<b>Module-2 (07 hours of pedagogy)</b>			



**Characterization of Nanomaterials**

Basic principles and instrumentations of Electron Microscopy –Transmission Electron Microscope, Scanning Electron Microscope, Scanning Probes- Scanning Tunneling microscope, Atomic Force Microscope –different imaging modes, comparison of SEM and TEM, AFM and STM, AFM and SEM.

Basic principles of working of X-ray diffraction, derivation of Debye-Scherrer equation, numericals on Debye Scherrer equation, Optical Spectroscopy- Instrumentation and application of IR, UV/VIS (Band gap measurement)

**Module-3(07 hours of pedagogy)****Carbon Based Materials**

Introduction, Synthesis, Properties (electrical, Electronic and Mechanical), and Applications of Graphene, SWCNT, MWCNT, Fullerenes and other Carbon Materials: Carbon nanocomposites, nanofibres, nanodiscs, nanodiamonds.

**Module-4(07 hours of pedagogy)****Nanotechnology in Energy storage and conversion**

Solar cells: First generation, Second generation and third generation solar cells: Construction and working of Dye sensitized and Quantum dot sensitized solar cells.

Batteries: Nanotechnology in Lithium ion battery- working, Requirements of anodic and cathodic materials, classification based on ion storage mechanisms, limitations of graphite anodes, Advances in Cathodic materials, Anodic materials, Separators

Fuel Cells:Introduction, construction, working of fuel cells and nanotechnology in hydrogen storage and proton exchange membranes

**Self study for lifelong learning:**

Super capacitors: Introduction, construction and working of supercapacitor

**Module-5 (07 hours of pedagogy)****Applications of Nanotechnology**

Nanotech Applications and Recent Breakthroughs: Introduction, Significant Impact of Nanotechnology and Nanomaterial, Medicine and Healthcare Applications, Biological and Biochemical Applications (Nano biotechnology), Electronic Applications (Nano electronics), Computing Applications (Nano computers), Chemical Applications (Nano chemistry), Optical Applications (Nano photonics), Agriculture and Food Applications, Recent Major Breakthroughs in Nanotechnology.

**Self study for lifelong learning:**

Nano coatings (Photocatalysts) and super hydrophobic coatings (Lotus effect)

**Course outcome (Course Skill Set)**

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

C01	Demonstrate the synthesis of nanoparticles by various techniques. [L2]
C02	Explain working of basic instruments used in characterization of nanoparticles. [L2]
C03	Discuss the application of nanotechnology to mechanical and civil domains [L2]
C04	Classify the nanomaterials based on the dimensions. [L3]
C05	Assess the suitability of nanomaterials for various device applications. [L4]

**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination (SEE):**

Theory SEE will be conducted by University 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 Resources:****Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**

1. Nano Materials – A.K. Bandyopadhyay/ New Age Publishers
2. Nanocrystals: Synthesis, Properties and Applications – C.N.R. Rao, P. John Thomas and G. U. Kulkarni, Springer Series in Materials Science
3. Nano Essentials- T. Pradeep/TMH
4. Peter J. F. Harris, Carbon nanotube science: synthesis, properties, and applications. Cambridge University Press, 2011
5. M.A. Shah, K.A. Shah, "Nanotechnology: The Science of Small", Wiley India, ISBN 13: 9788126538683

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

1. Introduction to Nanotechnology, C. P. Poole and F. J. Owens, Wiley, 2003
2. Understanding Nanotechnology, Scientific American 2002
3. Nanotechnology, M. Ratner and D. Ratner, Prentice Hall 2003
4. Nanotechnology, M. Wildon, K. Kannagara, G. Smith, M. Simmons and B. Raguse, CRC Press Boca Raton 2002
5. Recent reviews on Li-ion batteries, solar cells and fuel cells

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

- <https://nptel.ac.in/courses/118104008>
- <https://www.digimat.in/nptel/courses/video/118104008/L16.html>
- <https://archive.nptel.ac.in/courses/113/106/113106099/>
- <https://nptel.ac.in/courses/112107283>
- [https://onlinecourses.nptel.ac.in/noc22\\_me131/preview](https://onlinecourses.nptel.ac.in/noc22_me131/preview)

**Practical Based learning (Any 5 experiments x 2 hours = 10 practical hours)**

- Preparation of silver nanoparticles and characterization of particle size by optical spectroscopy
- Preparation of ZnO nanoparticles by combustion technique
- Preparation of Al<sub>2</sub>O<sub>3</sub> nanoparticles by precipitation method
- Preparation of Silica nanoparticles by sol-gel method
- Preparation of metal oxide nanoparticles by hydrothermal method
- Determination of thermal conductivity of nanofluids using a thermal analyser
- Preparation of thin films by SILAR method
- Determination of Band gap of given material using Tauc plot

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

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	2						2	1		
CO2	3	3	2									
CO3	3	3										
CO4	3	3							2	1		2
CO5	3	3							2	1		2

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

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Course Title:	<b>Introduction to Sustainable Engineering</b>		
Course Code:	BETC105D/205D	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3-0-0-0	Total Marks	100
Total Hours of Pedagogy	40 hours	Exam Hours	03
		Credits	03
<b>Course Learning Objectives:</b> <ul style="list-style-type: none"> <li>To familiarize the students to the area of sustainability and concepts of sustainability engineering</li> <li>To enable students with an understanding of principles and frame work of sustainable engineering</li> <li>To provide students with an understanding of Life Cycle Assessment tool in sustainable engineering</li> <li>To provide students with understanding of integration of sustainability with design.</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective <ol style="list-style-type: none"> <li>Explanation via real life problem, deliberate on solution and inquiry type teaching</li> <li>Instructions with interactions in class room lectures (physical/hybrid)</li> <li>Use of ICT Tools including You Tube videos and related MOOCs, AR/VR/MR tools</li> <li>Flipped Classroom session (approx. 10% of classes)</li> <li>Guest talks and competitions for learning beyond the syllabus</li> <li>Students oral presentation of case studies</li> </ol>			
<b>Module-1 (8 Hours)</b>			
<b>Sustainable Development and Role of Engineers:</b> Introduction, Why and What is Sustainable Development, THE SDFs, Paris Agreement and Role of Engineering, Sustainable Development and the Engineering Profession, Key attributes of the Graduate Engineering <b>Sustainable Engineering Concepts:</b> Key concepts – Factor 4 and Factor 10: Goals of sustainability, System Thinking, Life Cycle Thinking and Circular Economy			
<b>Module-2 (8 Hours)</b>			
<b>Sustainable Engineering and Concepts, Principles and Frame Work:</b> Green Economy and Low Carbon Economy, Eco Efficiency, Triple bottom Line, Guiding principles of sustainable engineering, Frameworks for sustainable Engineering. <b>Tools for sustainability Assessment:</b> Environmental Management System, Environmental Auditing, Cleaner Production Assessment, Environmental Impact Assessment, Strategic Environmental			
<b>Module-3 (8 Hours)</b>			
<b>Fundamentals of Life Cycle Assessment</b> Why and What is LCA, LCA Goal and Scope, Life cycle inventory, Life Cycle Impact Assessment, Interpretation and presentation of Results, Iterative Nature of LCA, Methodological Choices, LCI Databases and LCA Softwares, Strength and Limitations of LCA.			
<b>Module-4 (8 Hours)</b>			
<b>Environmental Life Cycle Costing, Social Life Cycle Assessment, and Life Cycle Sustainability Assessment:</b> Introduction, Environmental Life Cycle Costing, Social Life Cycle Assessment, Life Cycle Sustainability, LCA Applications in Engineering: Environmental Product Declarations and Product Category Rules, Carbon and Water Foot Printing, Energy systems, Buildings and the Built Environment, Chemical and Chemical Production Food and Agriculture <b>Introduction to Environmental Economics:</b> Introduction – What Is Environmental Economics?, Valuing the Environment, Market-based Incentives (or Economic Instruments) for Sustainability, Command-and-Control versus Economic Instruments, A Simple Model of Pollution Control			

