

S J P N Trust's

Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

Approved by AICTE, New Delhi, Permanently Affiliated to VTU, Belagavi

Recognized under 2(f) & 12B of UGC Act, 1956

Accredited at "A" grade by NAAC & Programmes Accredited by NBA: CSE & ECE

First Year Engg.

Academics

Course Plan

AY:2022-23 (Odd)



***First year Engineering
Course Plan 2022-23 Odd– Semester
(Physics group)***

Nidasoshi-591 236, Tq.: Hukkeri, Dist.: Belagavi, Karnataka, India.

Phone: +91-8333-278887, Fax: 278886, Web: www.hsit.ac.in, E-mail: principal@hsit.ac.in




INSTITUTE VISION

To be a preferred institution in Engineering Education by achieving excellence in teaching and research and to remain as a source of pride for its commitment to holistic development of individual and society.


INSTITUTE MISSION

To continuously strive for the overall development of students by educating them in a state-of-the-art-infrastructure, by retaining the best practices, people and inspire them to imbibe real time problem solving skills, leadership qualities, human values and societal commitments, so that they emerge as competent professionals.

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PROGRAMME OUTCOMES (POs)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological

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DEPARTMENTAL RESOURCE FACULTY POSITION

S.N.	Category	No. in position	Average experience
1	Teaching faculty	13	17
2	Technical supporting staff	01	18
3	Helper	01	18

MAJOR LABORATORIES

S.N.	Name of the laboratory	Area in Sq. Mtrs	Amount Invested (Rs.)
1.	Engg. Chemistry Lab	200	13,83,479.00
2.	C programming Lab	200	18,75,652.00
Total Investment in the Department			31,96,783.00

TEACHING FACULTY DETAILS

S.N.	Name	Designation	Qualification	Specialization	Teaching Exp. (In yrs.)	Phone No.
1.	Dr. B. V. Madiggond	Prof. & HOD	M.Tech .Ph.D	Power Electronics	29	9343454993
2.	Dr. R. R. Maggavi	Asso. Prof.	M.Tech .Ph.D	Digital Electronics.	18	9591462083
3.	Dr. K. B. Manawade	Asso. Prof.	M.Tech .Ph.D	Computer Science Engg.	17	8412968254
4.	Dr. M. S. Hanagadakar	Asso. Prof.	M.Sc. Ph.D	Physical Chemistry	18	8310768223
5.	Dr. S. J. Walaki	Asst. Prof.	M.Sc. Ph.D	Organic Chemistry	06	8105787069
6.	Prof. S.V. Manjaragi	Asst. Prof.	M.Tech .	Computer Science Engg.	18	998665309
7.	Prof. H. R. Zinage	Asst. Prof	M.Tech	Power Systems	22	9480849335
8.	Prof. S. S. Malaj	Asst. Prof.	M.Tech	Electronics & Telecommunication.	24	8073529095
9.	Prof. V. M. Bhumannavar	Asst. Prof.	M.Sc. (Ph.D)	Physics	17	9448526988
10.	Prof. M. S. Futane	Asst. Prof.	M.Tech	CIM	17	9164105035
11.	Prof. S. A. Patil	Asst. Prof.	M.Sc.	Mathematics	10	9945800869
12.	Prof. S. S. Thabaj	Asst. Prof.	M.Sc.	Mathematics	10	9901398134
13.	Prof. B. S. Hooli	Lecturer	M.A	English	20	9353476479



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)

I Semester (CSE Stream)					(Physics Group)								
Sl. No	Course and course code		Course title	TD/PSB	Teaching Hours/Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	*ASC(IC)	**22MATS11	Mathematics for CSE Stream-I	Maths	2	2	2	0	03	50	50	100	04
2	#ASC(IC)	22PHYS12	Physics for CSE stream	Physics	2	2	2	0	03	50	50	100	04
3	ESC	22POP13	Principles of Programming Using C	CSE	2	0	2	0	03	50	50	100	03
4	ESC-I	22ESC14x	Engineering Science Course-I	Respective Engg Dept	3	0	0	0	03	50	50	100	03
5	ETC-I	22ETC15x	Emerging Technology Course-I	Any Dept	3	0	0	0	03	50	50	100	03
	OR												
	PLC-I	22PLC15x	Programming Languages Course-I		2	0	2	0	03				
6	AEC	22ENG16	Communicative English	Humanities	1	0	0	0	01	50	50	100	01
7	HSMC	22KSK17	Sanskritika Kannada/ Balake	Humanities	1	0	0	0	01	50	50	100	01
		22KBK17	Kannada										
		OR											
		20IC017	Indian Constitution										
8	AEC/SDC	22IDT18	Innovation and Design Thinking	Any Dept	1	0	0	0	02	50	50	100	01
		OR											
		22SFH18	Scientific Foundations of Health										
TOTAL										400	400	800	20

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

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Subject Title	Mathematics-I for Computer Science and Engineering stream		
Subject Code	BMATS101	IA Marks(20)+Assignments(10)+	50
Number of Lecture Hrs /	02+02	Exam Marks (appearing for)	50 (100)
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 04			

FACULTY DETAILS:		
Name: 1) Prof. S. A. Patil 2) Prof. S. S. Thabaj	Designation 1) Asst. Prof. 2) Asst. Prof.	Experience: 1) 10 years 2) 10 years
No. of times course taught 1) 01 (including present) 2) 02	Specialization: Mathematics	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Pre-University Course (Students should have the knowledge of basic subjects)	I and II	Mathematics

2.0 Course Objectives

To enable the students to apply the knowledge of Mathematics in various engineering fields by making them to learn the following:

The goal of the course Mathematics-I for Electrical & Electronics Engineering Stream- BMATS101 is

- ❖ Familiarize the importance of calculus associated with one variable and multivariable for computer science and engineering.
- ❖ To solve the first order ordinary differential equations enabling them to acquire the knowledge of these mathematical tools.
- ❖ Analyze computer science and engineering problems by applying Ordinary Differential Equations.
- ❖ Apply the knowledge of modular arithmetic to computer algorithms.
- ❖ To develop the knowledge of matrices and linear algebra in a comprehensive manner.

3.0 Course Outcomes

After successfully completing the course, the student will be able to understand the topics

Course Code	Course Outcome	Pos
C101.1	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.	1, 2, 3,12
C101.2	Analyze the solution of linear and nonlinear ordinary differential equations.	1, 2, 3,12
C101.3	Apply to get acquainted and to apply modular arithmetic to computer algorithms.	1, 2, 3,12
C101.4	Make use of matrix theory for solving for system of linear equations and compute eigenvalues and eigenvectors	1, 2, 3,12
C101.5	Familiarize with modern mathematical tools namely MATHEMATICA/MATLAB/PYTHON/ SCILAB	1, 2, 3,12

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Total Hours of instruction	40
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4.0 Course Content

CONTENTS	RBTL	No. of Hrs
<p style="text-align: center;">Module-1 Calculus</p> <p>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. Pedagogy: Chalk and talk method/Power Point Presentation</p>	L1 , L2 & L3	08
<p style="text-align: center;">Module-2 Series Expansion and Multivariable Calculus</p> <p>Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms-L'Hospital's rule. 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 undetermined multipliers with single constraint. Applications: Series expansion in computer programming, Errors and approximations, calculators. Pedagogy: Chalk and talk method/Power Point Presentation</p>	L1 , L2 & L3	08
<p style="text-align: center;">Module-3 Ordinary differential equations (ODE's) of first order:</p> <p>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 and C-R circuits. Problems. Nonlinear differential equations: Introduction to general and singular solutions; Solvable for p only; Clairaut's equations, reducible to Clairaut's equations. Problems. Self-Study: Applications of ODE's. Solvable for x and y. Applications of ordinary differential equations: Rate of Growth or Decay, Conduction of heat. Pedagogy: Chalk and talk method/Power Point Presentation</p>	L1 , L2 & L3	08
<p style="text-align: center;">Module-4 Modular Arithmetic</p> <p>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. Pedagogy: Chalk and talk method/Power Point Presentation</p>	L1 , L2 & L3	08

Module-5 Linear Algebra

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.