**Module-5 (8 Hours)**

**Integrating Sustainability in Engineering Design:** Problems Solving in Engineering, conventional to Sustainable Engineering Design Process, Design for Life Guidelines and Strategies, Measuring Sustainability, Sustainable Design through sustainable procurement criteria, Case studies on sustainable Engineering Design Process – Sustainable Process Design, Sustainable Production Design Sustainable product design in Electronic Engineering.

**Course outcome (Course Skill Set)**

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

CO1	Elucidate the basics of sustainable development, sustainable engineering and its role in engineering
CO2	Application of Sustainable Engineering Concepts and Principles in Engineering
CO3	Apply the Principle, and methodology of Life Cycle Assessment Tool to engineering systems
CO4	Understand integration methods of sustainability to Engineering Design
CO5	

**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination(SEE):**

Theory SEE will be conducted by University 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



Course Title:	Introduction to Cyber Security		
Course Code:	BETCK1051/2051	CIE Marks	50
Course Type (Theory/Practical /Integrated )	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3-0-0-0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03
<b>Course objectives</b> <ul style="list-style-type: none"> <li>To familiarize cybercrime terminologies and perspectives</li> <li>To understand Cyber Offenses and Botnets</li> <li>To gain knowledge on tools and methods used in cybercrimes</li> <li>To understand phishing and computer forensics</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective <ol style="list-style-type: none"> <li>Chalk and Board</li> <li>Demonstration</li> <li>Interactive learning</li> <li>Videos and online material</li> </ol>			
<b>Module-1 (8 hours of pedagogy)</b>			
<b>Introduction to Cybercrime:</b>  <b>Cybercrime:</b> 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)			
<b>Module-2 (8 hours of pedagogy)</b>			
<b>Cyber Offenses:</b>  <b>How Criminals Plan Them:</b> Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercaafe & cybercrimes.  <b>Botnets:</b> The fuel for cybercrime, Attack Vector.  Textbook:1 Chapter 2 (2.1 to 2.7)			
<b>Module-3 (8 hours of pedagogy)</b>			



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

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

**Module-4 ( 8 ours of pedagogy)**

**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)

**Module-5 (8 hours of pedagogy)**

**Understnading Computer Forensics:** Introdction, Historical Background of Cyberforensics, Digital Foresics Science, Need for Computer Foresics, 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)

**Course outcome (Course Skill Set)**

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

C01	Explain the cybercrime terminologies
C02	Describe Cyber offenses and Botnets
C03	Illustrate Tools and Methods used on Cybercrime
C04	Explain Phishing and Identity Theft
C05	Justify the need of computer forensics

**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination(SEE):**

Theory SEE will be conducted by University 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 Resources:****Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**

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

**Reference:**

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.

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

- 1. <https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs31/>

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

- Demonstrate a sensor based application
- 

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

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

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

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Course Title:	Introduction to Internet of Things (IOT)		
Course Codes:	BETCK105H/205H	CIE Marks	50
Course Type (Theory/Practical /Integrated )	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3-0-0-0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03
<b>Course objectives</b> <ul style="list-style-type: none"> <li>Understand about the fundamentals of Internet of Things and its building blocks along with their characteristics.</li> <li>Understand the recent application domains of IoT in everyday life.</li> <li>Gain insights about the current trends of Associated IOT technologies and IOT Analytics.</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes. <ol style="list-style-type: none"> <li>Lecturer method (L) need not to be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.</li> <li>Use of Video/Animation to explain functioning of various concepts.</li> <li>Encourage collaborative (Group Learning) Learning in the class.</li> <li>Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.</li> <li>Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.</li> <li>Introduce Topics in manifold representations.</li> <li>Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them.</li> <li>Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding</li> <li>Use any of these methods: Chalk and board, Active Learning, Case Studies</li> </ol>			
<b>Module-1 (8 hours of pedagogy)</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  Textbook 1: Chapter 1- 1.1 to 1.3 Chapter 4 – 4.1 to 4.4			
<b>Module-2 (8 hours of pedagogy)</b>			
<b>IoT Sensing and Actuation:</b> Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics.  Textbook 1: Chapter 5 – 5.1 to 5.9			
<b>Module-3 (8 hours of pedagogy)</b>			

IoT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading.

Textbook 1: Chapter 6 – 6.1 to 6.5

#### Module-4 ( 8 ours of pedagogy)

##### ASSOCIATED IOT TECHNOLOGIES

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

##### IOT CASE STUDIES

Agricultural IoT – Introduction and Case Studies

Textbook 1: Chapter 10– 10.1 to 10.6; Chapter 12- 12.1-12.2

#### Module-5 (8 hours of pedagogy)

##### IOT CASE STUDIES AND FUTURE TRENDS

Vehicular IoT – Introduction

Healthcare IoT – Introduction, Case Studies

IoT Analytics – Introduction

Textbook 1: Chapter 13– 13.1; Chapter 14- 14.1-14.2; Chapter 17- 17.1

#### Course outcome (Course Skill Set)

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

C01	Describe the evolution of IoT, IoT networking components, and addressing strategies in IoT.
C02	Classify various sensing devices and actuator types.
C03	Demonstrate the processing in IoT.
C04	Explain Associated IOT Technologies
C05	Illustrate architecture of IOT Applications

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

- <https://www.youtube.com/watch?v=kQ6CY1qpGjY>
- <https://nptel.ac.in/courses/102101054>
- [https://onlinecourses.nptel.ac.in/noc20\\_ph13/preview](https://onlinecourses.nptel.ac.in/noc20_ph13/preview)
- [https://onlinecourses.nptel.ac.in/noc22\\_ph01/preview](https://onlinecourses.nptel.ac.in/noc22_ph01/preview)

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

- AV presentation by students (on specific topics).
- Discussion of case studies based on research findings.
- Model making and Poster presentations

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

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	2			2		2					
CO2	2	2			2		2					
CO3	3	2			2		2					
CO4	3	2			2		2					

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

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Course Title:	<b>EMERGING APPLICATIONS OF BIOSENSORS</b>		
Course Code:	BETCK105G/205G	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Total Marks	100
Total Hours of Pedagogy	40 hours	Exam Hours	3 hrs of Theory
		Credits	03
<b>Course objectives</b> <ol style="list-style-type: none"> <li>1. To learn the Fundamentals of biosensors.</li> <li>2. To acquaint the student with design and construction of biosensors.</li> <li>3. To expose the students to recent advances in application of biosensors in health, environment, agriculture and food industry.</li> </ol>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective <ol style="list-style-type: none"> <li>1. Include traditional teaching learning process such as Chalk and Talk using writing boards.</li> <li>2. Construct graphical and pictorial representation of the subject in the form of Chart, hand-outs or PowerPoint presentations.</li> <li>3. Collaborate with students how tools are applied to solve biological problems.</li> <li>4. Integrate real time case studies in various scientific tools used.</li> <li>5. Reflective approaches on analysing how and why the tools are used in self-reflected or published data.</li> <li>6. Incorporate Inquiry based approach using demonstration, field study, experiments and project work</li> </ol>			
<b>Module-1 (8)</b>			
<b>INTRODUCTION TO BIOSENSORS</b>			
Introduction to biosensor, General components of biosensor, Biomolecules in biosensors such as enzyme, DNA, antigen antibody, protein, Classification of biosensors based on principle: amperometric, potentiometric biosensors, optical, acoustic, piezoelectric, and calorimetric biosensors, scope of biosensors and its limitations.			
<b>Module-2 (8)</b>			
<b>BASIC DESIGN AND TRANSDUCER</b>			
Design Considerations: calibration, dynamic Range, signal to noise, sensitivity, selectivity, Interference recognition. Transduction membrane protein sensors: ion channels, Types of Transducer, Optical;Fiber Optic, ECL, Surface Plasmon Resonance, Electro chemical; FET, Impedance, Piezoelectric;Cantileaver,			
<b>Module-3(8)</b>			
<b>APPLICATIONS OF BIOSENSORS IN HEALTH AND ENVIRONMENT</b>			
Biosensors and diabetes management, Microfabricated biosensors and point-of-care diagnosticssystems, Noninvasive biosensors in clinical analysis; Surface plasmon resonance and evanescent wave biosensors, Biosensor in cancer and HIV early diagnosis.			
<b>Module-4(8)</b>			
<b>APPLICATIONS OF BIOSENSORS IN FOOD AND AGRICULTURE INDUSTRY</b>			
Detection of product content, allergic components, pathogens, pesticide residues. Monitoring of raw material conversions. Detection of crop diseases, pathogens in plants, Detection of soil nutrients, pesticide and its residual detection.			
<b>Module-5 (8)</b>			
<b>APPLICATIONS OF NANOMATERIALS IN BIOSENSORS</b>			
Nano Materials in biosensors; Carbon based Nano Material, Metal oxide and nano particle, Quantumdots, Role of nano material in Signal Amplifications, Detection and Transducer Fabrication			

**Course outcome (Course Skill Set)**

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

CO1	Classify types of biosensors based on principle
CO2	Able to differentiate different types of transducers based on their physicochemical characteristics
CO3	Apply bio sensing techniques in health, environment, agriculture and food industry.
CO4	Use biomaterial and nanomaterials in biosensors for signal amplification, Detection and Transducer Fabrication

**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks  
**Semester End Examination(SEE):**

Theory SEE will be conducted by University 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/Kannada). 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.
- 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 Resources:****Books****Text Books:**

1. Jeong-Yeol Yoon, Introduction to Biosensors, Springer-Verlag New York Ed. 2016
2. Mohammed Zurob, Recognition Receptors in Biosens; Publisher: Springer-Verlag New York Ed. 2010

**Reference Books:**

1. Zvi Liron, Novel Approaches in Biosensors and Rapid Diagnostic Assays; Publisher: Springer US Ed. 2001
2. Pierre R. C. and Loic J.B, Biosensor Principles and Applications, CRC Press, 2019



**Reference Books:**

1. White, F. R., Franke P. R., & Hindle M., Integrated solid waste management: a life cycle inventory. McDougall, P. John Wiley & Sons. 2001
2. Nicholas, P., & Cheremisinoff, P. D., Handbook of solid waste management and waste minimization technologies, Imprint of Elsevier Science. 2005

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

- <https://nptel.ac.in/courses/105103205>
- <https://www.youtube.com/watch?v=k0ktJRoRcOA>
- <https://nptel.ac.in/courses/103/107/103107125/>
- [https://onlinecourses.nptel.ac.in/noc22\\_ce76/preview](https://onlinecourses.nptel.ac.in/noc22_ce76/preview)
- [https://onlinecourses.swayam2.ac.in/cec20\\_ge13/preview](https://onlinecourses.swayam2.ac.in/cec20_ge13/preview)

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

- AV presentation by students (on specific topics).
- Discussion of case studies based on research findings.
- Model making and Poster presentations

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

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3					3	3					
CO2	3					3	3					
CO3	3					3	3					
CO4	3					3	3					

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

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Course Title:	<b>Waste Management</b>		
Course Code:	BETCK105F/205F	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Total Marks	100
Total Hours of Pedagogy	40 hours	Exam Hours	3 hrs of Theory
		Credits	03
<b>Course objectives</b> <ul style="list-style-type: none"> <li>To learn broader understandings on various aspects of solid waste management practiced in industries.</li> <li>To learn recovery of products from solid waste to compost and biogas, incineration and energy recovery, hazardous waste management and treatment, and integrated waste management.</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching – Learning more effective <ol style="list-style-type: none"> <li>1. Include traditional teaching learning process such as Chalk and Talk using writing boards.</li> <li>2. Construct graphical and pictorial representation of the subject in the form of Chart, hand-outs or PowerPoint presentations.</li> <li>3. Collaborate with students how tools are applied to solve biological problems.</li> <li>4. Integrate real time case studies in various scientific tools used.</li> <li>5. Reflective approaches on analysing how and why the tools are used in self-reflected or published data.</li> <li>6. Incorporate Inquiry based approach using demonstration, field study, experiments and project work</li> </ol>			
<b>Module-1 (08)</b>			
<b>INTRODUCTION TO SOLID WASTE MANAGEMENT:</b> Classification of solid wastes (source and type based), solid waste management (SWM), elements of SWM, ESSWM (environmentally sound solid waste management) and EST (environmentally sound technologies), factors affecting SWM, Indian scenario, progress in MSW (municipal solid waste) management in India. Indian and global scenario of e-waste,			
<b>Module-2 (08)</b>			
<b>WASTE GENERATION ASPECTS:</b> Waste stream assessment (WSA), waste generation and composition, waste characteristics (physical and chemical), health and environmental effects (public health and environmental), comparative assessment of waste generation and composition of developing and developed nations, a case study results from an Indian city, handouts on solid waste compositions. E-waste generation.			
<b>Module-3 (08)</b>			
<b>COLLECTION, STORAGE, TRANSPORT AND DISPOSAL OF WASTES:</b> Waste Collection, Storage and Transport: Collection components, storage-containers/collection vehicles, collection operation, transfer station, waste collection system design, record keeping, control, inventory and monitoring, implementing collection and transfer system, a case study. Waste Disposal: key issues in waste disposal, disposal options and selection criteria, sanitary landfill, landfill gas emission, leachate formation, environmental effects of landfill, landfill operation issues, a case study.			
<b>Module-4 (08)</b>			
<b>WASTE PROCESSING TECHNIQUES &amp; SOURCE REDUCTION, PRODUCT RECOVERY &amp; RECYCLING:</b> Purpose of processing, mechanical volume and size reduction, component separation, drying and dewatering. Source Reduction, Product Recovery and Recycling: basics, purpose, implementation monitoring and evaluation of source reduction, significance of recycling, planning of a recycling programme, recycling programme elements, commonly recycled materials and processes, a case study.			
<b>Module-5 (08)</b>			
<b>HAZARDOUS WASTE MANAGEMENT AND TREATMENT:</b> Identification and classification of hazardous waste, hazardous waste treatment, pollution prevention and waste minimization, hazardous wastes management in India. E-waste recycling.			