Pedagogy: Chalk and talk method/Power Point Presentation

L1, L2
& L3

08

5.0**Relevance to future subjects**

Sl. No.	Semester	Subject	Topics
01	Common to all	Common to all engineering Subjects	Signal and Analysis, Field Theory, Thermodynamics, Fluid Dynamics etc

6.0**Relevance to Real World**

Sl. No	Real World Mapping
01	Ordinary differential equations serve as Mathematical models for many real word problems.
02	Differential equations are Radioactive decay, chemical reaction, Newton's law of cooling, RL, RC & RLC circuits, simple harmonic motion etc.
03	Integral calculus is used to find the path of the aero plane.

7.0**Gap Analysis and Mitigation**

Sl. No	Delivery Type	Details
01	Tutorial	Topic: Modular Arithmetic

8.0**Books Used and Recommended to Students**

Text Books
1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2021.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2018.
Reference Books



1. V. Ramana: "Higher Engineering Mathematics"-McGraw-Hill Education, 11th Ed. 2017
2. Srimanta Pal & Subodh C. Bhunia: "Engineering Mathematics" Oxford University Press, 3rd Reprint, 2016.
3. N.P Bali and Manish Goyal: "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022
4. C. Ray Wylie, Louis C. Barrett: "Advanced Engineering Mathematics" McGraw – Hill Book Co. Newyork, 6th Ed., 2017.
5. Gupta C.B, Sing S.R and Mukesh Kumar: Engineering Mathematics for Semester I and II, Mc-Graw Hill Education (India) Pvt. Ltd 2015.
6. H. K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics" S. Chand Publication 3rd Ed., 2014.
7. **James Stewart**: "Calculus" Cengage Publications, 7th Ed., 2019.
8. **David C Lay**: "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams**: "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Additional Study material & e-Books

1. CRC Standard Mathematical Tables and Formulae, 32nd Edition
2. A Student's Guide to the Study, Practice, and Tools of Modern Mathematics- Bindner, Donald
3. P.N.Wartikar & J.N.Wartikar – Applied Mathematics (Volume I and II) Pune Vidyarthi Griha Prakashan, 7th Edition 1994.
4. Peter V.O'Neil – Advanced Engineering Mathematics, Thomson Brooks/Cole, 7th Edition, 2011.
5. Glyn James – Advanced Modern Engineering Mathematics, Pearson Education, 4th Edition, 2010.

9.0

Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

- ❖ <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 EDUSAT PROGRAMME
- ❖ VTU e-Shikshana Program

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

- ❖ Quiz
- ❖ Assignments
- ❖ Seminar

10.0

Magazines/Journals Used and Recommended to Students

Sl. No	Magazines/Journals	Website
1	+ Plus Magazine	https://plus.maths.org/issue44 .
2	Mathematics Magazine	www.mathematicsmagazine.com

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11.0 Examination Note

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:

Two Unit Tests each of **20 Marks (duration 01 hour)**

1. First test after the completion of 30-40 % of the syllabus
2. 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 10 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 60 marks and will be scaled down to 30 marks

CIE for the practical component of the Integrated Course

- 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 02/03 hours**) at the end of the 14th /15th 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 IPCC for **20 marks.**

Semester End Examination:

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

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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.

12.0 Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
Module -1	1	Differential Calculus-1: Review of elementary differential calculus, Polar curves	20
	2	Angle between the radius vector and tangent	
	3	Angle between two curves & Problems	
	4	Pedal equation & Problems	
	5	Curvature and Radius of curvature in Cartesian from	
	6	Curvature and Radius of curvature in Polar from	
	7	Centre and circle of curvature (All without proof-formulae only)	
	8	Applications to evolutes and involutes	
Module-2	9	Differential Calculus-2: Taylor's and Maclaurin's series for one variable (statement only)	20
	10	Indeterminate forms-L' Hospital's rule & Problems	
	11	Total derivatives & Problems	
	12	Partial differentiation of composite functions	
	13	Maxima and minima for a function of two variables	
	14	Method of Lagrange multipliers with one subsidiary condition	
	15	Jacobians simple problems	
	16	Applications of maxima and minima with illustrative examples	
Module-3	17	Ordinary differential equations(ODE's)of first order: Exact and reducible to exact differential equations	20
	18	Bernoulli's differential equations	
	19	Applications of ODEs orthogonal trajectories	
	20	Newton's law of cooling & Problems	
	21	Introduction to general and singular solutions; Solvable for p only	
	22	Clairaut's equation	
	23	Equation reducible to Clairaut's form	
	24	L-R circuits & Nonlinear differential equations	
	25	Modular Arithmetic Introduction to Congruences, Linear Congruences	

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Module-4	26	Remainder theorem, Solving Polynomials	20
	27	Linear Diophantine Equation	
	28	System of Linear Congruences	
	29	Euler's Theorem .	
	30	Wilson Theorem and Fermat's little theorem	
	31	problems	
	32	Applications of Congruences-RSA algorithm.	
Module-5	33	Linear Algebra : Rank of a matrix-echelon form	20
	34	Solution of a system of linear equation-consistency	
	35	Solution of a system of linear equation by Gauss elimination method	
	36	Solution of a system of linear equation by Gauss Jordan method	
	37	Approximate solution by Gauss –Seidel method	
	38	Eigen values and eigenvectors-Rayleigh's power method	
	39	Solution of system of equations by Gauss-Jacobi iterative method	
	40	Inverse of a square matrix by Cayley- Hamilton theorem.	

13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl.No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website/Paper
1	Assignment 1: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 1 of the syllabus	4	Individual Activity.	Book 1, of the reference list. Website of the Reference list
2	Assignment 2: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 2 of the syllabus	8	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list
3	Assignment 3: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 3 of the syllabus	6	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list
4	Assignment 4: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 4 of the syllabus	8	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list



5	Assignment 5: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 5 of the syllabus	10	Individual Activity.	Book 1, 2 of the reference list. Website of the Reference list
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14.0 QUESTION BANK

Module-1: Calculus

- Find the angle of intersection of the curves $r = a \log \theta$ and $r = \frac{a}{\log \theta}$
- Find the Pedal equation of the curve $r^2 = a^2 \sin 2\theta + b^2 \cos 2\theta$.
- Find the radius of curvature for the given curve $x^3 + y^3 + 3xy = 1$ at the point $(3/2, 3/2)$
- Find the radius of curvature of the curve $y = \log \sin x$ at $x = \pi/2$.
- Find the radius of curvature of the curve $y = e^x$ at the point where it crosses the y-axis
- Find the radius of curvature of the curve $xy = c^2$ at (c, c) .
- Find the curvature at $(3, -4)$ to the curve $x^2 + y^2 = 25$.
- What is the curvature of $x^2 + y^2 - 4x - 6y + 10 = 0$ at any point on it
- Find the radius of curvature at any point on the curve $\theta = \left[\frac{\sqrt{r^2 - a^2}}{a} \right] - \cos^{-1}(a/r)$
- Find the radius of curvature at $y = 2a$ on the curve $y^2 = 4ax$.
- Find the radius of curvature of the curve $y = a \cosh(x/a)$ at the point where it crosses the y axis.
- Find the radius of curvature of the curve $y = \cos \log(\sec(x/c))$.
- Find the radius of curvature at $x = \pi/2$ on the curve $y = 4 \sin x - \sin 2x$
- Find the radius of curvature of the parabola $x = at^2, y = 2at$ at t .
- For the curve $x = a(\cos \theta + \theta \sin \theta), y = a(\sin \theta - \theta \cos \theta)$, prove that the radius of curvature is $a\theta$
- Find the radius of curvature at any point $(a \cos 3\theta, a \sin 3\theta)$ on the Curve $x^{2/3} + y^{2/3} = a^{2/3}$
- Find the coordinates of the centre of curvature at any point of the parabola $y^2 = 4ax$.
- Find the centre of circle of curvature for $xy(x + y) = 2$ at $(1, 1)$
- Find the evolutes of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