**Course outcome (Course Skill Set)**

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

CO1	Apply the basics of solid waste management towards sustainable development
CO2	Apply technologies to process waste and dispose the same.
CO3	Design working models to convert waste to energy
CO4	Identify and classify hazardous waste and manage the hazard

**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination(SEE):**

Theory SEE will be conducted by University 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.
- 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 Resources:****Books****Text Books:**

1. Tchobanoglous, G., Theisen, H., and Samuel A Vigil, Integrated Solid Waste Management, McGraw-Hill Publishers, 1993.
2. Bilitewski B., Hard He G., Marek K, Weissbach A., and Boeddicker H., Waste Management, Springer, 1994.



**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 20 Marks;

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- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination (SEE):**

Theory SEE will be conducted by University 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.

**Semester End Examination(SEE):**

Theory SEE will be conducted by University 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/Kannada). The duration of SEE is 03 hours.

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

1. Nonconventional Energy sources, G D Rai, Khanna Publication, Fourth Edition,
2. Energy Technology, S.Rao and Dr. B.B. Parulekar, Khanna Publication.Solarenergy, SubhasPSukhatme, TataMcGrawHill, 2<sup>nd</sup>Edition,1996.



**Reference Books:**

1. Principles of Energy conversion, A. W. Culp Jr., McGraw Hill, 1996
2. Non-Convention EnergyResources, Shobh Nath Singh, Pearson, 2018

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

- E-book URL: <https://www.pdfdrive.com/non-conventional-energy-sources-e10086374.html>
- E-book URL: <https://www.pdfdrive.com/non-conventional-energy-systems-nptel-d17376903.html>
- E-book URL: <https://www.pdfdrive.com/renewable-energy-sources-and-their-applications-e33423592.html>
- E-book URL: <https://www.pdfdrive.com/lecture-notes-on-renewable-energy-sources-e34339149.html>
- [https://onlinecourses.nptel.ac.in/noc18\\_ge09/preview](https://onlinecourses.nptel.ac.in/noc18_ge09/preview)

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

- Poster presentation on the theme of renewable energy sources
- Industry Visit

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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

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

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RENEWABLE ENERGY SOURCES			
Course Code:	BETCK105E/205E	CIE Marks	50
Course Type (Theory/Practical/Integrated )	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Total Marks	100
Total Hours of Pedagogy	40 hours	Exam Hours	03
		Credits	03
<b>Course objectives</b> <ul style="list-style-type: none"> <li>To understand energy scenario, energy sources and their utilization.</li> <li>To explore society's present needs and future energy demands.</li> <li>To Study the principles of renewable energy conversion systems.</li> <li>To exposed to energy conservation methods.</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching – Learning more effective <ol style="list-style-type: none"> <li>Use pie chart showing distribution of renewable energy sources</li> <li>Use wind turbine models</li> <li>Use sun path diagrams</li> </ol>			
<b>Module-1 (08 hours)</b>			
<b>Introduction:</b> Principles of renewable energy; energy and sustainable development, fundamentals and social implications. worldwide renewable energy availability, renewable energy availability in India, brief descriptions on solar energy, wind energy, tidal energy, wave energy, ocean thermal energy, biomass energy, geothermal energy, oil shale. Introduction to Internet of energy (IOE).			
<b>Module-2 (08 hours)</b>			
<b>Solar Energy:</b> Fundamentals; Solar Radiation; Estimation of solar radiation on horizontal and inclined surfaces; Solar radiation Measurements- Pyrheliometers, Pyrometer, Sunshine Recorder. Solar Thermal systems: Flat plate collector; Solar distillation; Solar pond electric power plant. <b>Solar electric power generation-</b> Principle of Solar cell, Photovoltaic system for electric power generation, advantages, Disadvantages and applications of solar photovoltaic system.			
<b>Module-3 (08 hours)</b>			
<b>Wind Energy:</b> Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, Basic components of wind energy conversion system (WECS); Classification of WECS- Horizontal axis- single, double and muliblade system. Vertical axis- Savonius and darrieus types. <b>Biomass Energy:</b> Introduction; Photosynthesis Process; Biofuels; Biomass Resources; Biomass conversion technologies-fixed dome; Urban waste to energy conversion; Biomass gasification (Downdraft) .			
<b>Module-4 (08 hours)</b>			
<b>Tidal Power:</b> Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, advantages and limitations. <b>Ocean Thermal Energy Conversion:</b> Principle of working, OTEC power stations in the world, problems associated with OTEC.			
<b>Module-5 (08 hours)</b>			
<b>Green Energy:</b> Introduction, Fuel cells: Classification of fuel cells – H <sub>2</sub> ; Operating principles, Zeroenergy Concepts. Benefits of hydrogen energy, hydrogen production technologies (electrolysis method only). hydrogen energy storage, applications of hydrogen energy, problem associated with hydrogen energy.			

**Course outcome (Course Skill Set)**

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

C01	Describe the environmental aspects of renewable energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
C02	Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation.
C03	Understand the conversion principles of wind and tidal energy
C04	Understand the concept of biomass energy resources and green energy.
C05	Acquire the basic knowledge of ocean thermal energy conversion and hydrogen energy.



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

1. Introduction to Sustainability for Engineers, Toolseeram Ramjeawon, CRC Press, 1<sup>st</sup>Edn., 2020
2. Sustainability Engineering: Concepts, Design and Case studies, Prentice Hall, 1<sup>st</sup>Edn, 2015
3. System Analysis for sustainable Engineering: Theory and applications, Ni bin Chang, McGraw Hill Publications, 1<sup>st</sup>Edn., 2010
4. Engineering for Sustainable development: Delivery a sustainable development goals, UNESCO, International Centre for Engineering Education, France, 1<sup>st</sup>Edn., 2021
5. Introduction to Sustainable Engineering, Rag. R.L. and Ramesh Lakshmi Dinachandran, PHI Learning Pvt. Ltd., 2<sup>nd</sup>Edn, 2016

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

- VTU/EDUSAT/SWAYAM/NPTEL/MOOC.
- <https://nptel.ac.in/courses/127105018>
- <https://nptel.ac.in/courses/107103081/www.macfound.org>
- <https://unesdoc.unesco.org/>
- <https://unesdoc.unesco.org/ark:/48223/pf0000375644.locale=en>
- <https://engineeringforoneplanet.org/>

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

- Group Discussion of case studies.
- Solutions to real time case studies
- Seminar/Poster Presentation

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

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
C01												
C02												
C03												
C04												
C05												

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

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### Assessment Details (both CIE and SEE)

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

#### Continuous Internal Evaluation (CIE):

- Two Tests (preferably in MCQ pattern ) each of **30 Marks**; The first test after the completion of the 40 -50% syllabus of the course. A second test after the completion of 90-100% of the syllabus of the course.
- Two Assignments/two quizzes/two seminars/one field survey and report presentation/one-course project totaling **40 marks**

Total Marks scored (test + assignments) out of 100 shall be scaled down to **50 marks**

At the beginning of the semester, the instructor/faculty teaching the course has to announce the methods of CIE for the course.

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.

#### Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for subject

SEE paper will be set for 50 questions of each of 01 marks. The pattern of the question paper is MCQ. The time allotted for SEE is **01 hour**

#### Suggested Learning Resources:

##### Text Books :

1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design",Cengage learning (International edition) Second Edition, 2013.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.
3. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand - Improve - Apply", Springer, 2011
4. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013.

#### References:



5. Yousef Haik and Tamer M. Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011.
6. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover - 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

**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)
7. <https://support.microsoft.com/en-us/kb/273814>
8. <https://support.google.com/docs/answer/179740?hl=en>
9. <https://www.youtube.com/watch?v=2mjSDIBaUIM>
10. [thevirtualinstructor.com/foreshortening.html](http://thevirtualinstructor.com/foreshortening.html)
11. <https://dschool.stanford.edu/.../designresources/.../ModeGuideBOOTCAMP2010L.pdf>
12. <https://dschool.stanford.edu/use-our-methods/>
13. <https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process>
14. <http://www.creativityatwork.com/design-thinking-strategy-for-innovation/>
15. <http://www.nngroup.com/articles/design-thinking/>
16. <https://designthinkingforeducators.com/design-thinking/>
17. [www.designthinkingformobility.org/wp-content/.../10/NapkinPitch\\_Worksheet.pdf](http://www.designthinkingformobility.org/wp-content/.../10/NapkinPitch_Worksheet.pdf)

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

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

[https://onlinecourses.nptel.ac.in/noc19\\_mg60/preview](https://onlinecourses.nptel.ac.in/noc19_mg60/preview)

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## I Semester

INNOVATION and DESIGN THINKING			
Course Code	BIDTK158/258	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

**Course Category:** Foundation

**Preamble:** This course provides an introduction to the basic concepts and techniques of engineering and reverses engineering, the process of design, analytical thinking and ideas, basics and development of engineering drawing, application of engineering drawing with computer aide.

**Course objectives:**

- To explain the concept of design thinking for product and service development
- To explain the fundamental concept of innovation and design thinking
- To discuss the methods of implementing design thinking in the real world.

**Teaching-Learning Process (General Instructions)**

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

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain concepts
3. Encourage collaborative (Group Learning) Learning in the class
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develops thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

**Module-1****PROCESS OF DESIGN****Understanding Design thinking**

Shared model in team-based design - Theory and practice in Design thinking - Explore presentation signers across globe - MVP or Prototyping

<b>Teaching-Learning Process</b>	Introduction about the design thinking: Chalk and Talk method
	Theory and practice through presentation
	MVP and Prototyping through live examples and videos

**Module-2****Tools for Design Thinking**

Real-Time design interaction capture and analysis - Enabling efficient collaboration in digital space  
- Empathy for design - Collaboration in distributed Design

<b>Teaching-Learning</b>	Case studies on design thinking for real-time interaction and analysis
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Process	Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking	
Module-3		
Design Thinking in IT Design Thinking to Business Process modelling – Agile in Virtual collaboration environment – Scenario based Prototyping		
Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping	
Module-4		
DT For strategic innovations Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.		
Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students	
Module-5		
Design thinking workshop Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test		
Teaching-Learning Process	8 hours design thinking workshop from the expert and then presentation by the students on the learning from the workshop	
Course Outcomes: Upon the successful completion of the course, students will be able to:		
CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Appreciate various design process procedure	K2
CO2	Generate and develop design ideas through different technique	K2
CO3	Identify the significance of reverse Engineering to Understand products	K2
CO4	Draw technical drawing for design ideas	K3



**Scientific Foundations of Health**

Course Title:	<b>Scientific Foundations of Health</b>		
Course Code:	<b>BSFHK158/258</b>	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

**Course objectives**

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

1. To know about Health and wellness (and its Beliefs) & It's balance for positive mindset.
2. To Build the healthy lifestyles for good health for their better future.
3. To Create a Healthy and caring relationships to meet the requirements of good/social/positive life.
4. To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future
5. To Prevent and fight against harmful diseases for good health through positive mindset

**Teaching-Learning Process**

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

Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools.

- (i) Direct instructional method ( Low/Old Technology), (ii) Flipped classrooms (High/advanced Technological tools), (iii) Blended learning (Combination of both), (iv) Enquiry and evaluation based learning, (v) Personalized learning, (vi) Problems based learning through discussion, (vii) Following the method of expeditionary learning Tools and techniques, (viii) Use of audio visual methods.

Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills.

**Module-1****(03 hours of pedagogy)**

**Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.

**Module-2****(03 hours of pedagogy)**

**Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components for health, Wellness and physical function, How to avoid exercise injuries

**Module-3****(03 hours of pedagogy)**

**Creation of Healthy and caring relationships :** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.

**Module-4****(03 hours of pedagogy)**

**Avoiding risks and harmful habits :** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictive people and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.

**Module-5****(03 hours of pedagogy)**

**Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health. Reducing risks & coping with chronic conditions. Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.



**Course outcome (Course Skill Set) :**

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

CO1	To understand and analyse about Health and wellness (and its Beliefs) & Its balance for positive mindset.
CO2	Develop the healthy lifestyles for good health for their better future.
CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
CO5	Prevent and fight against harmful diseases for good health through positive mindset.