Module-2: Series Expansion and Multivariable Calculus

- Expand $e^{\sin x}$ by Maclauris series up to the term containing x^4 .
- Expand $\log(1 + \cos x)$ by Maclauris series up to the term containing x^4 .
- Obtain the Taylor's expansion of $\log_e x$ about $x=1$ up to the term containing 4th degree & hence obtain $\log_e(1.1)$.
- Using Maclaurin's series expand $\log(\sec x)$ up to the term containing x^5
- Evaluate $\lim_{x \rightarrow 0} \left[\frac{a^x + b^x + c^x}{3} \right]^{1/x}$.
- Find the values of a & b such that $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\log \cos x}{\tan x}$
- Evaluate $\lim_{x \rightarrow \pi/4} (\tan x)^{\tan 2x}$
- Evaluate $\lim_{x \rightarrow 1} (2 - x)^{\tan(\frac{\pi x}{2})}$
- Evaluate $\lim_{x \rightarrow 0} \frac{x e^x - \log(1+x)}{x^2}$

10. Discuss the maxima & minima of $f(x, y) = x^3y^2(1 - x - y)$

11. Examine the following function for extreme values $f(x, y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$

Module-3: Ordinary differential equations (ODE's) of first order

1. Solve $3e^{xt} \tan y dx + (1 - e^x) \sec^2 y dy = 0$.

2. Solve $\frac{dy}{dx} = x \tan(y - x) + 1$

3. Solve $\frac{dy}{dx} = \frac{x(2 \log x + 1)}{\sin y + y \cos y}$

4. Solve $(x - y \log y + y \log x) dx + x (\log y - \log x) dy = 0$

5. Solve $(x \tan y/x - y \sec^2 y/x) dx + x \sec^2 y/x dy = 0$

6. Solve $\frac{dy}{dx} = \frac{2x - y + 1}{x + 2y - 3}$

7. Solve $e^y \left(\frac{dy}{dx} + 1 \right) = e^x$

8. Solve $(x^2 - 4xy - 2y^2) dx + (y^2 - 4xy - 2x^2) dy = 0$

9. Solve $\frac{dy}{dx} + y \cot x = \cos x$.

10. Solve $\frac{dy}{dx} + x \sin 2y = x^3 \cos 2y$

11. Solve $\tan y \frac{dy}{dx} + \tan x = \cos y \cos^2 x$

12. Solve $\frac{dy}{dx} - \frac{dx}{x} = x + x^2$

13. Solve $(xy^3 + y) dx + (x^2y^2 + x + y^4) dy = 0$

14. Solve $xy(1 + xy^2) \frac{dy}{dx} = 1$

15. Solve $\sec^2 y \frac{dy}{dx} + x \tan y = x^3$

16. Find the orthogonal trajectory of the family of coaxial circles $\frac{x^2}{a^2} + \frac{y^2}{b^2 + \lambda} = 1$

17. Find the orthogonal trajectory of $r^n = a^n \sin n\theta$



18. Find the orthogonal trajectories of the cardioids $r = a(1 - \cos \theta)$
19. Solve the equation $e^{3x}(p - 1) + p^3e^{2y} = 0$ by using substitution $u = e^x, v = e^y$.
20. Obtain the general solution & the singular solution of the equation as Clairaut's equation $xp^3 - yp^2 + 1 = 0$.
21. Solve: $y + px = x^4p^2$
22. Solve: $xp^2 + x = 2yp$.
23. Solve the equation $e^{3x}(p - 1) + p^3e^{2y} = 0$ by using substitution $u = e^x, v = e^y$.

Module-- 4: Modular Arithmetic

1. Solve the linear congruence $3x = 12 \pmod{6}$
2. Solve the following diophantine linear equation $23x + 49y = 102$
3. Find $331 \pmod{7}$.
4. Find all integers x such that $x \pmod{86} = 6$
5. Solve the Linear Congruence $11x = 1 \pmod{23}$
6. Find $220 + 330 + 440 + 550 + 660 \pmod{7}$.
7. Using Fermat's Little Theorem, show that $830 - 1$ is divisible by 31
8. Find the solutions of the linear congruence $11x \equiv 4 \pmod{25}$.
9. Find the last digit of 1337
10. Solve $2x + 6y \equiv 1 \pmod{7}$
11. Using Fermat's Little Theorem, show that $830 - 1$ is divisible by 31.
12. Find the remainder when the number 21000 is divided by 13
13. Find the remainder when $14!$ is divided by 17
14. Find the remainder when $(349 \times 74 \times 36)$ is divided by 3
15. Find the least positive values of x such that
 - a. $71 \equiv x \pmod{8}$
 - b. $78 + x \equiv 3 \pmod{5}$
 - c. $89 \equiv (x + 3) \pmod{4}$
16. Find the last digit of 72013

Module-5: Linear Algebra

- 1) Solve the system of linear equations by Gauss elimination method
 $x + 4y - z = -5; x + y - 6z = -12; 3x - y - z = 4$.
- 2) Use the Gauss-Jordan iteration method to solve the system of equations
 $27x + 6y - z = 85, 6x + 15y + 2z = 72, x + y + 54z = 110$.
- 3) Solve the system of equation by Gauss-elimination method. $2x_1 + 5x_2 + 2x_3 - 3x_4 = 3;$
 $3x_1 + 6x_2 + 5x_3 + 2x_4 = 2; 4x_1 + 5x_2 + 14x_3 + 14x_4 = 11; 5x_1 + 10x_2 + 8x_3 + 4x_4 = 4$
- 4) Reduce the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ to the diagonal form
- 5) Solve the system of equations by Gauss Jordan method $2x + y + 4z = 12, 4x + 11y - z = 33, 8x - 3y + 2z = 20$.
- 6) Test for consistency and solve $5x + 3y + 7z = 4, 3x + 26y + 2z = 9, 7x + 2y + 10z = 5$.
- 7) Test for consistency and solve $x + 2y + 2z = 1, 2x + y + z = 2, 3x + 2y + 2z = 3, y + z = 0$.

- 8) S.T. the transformation $y_1 = 2x_1 - 2x_2 - x_3$; $y_2 = -4x_1 + 5x_2 + 3x_3$; $y_3 = x_1 - x_2 - x_3$
 a. is regular and find the inverse transformation.

$$\begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}$$

- 9) Find the largest Eigen value and corresponding Eigen vector by using Rayleigh power method

- 10) Find the largest eigen value and the corresponding eigen vector of the matrix A, by using the power


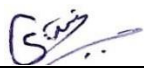

$$A = \begin{bmatrix} 4 & 1 & -1 \\ 2 & 3 & -1 \\ -2 & 1 & 5 \end{bmatrix}$$

Method by taking initial vector as $[1, 0.8, -0.8]^T$

- 11) Reduce the matrix $\begin{bmatrix} -1 & 3 \\ -2 & 4 \end{bmatrix}$ to the diagonal form

16.0 University Result

Examination	S+	S	A	B	C	D	E	% Passing

Prepared by	Checked by		
			
Dr. S. L. Patil Prof. S. A. Patil Prof. S. S. Thabaj	Dr. S. L. Patil	HOD	Principal



Subject Title	Applied Physics for CSE Stream		
Subject Code	BPHYS102	CIA Marks	50
Number of Lecture Hrs /	06(2L+2T+2P)	SEE Marks	50
Total Number of Lecture Hrs	40	Exam Hours	03 Hour
CREDITS – 04			

FACULTY DETAILS:

Name: Sri. V. M. Bhumannavar	Designation: Asst. Professor	Experience: 1) 17.5 Years
No. of times course taught: 24	Specialization: Spectroscopy	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	First year (Common to all)	I/II	Fundamentals of Physics

2.0 Course Objectives

This course (**BPHYS102**) will enable students

1. To make the students understand and interpret in experimental section manually.
2. Learn the basic concepts in Physics which are very much essential in understanding and solving engineering related challenges.
3. Gain the knowledge of newer concepts in modern physics for the better appreciation of modern technology
4. To acquire the knowledge of basic fundamental science.
5. To inculcate understanding of the theory and applications of fundamental in experiments with the theoretical knowledge.
6. To familiarize the students with Indian Standards units and measurements of the fundamental values.
7. To impart knowledge of mechanics and some of basic expressions using in its applications.