**Assessment Details (both CIE and SEE) :**

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

**Continuous Internal Evaluation(CIE) :****Two Unit Tests each of 30 Marks (duration 01 hour)**

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

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

**Two assignments each of 20 Marks**

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

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

**Semester End Examinations (SEE)**

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

**Suggested Learning Resources:****Textbook:**

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

**Reference Books:**

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

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

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

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35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### Continuous Internal Evaluation(CIE):

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

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

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

##### Two assignments each of 20 Marks

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

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

##### Semester End Examinations (SEE)

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

#### University Prescribed Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

#### ಸೂಚನೆ :

1. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.
2. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈವಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

#### 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

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Theory - 01 Credit Course

**ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)****ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)**

Course Title:	ಬಳಕೆ ಕನ್ನಡ		
Course Code:	BKBKK107-207	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

**Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:**

The course (22K BK17/27) will enable the students,

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 conversation.
5. To know about Karnataka state and its language, literature and General information about this state.

**ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) :**

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

1. ಬಳಕೆ ಕನ್ನಡವನ್ನು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಬೋಧಿಸಲು ವಿಟಿಯು ಸೂಚಿಸಿರುವ ಪಠ್ಯಪುಸ್ತಕವನ್ನು ಉಪಯೋಗಿಸಬೇಕು.
2. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಉತ್ತೇಜಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.
3. ಪ್ರತಿ ವಿದ್ಯಾರ್ಥಿ ಪುಸ್ತಕವನ್ನು ತರಗತಿಯಲ್ಲಿ ಬಳಸುವಂತೆ ನೋಡಿಕೊಳ್ಳುವುದು ಮತ್ತು ಪ್ರತಿ ಪಾಠ ಮತ್ತು ಪ್ರವಚನಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಪೂರಕ ಚಟುವಟಿಕೆಗಳಿಗೆ ತೊಡಗಿಸತಕ್ಕದ್ದು.
4. ಡಿಜಿಟಲ್ ತಂತ್ರಜ್ಞಾನದ ಮುಖಾಂತರ ಇತ್ತೀಚೆಗೆ ಡಿಜಿಟಲೀಕರಣ ಗೊಂಡಿರುವ ಭಾಷೆ ಕಲಿಕೆಯ ವಿಧಾನಗಳನ್ನು ಪಿಪಿಟಿ ಮತ್ತು ದೃಶ್ಯ ಮಾಧ್ಯಮದ ಮುಖಾಂತರ ಚರ್ಚಿಸಲು ಕ್ರಮಕೈಗೊಳ್ಳುವುದು. ಇದರಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ತರಗತಿಯಲ್ಲಿ ಹೆಚ್ಚು ಏಕಾಗ್ರತೆಯಿಂದ ಪಾಠ ಕೇಳಲು ಮತ್ತು ಅಧ್ಯಯನದಲ್ಲಿ ತೊಡಗಲು ಅನುಕೂಲವಾಗುತ್ತದೆ.
5. ಭಾಷಾಕಲಿಕೆಯ ಪ್ರಯೋಗಾಲಯದ ಮುಖಾಂತರ ಬಹುಬೇಗ ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಕಲಿಯಲು ಅನುಕೂಲವಾಗುವಂತೆ ಕಾರ್ಯಚಟುವಟಿಕೆಗಳನ್ನು ಮತ್ತು ಕ್ರಿಯಾ ಯೋಜನೆಗಳನ್ನು ರೂಪಿಸುವುದು.

**Module - 1**

(03 hours of pedagogy)

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 conversation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words



Module - 2		(03 hours of pedagogy)
1	ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - Possessive forms of nouns, dubitive question and Relative nouns	
2	ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ, ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative, Quantitative and Colour Adjectives, Numerals	
3	ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು -ಸಕ್ರಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ - (ಆ, ಆದ, ಆವು, ಅಲ್ಲಿ) -Predictive Forms, Locative Case	
Module - 3		(03 hours of pedagogy)
1.	ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - Dative Cases, and Numerals	
2.	ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು -Ordinal numerals and Plural markers	
3.	ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು -Defective/Negative Verbs & Colour Adjectives	
Module- 4		(03 hours of pedagogy)
1.	ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು Permission, Commands, encouraging and Urging words (Imperative words and sentences)	
2.	ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು Accusative Cases and Potential Forms used in General Communication	
3.	"ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು - Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs	
4.	ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ- Comparative, Relationship, Identification and Negation Words	
Module - 5		(03 hours of pedagogy)
1.	ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs	
2.	ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms	
3.	Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation	

### Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

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

C01	To understand the necessity of learning of local language for comfortable life.
C02	To speak, read and write Kannada language as per requirement.
C03	To communicate (converse) in Kannada language in their daily life with kannada speakers.
C04	To Listen and understand the Kannada language properly.
C05	To speak in polite conversation.

### 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

## Theory - 01 Credit Course

**ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ**

Course Title:	ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ		
Course Code:		CIE Marks	50
Course Type (Theory/Practical /Integrated)	BKSJK107-207	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01
<b>Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:</b> The course (22KSK17/27) will enable the students, <ol style="list-style-type: none"> <li>1. ವೃತ್ತಿಪರ ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.</li> <li>2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಪರಿಚಯಿಸುವುದು.</li> <li>3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು.</li> <li>4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.</li> <li>5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.</li> </ol>			
<b>ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) :</b> These are sample Strategies, which teacher can use to accelerate the attainment of the course outcomes. <ol style="list-style-type: none"> <li>1. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡವನ್ನು ಬೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧಾರಿಸಿ ಬ್ಯಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.</li> <li>2. ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು - ಅಂದರೆ ಕವಿ-ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪ್ಪಣಿ, ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.</li> <li>3. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಬೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.</li> </ol>			
<b>ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (03 hours of pedagogy)</b>			
<ol style="list-style-type: none"> <li>1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ</li> <li>2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ</li> <li>3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ</li> </ol>			
<b>ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ (03 hours of pedagogy)</b>			
<ol style="list-style-type: none"> <li>1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ಯಕ್ಕಿ ಮಾರಯ್ಯ, ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ಯಕ್ಕಿ, ಅಕ್ಕಮ್.</li> <li>2. ಕೀರ್ತನೆಗಳು : ಅದರಿದೇನು ಫಲ ಇದರಿದೇನು ಫಲ - ಪುರಂದರದಾಸರು ತಲ್ಲಣಿಸಿದರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು</li> <li>3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ</li> </ol>			
<b>ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ (03 hours of pedagogy)</b>			
<ol style="list-style-type: none"> <li>1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗದಿಂದ ಅಯ್ಯ ಕೆಲವು ಭಾಗಗಳು</li> <li>2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ</li> <li>3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು</li> </ol>			
<b>ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ (03 hours of pedagogy)</b>			
<ol style="list-style-type: none"> <li>1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ - ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್</li> <li>2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ</li> </ol>			
<b>ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (03 hours of pedagogy)</b>			
<ol style="list-style-type: none"> <li>1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ</li> <li>2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಜಿ. ಬೋರಲಿಂಗಯ್ಯ</li> </ol>			



**Course outcome (Course Skill Set)**

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

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

C01	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
C02	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ.
C03	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
C04	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕ ಹೆಚ್ಚಾಗುತ್ತದೆ.
C05	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

**Assessment Details (both CIE and SEE)**

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

**Continuous Internal Evaluation(CIE):****Two Unit Tests each of 30 Marks (duration 01 hour)**

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

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

**Two assignments each of 20 Marks**

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

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

**Semester End Examinations (SEE)**

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

**University Prescribed Textbook :**

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ

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

ಪ್ರಕಟಣೆ : ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

ಸೂಚನೆ :

1. ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಣೆಗಳಿಗೆ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ (9900832331) ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.
2. ಮಾದರಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ, ಕೋರ್ಸ್ ಆಯ್ಕೆ ಮಾಹಿತಿ, ಅಧ್ಯಯನ ಸಾಮಗ್ರಿ & ಬಹು ಆಯ್ಕೆ ಮಾದರಿಯ ಪ್ರಶ್ನೆಗಳ ಕೈಪಿಡಿಗಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್ ಸೈಟ್ ನೋಡುವುದು.