3.0 Course Outcomes

Having successfully completed this course, the student will be able to draw and use modeling software's to generate

	Course Outcome	Cognitive Level	Pos
C105.1	Describe the principles of LASERS and Optical fibers and their relevant applications.	L1,L2,L3	1,2,3,8,12
C105.2	Discuss the basic principles of the Quantum Mechanics and its application in Quantum Computing.	L1,L2,L3	1,2,3,8,12
C105.3	Summarize the essential properties of superconductors and its applications in qubits.	L1,L2,L3	1,2,3,8,12
C105.4	Illustrate the application of physics in design and data analysis.	L1,L2,L3	1,2,3,8,12
C105.5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements.	L1,L2,L3	1,2,3,8,12
Total Hours of instruction		40 Hours	

4.0

Course Content

MODULE-1**Laser and Optical Fibers:**

LASER: Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Metastable State, Requisites of a laser system, Semiconductor Diode Laser, Applications: Bar code scanner, Laser Printer, Laser Cooling(Qualitative), Numerical Problems.

Optical Fiber: Principle and Structure, Propagation of Light, Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA, Modes of Propagation, RI Profile, Classification of Optical Fibers, Attenuation and Fiber Losses, Applications: Fiber Optic networking, Fiber Optic Communication. Numerical Problems

Pre requisite: Properties of light

Self-learning: Total Internal Reflection.

08 Hours

MODULE-2**Quantum Mechanics:**

de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus - Non Relativistic), Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation (Derivation), Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values, Particle inside one dimensional infinite potential well, Quantization of Energy States, Waveforms and Probabilities. Numerical Problems.

Pre requisite: Wave-Particle dualism

Self-learning: de Broglie Hypothesis

08 Hours

MODULE-3**Quantum Computing:****Principles of Quantum Information & Quantum Computing:**

Introduction to Quantum Computing, Moore's law & its end, Differences between Classical & Quantum computing. Concept of qubit and its properties. Representation of qubit by Bloch sphere. Single and Two qubits. Extension to N qubits.

Dirac representation and matrix operations:

Matrix representation of 0 and 1 States, Identity Operator I, Applying I to $|0\rangle$ and $|1\rangle$ states, Pauli Matrices and its

operations on $|0\rangle$ and $|1\rangle$ states, Explanation of i) Conjugate of a matrix and ii) Transpose of a matrix.

Unitary matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product), Probability, and Quantum Superposition, normalization rule. Orthogonality, Orthonormality. Numerical Problems

Quantum Gates:

Single Qubit Gates: Quantum Not Gate, Pauli – X, Y and Z Gates, Hadamard Gate, Phase Gate (or S Gate), T Gate **Multiple Qubit Gates:** Controlled gate, CNOT Gate, (Discussion for 4 different input states). Representation of Swapgate, Controlled -Z gate, Toffoli gate.

Pre requisites: Matrices

Self-learning: Moore's law

08 Hours

MODULE-4**Electrical Properties of Materials and Applications****Electrical Conductivity in metals**

Resistivity and Mobility, Concept of Phonon, Matheissen's rule, Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory, Fermi Energy, Density of States, Fermi Factor, Variation of Fermi Factor With Temperature and Energy. Numerical Problems.

Superconductivity

Introduction to Super Conductors, Temperature dependence of resistivity, Meissner's Effect, Critical Field, Temperature dependence of Critical field, Types of Super Conductors, BCS theory (Qualitative), Quantum Tunnelling, High Temperature superconductivity, Josephson Junctions (Qualitative), DC and RF SQUIDS (Qualitative), Applications in Quantum Computing: Charge, Phase and Flux qubits, Numerical Problems.

Pre requisites: Basics of Electrical conductivity**Self-learning: Resistivity and Mobility****08 Hours****MODULE-5****Applications of Physics in computing:****Physics of Animation:**

Taxonomy of physics based animation methods, Frames, Frames per Second, Size and Scale, Weight and Strength, Motion and Timing in Animations, Constant Force and Acceleration, The Odd rule, Odd-rule Scenarios, Motion Graphs, Examples of Character Animation: Jumping, Parts of Jump, Jump Magnification, Stop Time, Walking: Strides and Steps, Walk Timing. Numerical Problems

Statistical Physics for Computing: Descriptive statistics and inferential statistics, Poisson distribution and modeling the probability of proton decay, Normal Distributions (Bell Curves), Monte Carlo Method: Determination of Value of π . Numerical Problems.

Pre requisites: Motion in one dimension, Probability**Self-learning: Frames, Frames per Second****08 Hours****5.0 Relevance to future subjects**

Sl No	Semester	Subject	Topics
01	Higher Semester	Statics and Dynamics Strength of Materials Thermodynamics Materials and Metallurgy Machine design Fluid Mechanics Hydraulics and Pneumatics Mechatronics Robotics Material Characterization	Basic fundamentals

6.0 Relevance to Real World

SL.No	Real World Mapping
01	The basic principle of communication is done with optical fibers



02	Basic fundamentals related to electrical conductivity of metals.
03	Basic fundamentals related to animation are studied in detail
04	Applications of laser in the field of computer science and engineering devices are discussed.
05	Basic fundamentals related to optical fiber in communication engineering.

7.0 Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	Chalk and Talk	This delivery method is adapted to all modules.
02	Self prepared PPTs	The PPTs are also used in the discussions wherever necessary in the syllabus.
03	Self Prepared videos	Self prepared videos are also used for better understanding.
04	Experimental Demonstration	Experimental Demonstration is done to the students for better understanding of concepts.
05	Tutorial	Topic: Module I to Module V
06	NPTEL	Engineering Physics Videos

8.0 Books Used and Recommended to Students

Suggested Text Books

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

1. Solid State Physics, S O Pillai, New Age International Private Limited, 8th Edition, 2018.
2. Engineering Physics by Gupta and Gour, Dhanpat Rai Publications, 2016 (Reprint).
3. A Textbook of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand. &Company Ltd, New Delhi.
4. Concepts of Modern Physics, Aurther Beiser, McGrawhill, 6th Edition, 2009.
5. Lasers and Non Linear Optics, B B Loud, New age international, 2011 edition.
6. A Textbook of Engineering Physics by M.N. Avadhanulu, P G. Kshirsagar and T V S Arun Murthy, Eleventh edition, S Chand and Company Ltd. New Delhi-110055.
7. Quantum Computation and Quantum Information, Michael A. Nielsen & Isaac L. Chuang, Cambridge Universities Press, 2010 Edition.
8. Quantum Computing, Vishal Sahani, McGraw Hill Education, 2007 Edition.
9. Quantum Computing – A Beginner's Introduction, Parag K Lala, Indian Edition, McGrawHill, Reprint 2020.
10. Engineering Physics, S P Basavaraj, 2005 Edition, Subhash Stores.
11. Physics for Animators, Michele Bousquet with Alejandro Garcia, CRC Press, Taylor & Francis, 2016.
12. Quantum Computation and Logic: How Quantum Computers Have Inspired Logical Investigations, Maria Luisa Dalla Chiara, Roberto Giuntini, Roberto Leporini, Giuseppe Sergioli, Trends in Logic, Volume 48, Springer.
13. Statistical Physics: Berkely Physics Course, Volume 5, F. Reif, McGraw Hill.
14. Introduction to Superconductivity, [Michael Tinkham](#), McGraw Hill, INC, II Edition