**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.

*(Signature)*  
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**Indian Constitution**

Course Title:	<b>Indian Constitution</b>		
Course Code:		CIE Marks	50
Course Type (Theory/Practical /Integrated)	<b>BICOK107-207</b>	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

**Course objectives :**

The course **INDIAN CONSTITUTION (22IC017 / 27)** will enable the students,

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.

**Teaching-Learning Process**

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

- (i) Direct instructional method ( Low/Old Technology),
  - (ii) Flipped classrooms (High/advanced Technological tools),
  - (iii) Blended learning (Combination of both),
  - (iv) Enquiry and evaluation based learning,
  - (v) Personalized learning,
  - (vi) Problems based learning through discussion.
- (iii) 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.

**Module-1****(03 hours of pedagogy)**

Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly.

**Module-2****(03 hours of pedagogy)**

Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.

**Module-3****(03 hours of pedagogy)**

Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive : Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet.

**Module-4****(03 hours of pedagogy)**

Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India, Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism.

**Module-5****(03 hours of pedagogy)**

State Executive and Governor, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.

**Course outcome (Course Skill Set)**

At the end of the course 22IC017/27 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.



**Assessment Details (both CIE and SEE)**

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

**Continuous Internal Evaluation(CIE):****Two Unit Tests each of 30 Marks (duration 01 hour)**

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

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

**Two assignments each of 20 Marks**

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

**Suggested Learning Resources:****Textbook:**

1. "Constitution of India" (for Competitive Exams) - Published by Naidhriva 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:**

1. "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.
2. "The Constitution of India" by Merunandan K B: published by Merugu Publication, Second Edition, Bengaluru.
3. "Samvidhana Odu" - for Students & Youths by Justice HN Nagamohan Dhas, Sahayana, kerekon.
4. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "Engineering Ethics", Prentice -Hall, 2004.

**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

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# Communicative English

Course Title:	Communicative English		
Course Code:	BENGK106-206	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01
<b>Course objectives:</b> The course Communicative English (22ENG16) will enable the students, 1. To know about Fundamentals of Communicative English and Communication Skills in general. 2. To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better Communication skills. 3. To impart basic English grammar and essentials of important language skills. 4. To enhance with English vocabulary and language proficiency for better communication skills. 5. To learn about Techniques of Information Transfer through presentation.			
<b>Teaching-Learning Process :</b> 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 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.			
<b>Language Lab :</b> To augment LSRW, grammar and Vocabulary skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred as per the AICTE / VTU guidelines.			
<b>Module-1</b>		<b>(03 hours of pedagogy)</b>	
<b>Introduction to Communicative English :</b> Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.			
<b>Module-2</b>		<b>(03 hours of pedagogy)</b>	
<b>Introduction to Phonetics :</b> Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation.			
<b>Module-3</b>		<b>(03 hours of pedagogy)</b>	
<b>Basic English Communicative Grammar and Vocabulary PART - I :</b> Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.			
<b>Module-4</b>		<b>(03 hours of pedagogy)</b>	
<b>Basic English Communicative Grammar and Vocabulary PART - II:</b> Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.			
<b>Module-5</b>		<b>(03 hours of pedagogy)</b>	
<b>Communication Skills for Employment :</b> Information Transfer: Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises.			



**Course outcome (Course Skill Set)**

At the end of the course Communicative English (22ENG16) the student will be able to:

CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3	To impart basic English grammar and essentials of language skills as per present requirement.
CO4	Understand and use all types of English vocabulary and language proficiency.
CO5	Adopt the Techniques of Information Transfer through presentation.

**Assessment Details (both CIE and SEE)**

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

**Continuous Internal Evaluation(CIE):****Two Unit Tests each of 30 Marks (duration 01 hour)**

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

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

**Two assignments each of 20 Marks**

The teacher has to plan the assignments and get them completed by the students well before the closing of 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.

**Suggested Learning Resources:****Textbook:**

- 1) Communication Skills by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019.
- 2) A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

**Reference Books:**

1. Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
2. English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
3. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.
4. A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press – 2020.
5. Practical English Usage by Michael Swan, Oxford University Press – 2016.

**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

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## Professional Writing Skills in English

Course Title:	Professional Writing Skills in English		
Course Code:	BPWSK206-106	CIE Marks	50
Course Type (Theory/Practical /Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	Exam Hours	01 Theory
Total Hours of Pedagogy	15 hours	Credits	01

### Course objectives:

The course Professional Writing Skills in English (22PWS26) will enable the students,

1. To Identify the Common Errors in Writing and Speaking of English.
2. To Achieve better Technical writing and Presentation skills for employment.
3. To read Technical proposals properly and make them to write good technical reports.
4. To Acquire Employment and Workplace communication skills.
5. To learn about Techniques of Information Transfer through presentation in different level.

### 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.

**Language Lab :** To augment LSRW, grammar and Vocabulary skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred as per the AICTE / VTU guidelines.

### Module-1 (03 hours of pedagogy)

**Identifying Common Errors in Writing and Speaking English :** Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules), Common errors in Subject-verb agreement, Sequence of Tenses and errors identification in Tenses. Words Confused/Misused.

### Module-2 (03 hours of pedagogy)

**Nature and Style of sensible writing: Organizing** Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of Proper Punctuation, Precise writing and Techniques in Essay writing, Sentence arrangements and Corrections activities. Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words.

### Module-3 (03 hours of pedagogy)

**Technical Reading and Writing Practices:** Technical writing process, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. Grammar – Voices and Reported Speech, Spotting Error & Sentence Improvement, Cloze Test and Theme Detection Exercises.

### Module-4 (03 hours of pedagogy)

**Professional Communication for Employment:** Listening Comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for effective reading. Job Applications, Types of official/employment/business Letters, Resume vs. Bio Data, Profile, CV. Writing effective resume for employment, Emails, Blog Writing and Memos.

### Module-5 (03 hours of pedagogy)

**Professional Communication at Workplace:** Group Discussion and Professional Interviews, Characteristics and Strategies of a GD and PI's, 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.