9.0 Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

LASER: <https://www.youtube.com/watch?v=WgzzynezPiyc>
Superconductivity :
<https://www.youtube.com/watch?v=MT5X15ppn48>
Optical Fiber : https://www.youtube.com/watch?v=N_kA8EpCUQo
Quantum Mechanics :
<https://www.youtube.com/watch?v=p7bzE1E5PMY&t=136s>
Quantum Computing : <https://www.youtube.com/watch?v=jHoEjvuPoB8>
Quantum Computing : <https://www.youtube.com/watch?v=ZuvCUU2jD30>
Physics of Animation : https://www.youtube.com/watch?v=kj1kaA_8Fu4
Statistical Physics Simulation : https://phet.colorado.edu/sims/html/plinko-probability/latest/plinko-probability_en.html
NPTEL Superconductivity: <https://archive.nptel.ac.in/courses/115/103/115103108/> **NPTEL Quantum Computing :** <https://archive.nptel.ac.in/courses/115/101/115101092> **Virtual LAB :** <https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham> **Virtual LAB :** <https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1>
<https://www.britannica.com/technology/laser,k>
<https://nptel.ac.in/courses/115/102/115102124/>
<https://nptel.ac.in/courses/115/104/115104096/>
<http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>
https://onlinecourses.nptel.ac.in/noc20_mm14/preview
<https://bookspar.com/>
<https://www.khanacademy.org/science/physics>
<https://www.physicsgalaxy.com>
<https://freevidelectures.com/Subject/Physics>
<https://www.physics.org/>


10.0 Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	International Journal of Engineering Science	https://www.journals.elsevier.com/international-journal-of-engineering-science
2	International Journal of Engineering Trends and Technology	http://ijettjournal.org/

11.0 Laboratory Component

Any Ten Experiments have to be completed from the list of experiments
 Note: The experiments have to be classified into

- Exercise
- Demonstration
- Structured Inquiry
- Open Ended

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		Academics
		Course Plan
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Based on the convenience classify the following experiments into above categories. Select at least one simulation/spreadsheet activity.

List of Experiments

1. Determination of wavelength of LASER using Diffraction Grating.
2. Determination of acceptance angle and numerical aperture of the given Optical Fiber.
3. Determination of Magnetic Flux Density at any point along the axis of a circular coil.
4. Determination of resistivity of a semiconductor by Four Probe Method
5. Study the I-V Characteristics of the Given Bipolar Junction Transistor.
6. Determination of dielectric constant of the material of capacitor by Charging and Discharging method.
7. Study the Characteristics of a Photo-Diode and to determine the power responsivity /Verification of Inverse Square Law of Intensity of Light.
8. Study the frequency response of Series & Parallel LCR circuits.
9. Determination of Planck's Constant using LEDs.
10. Determination of Fermi Energy of Copper.
11. Identification of circuit elements in a Black Box and determination of values of the components.
12. Determination of Energy gap of the given Semiconductor.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Study of Application of Statistics using spread sheets
16. PHET Interactive Simulations
<https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html.prototype>

12.0 Examination Note

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 20marks.

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

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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 15th 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):

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.


13.0 Course Delivery Plan

Module	Lecture No.	Content of Lecturer	Teaching Method	Laboratory Component	% of Portion
	1	Characteristic properties of a LASER beam, Interaction of Radiation with Matter,	Chalk and Talk,		
	2	Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Laser Action, Population Inversion, Metastable State	Chalk and Talk, Power-point Presentation	Demonstration of Diffraction grating Experiment	
	3	Requisites of a laser system, Semiconductor Diode Laser, Applications: Bar code scanner	Chalk and Talk,	Demonstration of laser bar coder	


1	4	Laser Printer, Laser Cooling (Qualitative), Numerical Problems.	Chalk and Talk, Power-point Presentation	Demonstration of laser printer	20
	5	Optical Fiber: Principle and Structure, Propagation of Light,	Chalk and Talk,		
	6	Acceptance angle and Numerical Aperture (NA), Derivation of Expression for NA,	Chalk and Talk,	Demonstration of Numerical Aperture Experiment	
	7	Modes of Propagation, RI Profile, Classification of Optical Fibers, Attenuation and Fiber Losses,	Chalk and Talk, Power-point Presentation		
	8	Applications: Fiber Optic networking, Fiber Optic Communication. Numerical Problems	Chalk and Talk, Power-point Presentation	Demonstration of optical fiber	
2	9	de Broglie Hypothesis and Matter Waves, de Broglie wavelength and derivation of expression by analogy	Chalk and Talk,		20
	10	Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle and its application (Non existence of electron inside the nucleus - Non Relativistic),	Chalk and Talk,		
	11	Principle of Complementarity, Wave Function, Time independent Schrödinger wave equation (Derivation),	Chalk and Talk		
	12	Physical Significance of a wave function and Born Interpretation, Expectation value, Eigen functions and Eigen Values,	Chalk and Talk		
	13	Particle inside one dimensional infinite potential well,	Chalk and Talk		
	14	Quantization of Energy States	Chalk and Talk		
	15	Waveforms and Probabilities.	Chalk and Talk		
	16	Numerical Problems.	Chalk and Talk,		
	17	Introduction to Quantum Computing, Moore's law & its end, Differences between Classical & Quantum computing.	Chalk and Talk, Power-point Presentation		
			Chalk and		

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			Course Plan
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3	18	Concept of qubit and its properties. Representation of qubit by Bloch sphere.	Talk, Power-point Presentation	20
	19	Single and Two qubits. Extension to N qubits.	Chalk and Talk,	
	20	Dirac representation and matrix operations: Matrix representation of 0 and 1 States, Identity Operator I, Applying I to $ 0\rangle$ and $ 1\rangle$ states,	Chalk and Talk,	
	21	Pauli Matrices and its operations on $ 0\rangle$ and $ 1\rangle$ states, Explanation of i) Conjugate of a matrix and ii) Transpose of a matrix.	Chalk and Talk	
	22	Unitary matrix U, Examples: Row and Column Matrices and their multiplication (Inner Product), Probability, and Quantum Superposition,	Chalk and Talk, Power-point Presentation	
	23	Normalization rule. Orthogonality, Orthonormality. Numerical Problems Quantum Gates: Single Qubit Gates: Quantum Not Gate, Pauli – X, Y and Z Gates, Hadamard Gate	Chalk and Talk, Power-point Presentation	
	24	, Phase Gate (or S Gate), T Gate Multiple Qubit Gates: Controlled gate, CNOT Gate, (Discussion for 4 different input states). Representation of Swapgate, Controlled -Z gate, Toffoli gate.	Chalk and Talk, Power-point Presentation	
	25	Resistivity and Mobility, Concept of Phonon, Matheissen's rule,	Chalk and Talk, Power-point Presentation	
	26	Failures of Classical Free Electron Theory, Assumptions of Quantum Free Electron Theory, Fermi Energy,	Chalk and Talk, Power-point Presentation	
	27	Density of States, Fermi Factor, Variation of Fermi Factor With Temperature and Energy.	Chalk and Talk, Power-point Presentation	
	28	Numerical Problems.	Chalk and Talk	

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4	29	Superconductivity Introduction to Super Conductors, Temperature dependence of resistivity,	Chalk and Talk	20
	30	Meissner's Effect, Critical Field, Temperature dependence of Critical field, Types of Super Conductors,	Chalk and Talk, Power- point Presentation	
	31	BCS theory (Qualitative), Quantum Tunnelling, High Temperature superconductivity, Josephson Junctions (Qualitative), DC and RF SQUIDS (Qualitative),	Chalk and Talk	
	32	Applications in Quantum Computing: Charge, Phase and Flux qubits, Numerical Problems.	Chalk and Talk, Power- point Presentation	
	33	Physics of Animation: Taxonomy of physics based animation methods,	Chalk and Talk, Power- point Presentation	
5	34	Frames, Frames per Second, Size and Scale, Weight and Strength, Motion and Timing in Animations,	Chalk and Talk, Power- point Presentation	20
	35	Constant Force and Acceleration, The Odd rule, Odd-rule Scenarios, Motion Graphs, Examples of Character	Chalk and Talk, Power- point Presentation	
	36	Animation: Jumping, Parts of Jump, Jump Magnification, Stop Time,	Chalk and Talk, Power- point Presentation	
	37	Walking: Strides and Steps, Walk Timing. Numerical Problems	Chalk and Talk, Power- point Presentation	
	38	Statistical Physics for Computing: Descriptive statistics and inferential statistics,	Chalk and Talk, Power- point Presentation	
	39	Poisson distribution and modeling the probability of proton decay, Normal Distributions (Bell Curves),	Chalk and Talk, Power- point Presentation	