**Course outcome (Course Skill Set)**

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

CO1	To understand and identify the Common Errors in Writing and Speaking
CO2	To Achieve better Technical writing and Presentation skills
CO3	To read Technical proposals properly and make them to Write good technical reports.
CO4	Acquire Employment and Workplace communication skills
CO5	To learn about Techniques of Information Transfer through presentation in different level.

**Assessment Details (both CIE and SEE)**

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

**Continuous Internal Evaluation(CIE):****Two Unit Tests each of 30 Marks (duration 01 hour)**

- First test after the completion of 30-40 % of the syllabus
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One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

**Two assignments each of 20 Marks**

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

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

**Semester End Examinations (SEE)**

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

**Suggested Learning Resources:****Textbook:**

- 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].

**Reference Books:**

- 1) English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
- 2) Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
- 3) Technical Communication – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
- 4) High School English Grammar & Composition by Wren and Martin, S Chandh & Company Ltd – 2015.
- 5) Effective Technical Communication – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private

**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

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<ul style="list-style-type: none"><li>• 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.</li><li>• 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 <b>marks scored out of 100 shall be proportionally reduced to 50 marks.</b></li><li>• There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), <b>should have a mix of topics</b> under that module.</li></ul>
<b>Suggested Learning Resources:</b> <b>Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)</b> 1. Shibu K V, "Introduction to Embedded Systems", Second Edition, McGraw Hill Education
<b>Web links and Video Lectures (e-Resources):</b> NPTL Lectures: <a href="https://nptel.ac.in/courses/108102045">https://nptel.ac.in/courses/108102045</a> Embedded Systems, IIT Delhi, Prof. Santanu Chaudhary
<b>Activity Based Learning (Suggested Activities in Class)/ Practical Based learning</b> <ul style="list-style-type: none"><li>• To design a simple Embedded System like simple remote</li><li>• To demonstrate simple microcontroller based experiments like LED interfacing, LCD interfacing, DAC etc</li></ul>

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<b>Course Title:</b>	<b>INTRODUCTION TO EMBEDDED SYSTEMS</b>		
<b>Course Code:</b>	<b>BETCK105J-205J</b>	<b>CIE Marks</b>	<b>50</b>
<b>Course Type (Theory/Practical /Integrated )</b>	<b>Theory</b>	<b>SEE Marks</b>	<b>50</b>
		<b>Total Marks</b>	<b>100</b>
<b>Teaching Hours/Week (L:T:P: S)</b>	<b>3:0:0:0</b>	<b>Exam Hours</b>	<b>03</b>
<b>Total Hours of Pedagogy</b>	<b>40 hours</b>	<b>Credits</b>	<b>03</b>
<b>Course objectives:</b> To teach students <ul style="list-style-type: none"> <li>• Introductory topics of Embedded System design</li> <li>• Characteristics &amp; attributes of Embedded System</li> <li>• Introduction of Embedded System Software and Hardware development</li> <li>• RTOS based Embedded system design</li> </ul>			
<b>Teaching-Learning Process</b> These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective <ol style="list-style-type: none"> <li>1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.</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 analyse 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 (8 Hours)</b>			
<b>Introduction:</b> Embedded Systems and general purpose computer systems, history, classifications, applications and purpose of embedded systems <b>Chapter 1 – Text 1</b> <b>Core of Embedded Systems :</b> Microprocessors and microcontrollers, RISC and CISC controllers, Big endian and Little endian processors, Application specific ICs, Programmable logic devices, COTS, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components <b>Chapter 2 – Text 1</b>			
<b>Module-2(8 Hours)</b>			
<b>Characteristics and quality attributes of embedded systems:</b> Characteristics, Operational and nonoperational quality attributes, application specific embedded system - washing machine, domain specific – automotive <b>Chapter 3 &amp; 4 – Text 1</b>			
<b>Module-3(8 Hours)</b>			
<b>Hardware Software Co design and Program Modelling :</b> Fundamental issues in Hardware Software Co-design, Computational models in Embedded System Design <b>Chapter 7 – Text 1: 7.1, 7.2</b> <b>Embedded Hardware Design and Development:</b> Analog Electronic Components, Digital Electronic Components, VLSI & Integrated Circuit Design, Electronic Design Automation Tools <b>Chapter 8 – Text 1: 8.1, 8.2, 8.3, 8.4</b>			
<b>Module-4(8 Hours)</b>			

**Embedded Firmware Design and Development:** Embedded Firmware Design Approaches, Embedded Firmware Development Languages **Chapter 9 - Text 1: 9.1, 9.2**  
**Embedded System Development Environments:** Types of files generated on cross compilation (only explanation - programming codes need not be dealt), disassemble/decompiler, Simulators, Emulators and Debugging **Chapter 13 - Text 1: 13.2, 13.3, 13.4**

**Module-5(8 Hours)**

**Real-time Operating System(RTOS) based Embedded System Design:**  
 Operating System basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling **Chapter 10 - Text 1: 10.1 to 10.5**

**Course outcome (Course Skill Set)**

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

CO1	Explain characteristics of Embedded System design
CO2	Acquire knowledge about basic concepts of circuit emulators, debugging and RTOS
CO3	Analyse embedded system software and hardware requirements
CO4	Develop programming skills in embedded systems for various applications.
CO5	Design basic embedded system for real time applications

**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 20 Marks;

- 1<sup>st</sup>, 2<sup>nd</sup>. and 3<sup>rd</sup> tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination (SEE):**

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



**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 20 Marks;

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- Assignments/Seminar/quiz/group discussion /field survey & report presentation/ course project/Skill development activities, suitably planned to attain the COs and POs for a total of 40 Marks.

If the nature of the courses requires assignments/Seminars/Quizzes/group discussion two evaluation components shall be conducted. If course project/field survey/skill development activities etc then the evaluation method shall be one.

Total CIE marks (out of 100 marks) shall be scaled down to 50 marks

**Semester End Examination (SEE):**

Theory SEE will be conducted by University 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 Resources:****Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**

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

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

- [https://www.youtube.com/watch?v=yC\\_hFm0BX28&list=PLxApjaSnQGi6Jm7LLSxvmNQjS\\_rt9swsu](https://www.youtube.com/watch?v=yC_hFm0BX28&list=PLxApjaSnQGi6Jm7LLSxvmNQjS_rt9swsu)
- [https://www.youtube.com/watch?v=nzZkKoREEGo&list=PL9ooVrP1hQOGPQVeapGsJCktzI04DtI4\\_](https://www.youtube.com/watch?v=nzZkKoREEGo&list=PL9ooVrP1hQOGPQVeapGsJCktzI04DtI4_)
- [https://www.youtube.com/watch?v=6wi5DI6du-4&list=PL\\_uaeekrhGzJlB8XQBxU3z\\_hDwT95xlk](https://www.youtube.com/watch?v=6wi5DI6du-4&list=PL_uaeekrhGzJlB8XQBxU3z_hDwT95xlk)
- <https://www.youtube.com/watch?v=KqSqyKwVuA8>

16-2-2023

**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

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

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1												
CO2												
CO3												
CO4												
CO5												

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

*Sachin*  
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