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	40	Monte Carlo Method: Determination of Value of π . Numerical Problems.	Chalk and Talk, Power-point Presentation	
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14.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: University Questions on Section of Oscillations and Waves	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 4 of the syllabus	10	Individual Activity. Printed solution expected.	Book 1, 2 of the reference list. Website of the Reference List
2	Assignment 2: University Questions on Modern Physics & Quantum Mechanics	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 5 of the syllabus	12	Individual Activity. Printed solution expected.	Book 1, 2 of the reference list. Website of the Reference list

15.0 QUESTION BANK

Lasers & Optical Fibers

1. What is laser? Explain the terms a) Induced absorption b) Spontaneous emission c) Stimulated emission. d) Metastable state and e) Population inversion.
2. Obtain an expression for energy density of radiation under equilibrium condition in terms of Einstein's coefficients.
3. Discuss the conditions to be met by an active system for laser action.
4. Describe the requisites of a laser system.
5. Describe construction and working of a CO₂ laser.
6. Describe the construction and working of a semiconductor laser.
7. Write a note on industrial applications of lasers.
8. Describe construction & working of semiconductor laser along with the applications.
9. Describe the technique of measurement of pollutants in atmosphere using a laser beam.
10. Explain in brief laser used as range finder.
11. Explain in brief laser used as data storage.
12. Describe the principle on which optical fiber works.
13. With a neat diagram explain numerical aperture and ray propagation in an optical fiber.
14. Obtain an expression for N.A. and arrive at the condition for ray propagation through the fiber.
15. Explain the different types of optical fibers.

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16. Discuss the attenuation mechanism in an optical fiber.
17. Describe point to point communication system using optical fibers with the help of block diagram.
18. Mention advantages and disadvantages of optical fiber communication over the conventional methods of communication.

MODULE 2


Quantum Mechanics

1. State de Broglie hypothesis. Show that the de Broglie wavelength for an electron accelerated by a potential difference V volt is $\lambda = 1.226/\sqrt{v}$ nm for non-relativistic case.
2. What are matter waves? Mention their properties.
3. Explain Heisenberg's Uncertainty Principle.
4. Show that a free electron can't exist within the nucleus of an atom.
5. Set up time independent one dimensional Schrodinger's equation.
6. What is a wave function? Give its physical significance and properties.
7. What is a normalization of a wave function?
8. Find Eigen values and Eigen functions for a particle in one dimensional infinite potential well.
9. Assuming the time independent Schrodinger wave equation, discuss the solutions for energy of a particle in one dimensional infinite potential well.
10. Solve the Schrodinger wave equation for the allowed energy values in the case of particle in a box.
11. Obtain the time independent Schrodinger wave equation for a particle in one dimensional potential well of infinite height and discuss the solutions.
12. Obtain the Schrodinger wave equation for a free particle and discuss its solutions.

MODULE 3

Quantum Computing

1. Explain in detail about Quantum Computing
2. What is Moore's law & its end?
3. List the Differences between Classical & Quantum computing.
4. Write a note on Concept of qubit and its properties.
5. Explain the representation of qubit by Bloch sphere. Single and Two qubits. Extension to Nqubits.
6. Explain the Matrix representation of 0 and 1 States,
7. How to Identity Operator I
8. Explain the method of applying I to $|0\rangle$ and $|1\rangle$ states, Pauli Matrices and its operations on

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$|0\rangle$ and $|1\rangle$ states.

9. Explain i) Conjugate of a matrix and ii) Transpose of a matrix.
10. Explain with example Unitary matrix U.
11. Explain with examples Row and Column Matrices and their multiplication (Inner Product).
12. What is Probability
13. What is Quantum Superposition
14. What is Orthogonality
15. What is Orthonormality
16. Explain Quantum Not Gate
17. Explain Pauli – X, Y and Z Gates
18. Explain Hadamard Gate
19. Explain Phase Gate (or S Gate)
20. Explain T Gate
21. What is Controlled gate
22. Explain CNOT Gate
23. Explain representation of Swapgate
24. Explain controlled -Z gate
25. Explain Toffoli gate.

MODULE-4

Electrical Properties of Materials and Applications Electrical Conductivity in metals

1. Explain any three drawbacks of classical free-electron theory and success of Quantum theory.
2. Describe how quantum free electron theory has been successful in overcoming the failures of classical free electron theory.
3. Mention assumptions of quantum free electron theory.
4. Define Fermi factor. Discuss the probability of occupation of various energy states by electrons at $T=0$ K, and $T > 0$ K, on the basis of Fermi factor.
5. Derive the expression for Fermi energy of metal at 0 K temperatures.
6. Derive the relation between Fermi energy and energy gap for an intrinsic semiconductor.
7. Write a note on Super Conductors.
8. Explain the Temperature dependence of resistivity of superconductor
9. What is Meissner's Effect
10. What is Critical Field
11. Explain the temperature dependence of Critical field
12. Write a note types of Super Conductors
13. Explain BCS theory
14. What is Quantum Tunnelling
15. What are high temperature superconductivity
16. Explain Josephson Junctions
17. What are DC and RF SQUIDS




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18. What are the applications in Quantum Computing?
19. Explain the applications Charge, Phase and Flux qubits

MODULE 5

Applications of Physics in computing

1. Explain the taxonomy of physics based animation methods
2. Explain Frames
3. Explain Frames per Second
4. Explain Size and Scale
5. Explain weight and strength
6. Explain motion and timing in animations
7. Explain constant force
8. Explain acceleration
9. What is Odd rule and Odd-rule Scenarios
10. Explain motion Graphs,
11. Give the Example of Character Animation Jumping
12. Give the Examples of Character Animation Parts of Jump,
13. Give the Examples of Character Animation Jump Magnification
14. What is Stop Time,
15. Give the Examples of animation of Walking
16. What are Descriptive statistics and inferential statistics
17. What is Poisson distribution and modeling the probability of proton decay
18. What is normal Distributions (Bell Curves),
19. What is Monte Carlo Method
20. How to determine the value of π .

Prepared by	Checked by		
			
Sri. V.M.Bhumannavar	Sri. V.M.Bhumannavar	HOD	Principal

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Principles of Programming using C			
Course Code	BPOPS103	CIE Marks	50
Teaching Hours/Week (L:T:P)	2:0:2	SEE Marks	50
Total Hours of Pedagogy	40	Total marks(CIE + SEE)	100
Credits	03	SEE Hours	03
FACULTY DETAILS:			
Name: Prof. S. V. Manjaragi		Designation: Assistant Professor	Experience: 18Yrs
No. of times course taught: 10		Specialization: Computer Science and Engineering	

FACULTY DETAILS:			
Name: Dr. K. B. Manwade		Designation: Associate Professor	Experience: 18 Yrs
No. of times course taught: 3		Specialization: Computer Science and Engineering	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	-	-	Basic Mathematics, Logic & Reasoning ability


2.0 Course Objectives

- CLO1:** Elucidate the basic architecture and functionalities of a Computer
- CLO2:** Apply programming constructs of C language to solve the real-world problems
- CLO3:** Explore user-defined data structures like arrays, structures and pointers in implementing solutions to problems
- CLO4:** Design and Develop Solutions to problems using structured programming constructs such as functions and procedures

3.0 Course Outcomes [C103]

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

CO	Course Outcome	RBT Level	POs
C103.1	Elucidate the basic architecture and functionalities of a computer and also recognize	L1,L2	1,2,3,8,10
C103.2	Apply programming constructs of C language to solve the real world problem	L1,L2,L3	1,2,3,8,10

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C103.3	Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting	L1,L2,L3	1, 2, 3,8,10
C103.4	Explore user-defined data structures like structures, unions and pointers in implementing solutions	L1,L2,L3	1, 2,3,8,10
C103.5	Design and Develop Solutions to problems using modular programming constructs using functions	L1,L2,L3	1, 2,3,8,10

4.0 Course Content

C103.3	Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting	L1,L2,L3	1, 2, 3,8,10
C103.4	Explore user-defined data structures like structures, unions and pointers in implementing solutions	L1,L2,L3	1, 2,3,8,10
C103.5	Design and Develop Solutions to problems using modular programming constructs using functions	L1,L2,L3	1, 2,3,8,10

4.0 Course Content

Module-1 (6 Hours of Pedagogy)

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

Textbook: Chapter 1.1-1.9, 2.1-2.2, 8.1 - 8.6 ,9.1-9.14

Module-2 (6 Hours of Pedagogy)

Operators in C, Type conversion and typecasting.

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

Textbook: Chapter 9.15-9.16, 10.1-10.6

Module-3 (8 Hours of Pedagogy)

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

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

Textbook: Chapter 11.1-11.10, 12.1-12.10,12.12

Module-4 (6 Hours of Pedagogy)

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

Textbook: Chapter 13.1-13.6, 14-14.7


Module-5 (6 Hours of Pedagogy)

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

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

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Textbook: Chapter 15.1 – 15.10, 16.1-16.5

Programming Assignments:

- Simulation of a Simple Calculator.
- Compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages.
- An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs. 100 as meter charge. If the total amount is more than Rs 400, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges.
- Write a C Program to display the following by reading the number of rows as input,

```

1
1 2 1
1 2 3 2 1
1 2 3 4 3 2 1

```

nth row

- Implement Binary Search on Integers.
- Implement Matrix multiplication and validate the rules of multiplication.
- 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.
- Sort the given set of N numbers using Bubble sort.
- Write functions to implement string operations such as compare, concatenate, and find string length. Use the parameter passing techniques.
- Implement structures to read, write and compute average- marks of the students, list the students scoring above and below the average marks for a class of N students.
- Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.
- Write a C program to copy a text file to another, read both the input file name and target file name.

5.0 Relevance to future subjects


S. No	Semester	Subject	Topics
01	II	C++/Java/Python Programming	Functions, Arrays, Structure
02	III	Data Structures & Applications	Arrays, Structure, union, pointers
03	IV	Design of Algorithms	Arrays, Structure, union, pointers,
04	VI	System Software and Compiler	Arrays, Structure, union, pointers,

6.0 Relevance to Real World

S. No	Real World Mapping
01	Widely used and highly portable Language for building system as well as application softwares.

7.0 Gap Analysis and Mitigation

S. No	Delivery Type	Details
01	E-content	E-learning. vtu.ac.in/econtent/courses/video/BS/15PCD23.html
02	MOOC	https://nptel.ac.in/courses/106/105/106105171/

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8.0 Books Used and Recommended to Students

Text Books
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.
Additional Study material & e-Books
1. C Tutorials –videos on YouTube 2. E-learning- vtu.ac.in/econtent/courses/video/BS/15PCD23.html 3. https://nptel.ac.in/courses/106/105/106105171/ 4. elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html 5. 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.

9.0 Relevant Websites (Reputed Universities and Others) for Notes /Animation / Videos Recommended

Website and Internet Contents References
1) https://nptel.ac.in/courses/106/105/106105171/

10.0 Magazines/Journals Used and Recommended to Students

S.No	Magazines/Journals	Website
1	<u>C/C++ Users Wiki Journal</u>	https://en.wikipedia.org/
2	<u>Electronics for You</u>	https://electronicsforu.com/

11.0 Examination Note

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/onecourse 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

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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 15th 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:

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


1. The question paper will have ten questions. Each question is set for 20 marks. Marks scored shall be proportionally reduced to 50 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.

12.0 Course Delivery Plan

Module	Lecture No.	Content of Lecture	Teaching-Learning Process	% of Portion
		PART - A		
1	L1.	Introduction to C: Introduction to computers, input and output devices	Chalk &board, PPT, Animation, Active Learning	20
	L2.	Designing efficient programs		
	L3.	Introduction to C, Structure of C program		
	L4.	Files used in a C program		
	L5.	Compilers, Compiling and executing C programs		
	L6.	variables, constants, Input/output statements in C		
2	L7.	Operators in C, Type conversion and typecasting	Chalk & board, ActiveLearning, Problem based learning	20
	L8.	Introduction to decision control		
	L9.	Conditional branching statements		
	L10.	iterative statements		
	L11.	nested loops		
	L12.	break and continue statements, goto statement.		
3	L13.	Functions: Introduction using functions	Chalk & board, PPT, Animation, NPTEL, Active Learning	20
	L14.	Function definition, function declaration, function call, return statement		
	L15.	passing parameters to functions, scope of variables, storage classes		
	L16.	recursive functions		
	L17.	Arrays: Declaration of arrays, accessing the elements of an array, storing values in arrays		

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	L18.	Operations on arrays, Passing arrays to functions		
	L19.	two dimensional arrays, operations on two-dimensional arrays		
	L20.	two dimensional arrays to functions, multidimensional arrays, applications of arrays.		
	L21.	Strings and Pointers: Introduction, string taxonomy, operations on strings,	Chalk & board, Problembased learning	20
	L22.	Miscellaneous string and character functions,		
	L23.	arrays of strings		
	L24.	Introduction to pointers, declaring pointer variables		
	L25.	Types of pointers		
	L26.	passing arguments to functions using pointers.		
	L27.	Introduction to structure, structures and functions	Chalk & board, MOOC	20
	L28.	Unions, unions inside structures,		
	L29.	Enumerated data type		
	L30.	Files: Introduction to files, using files in C		
	L31.	reading and writing data files		
	L32.	Detecting end of file		
	P1.	Simulation of a Simple Calculator.	Conduction of Experiments in laboratory and viva-voce	
	P2.	Compute the roots of a quadratic equation by accepting the coefficients. Print appropriate messages.		
	P3.	An electricity board charges the following rates for the use of electricity: for the first 200 units 80 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs. 100 as meter charge. If the total amount is more than Rs 400, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges.		
	P4.	Write a C Program to display the following by reading the number of rows as input, <div style="text-align: center;"> 1 1 2 1 1 2 3 2 1 1 2 3 4 3 2 1 </div>		
	P5.	Implement Binary Search on Integers.		
	P6.	Implement Matrix multiplication and validate the rules of multiplication		
	P7.	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.		
	P8.	Sort the given set of N numbers using Bubble sort.		
	P9.	Write functions to implement string operations such as compare, concatenate, and find string length. Use the parameter passing techniques.		

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	P10.	Implement structures to read, write and compute average-marks of the students, list the students scoring above and below the average marks for a class of N students.		
	P11.	Develop a program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of N real numbers.		
	P12.	Write a C program to copy a text file to another, read both the input file name and target file name.		


13.0 Assignments, Quiz, GD, Mini Project, Seminars

S. No.	Title	Outcome expected	Related Study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment-1: Introduction to Computer Hardware & Software. (10Marks)	Students study the Topic and write the Answers.	Chapter-1 of Module-1	4	Individual Activity.	Book 1, 2 of the reference list.
2	Assignment-2: Character Array & Stings including problems. (10Marks)	Students study the Topics and write the Answers.	Chapter-2 of Module-3	9	Individual Activity.	Book 1, 2 of the reference list.
3	Quiz/Seminar/GD (20Marks)	Students study the Topics and answer the Quiz / present seminar.	Will be Notified later.	13	Individual/Group activity.	Book 1, 2 of the reference list.

14.0 QUESTION BANK

Module: 1

- 1 What is Computer? List and explain the generations of Computer.
- 2 Draw a neat block diagram of Computer and explain.
- 3 List and Explain the types of Computer based on size/Speed.
- 4 Draw a neat block diagram of Computer and explain (Jan-2020)
- 5 Differentiate between Primary memory and Secondary memory.
- 6 What is network? List and explain types of network.
- 7 What is Software? Explain the two types of software with Examples.
- 8 Write basic structure of C program and explain its different sections. (June/July-2018)
- 9 What is constant? Explain different types of constants with examples.
- 10 Define variables. List the rules for naming variables.
- 11 What is data type? Explain the basic data types that are supported by C
- 12 What is data type? Explain the basic data types that are supported by C
- 13 What are the rules to be followed to declare an identifier with example? (June/July-2018)
- 14 Define C- tokens. List and explain different C- tokens. (June/July-2018)
- 15 Write a note on operator precedence and Associativity. (June/July-2018)
- 16 What is formatted and unformatted input/output statement? Explain formatted and unformatted input/output statement with syntax and examples.
- 17 Explain printf() and scanf() function with an example.
- 18 Explain the getch(), gets() function with example.

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Module -2


- 1 Give classification of operators in C, explain with examples.
- 2 Define expression. Explain different types of Expressions.
- 3 Write a C program that takes the radius of the circle and calculates the area and perimeter of circle.
- 4 Write a C program that takes from the user and calculates their sum and average.
- 5 Write a C program to print numbers from 4 to 9 and their squares using printf () function.
- 6 Write a C program to find out largest of three numbers.
- 7 Write a C program to find the largest of three numbers using conditional operators.
- 8 An Electric power distribution company charges its domestic customers as follows:

Consumption Units	Rate of charge
0 - 200	Rs 0.50 per units
201 – 400	Rs 100 + Rs 0.65 per unit excess of 200
401 – 600	Rs 230 + Rs 0.80 per unit excess of 400
601 - above	Rs 390 + Rs 1.00 per unit excess of 600

- Write a C program to compute and print amount to be paid by the customer. (June/July-2018)
- 9 Write the Syntax of different looping control constructs and explains their working. (June/July-2018)
 - 10 Distinguish between the following:
i) goto and if ii) break and continue (June/July-2018)
 - 11 Write the syntax of nested if ...else statement and explain its working. (June/July-2018)
 - 12 Differentiate between do...while and while loop, with the help of Syntax. (June/July-2018)
 - 13 Write a C program to calculate area of circle, rectangle and triangle using switch
 - 14 Write a C program to plot a Pascal's triangle by reading the value of n.
 - 15 Given an integer number, write a C program using while loop to reverse the digits of the number.
 - 16 Write a C program to compute the binomial coefficients by reading the value of n.
 - 17 Write a C program to find the factorial of a given number using while loop.
 - 18 Write a C program to find roots of quadratic equation $ax^2 + bx + c$.
 - 19 Explain with syntax and example the switch case statement.
 - 20 Write a C program to find whether given no. is palindrome or not
 - 21 Write a C program to check whether the entered no. is prime or not.
 - 22 Explain the nesting of loops in C with examples.

Module- 3

- 1 What is array? How do you classify arrays? What are the advantages of arrays?
- 2 Explain the declaration and Initialization of 1-D and 2-D arrays with examples.
- 3 With an example, explain how the elements of two dimensional arrays stored in row major and column major order.
- 4 Define string? Explain the string handling functions in C.
- 5 What is string? How are they declared and initialized? Explain with example.
- 6 Explain the following string library functions: i. strlen() ii. strcpy() iii. strcat()
- 7 Write a C program to compare two strings without using library function.
- 8 Write a C program that accepts a string at the runtime and checks whether string is palindrome or not.
- 9 Given a string. Write a C program to count the number of A's in that string. Do not use any built in function.
- 10 Write a C program to find the largest element of an array of a given size.
- 11 Write a C program to find the number of positive, negative and zero elements in a given list of integers
- 12 Write a C program to find sum and average of N integer numbers using arrays.
- 13 Write a C program to find addition of two matrices.
- 14 Write a C program to find product of two matrices.
- 15 Write a C program to input 30 students' marks in a test through the keyboard. Compute and display average marks, highest marks and lowest marks.
- 16 Write a C program to search a given number in the list using Linear search.

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- 17 Write a C program to search a key integer element in the given array of N elements using binary search Technique. Print the output with suitable headings. (June/July-2018)
- 18 Write a C program to sort the given numbers in ascending order using Bubble sort.
- 21 What is function? What are the needs of function? What are its advantages?
- 22 Explain the function declaration with a suitable example.
- 23 Explain the different types of functions with examples.
- 24 What are the elements of functions? Explain.
- 25 What are the different ways of passing parameters to functions? Explain
- 26 Distinguish between actual parameters and formal parameters.
- 27 Distinguish between local and global variables.
- 28 Write a program to find the sum of odd numbers up to 50 using function.
- 29 Write a C functions to find sum of individual digits of given a number.
- 30 What is recursive function? Write a C program to accept two positive integers and compute their GCD using a recursive function.
- 31 Write a C program to print numbers from 1 to n, which are divisible by 6, using a function.
- 32 Write a function to test whether or not a given integer number is prime. Write main () which reads the integer to be tested from keyboard and calls the function to test for primness
- 33 Write a C program to find sum, Average & standard deviation of n values using functions.
- 34 Write a C function to length of string and check whether the entered string is palindrome or not.
- 35 Write a C function to find sum of specified row, sum of specified column and sum of all the elements of a matrix.
- 36 Write a C function to search the given element in a list using linear search technique.
- 37 Write a C program to find nth Fibonacci number in the series using recursion. (June/July-2018)
- 38 Write a C program to find the factorial of a positive integer using function.

Module- 4

- 1 Write a C program to sort the given numbers in ascending order using Selection sort.
- 2 Write a C program to find length of a string without using strlen() function. (June/July-2018)
Write a program in C to separate the individual characters from a string.
- 3 Write a program in C to print individual characters of string in reverse order.
- 4 Write a program in C to compare two strings without using string library functions
- 5 Write a program in C to count total number of alphabets, digits and special characters in a string.
- 6 Write a program in C to copy one string to another string
- 7 Write a program in C to count total number of vowel or consonant in a string.
- 8 Write a C program to sort a string array in ascending order.
- 9 What is pointer? Explain how to declare a variable as a pointer.
- 10 Write a C program to demonstrate the usage of pointers.
- 11 Write a program to display the value of variable and its location using pointer
- 12 If P is a pointer having address 2000 what could be values for the following:
 $P = P+2;$ for int *P;
 $P = P-1;$ for float *P;
 $P = P+10;$ for char *P;
 $P = P+1;$ for double *p;
- 13 Write a program to read two integers M and N and swap the content of two variables M and N using pointers.
- 14 Write a program using pointers in C to print a string in reverse order.

Module- 5


- 1 What are the structures in C? What is the need of structures?
- 2 What is Union? Give difference between union and structure with examples.
- 3 Explain declaring structure variables and initializing structure variables.
- 4 Explain nested structures with examples.
- 5 Write a note on the following with as example for each: (June/July-2018)
 i) Array of structures ii) Array within structures iii) Structures within structures


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- 6 Create a structure st_record having members student Name (Sname) and students marks (Smarks). Write a C program which reads name and marks of two students and compare whether both students are same. (June/July-2018)
- 7 Mention syntax and give an example for the following:
i) Structure definition ii) Structure variable declaration (June/July-2018)
- 8 Write a program that takes roll numbers, names, and marks of three students in three different subjects as input and prints total marks and percentage of each student
- 9 Write a program that takes book id, author name, publisher name, and price for a book as input and prints the same information as output.
- 10 Write a program in C to create and store information in a text file.
- 11 Write a program in C to read an existing file.
- 12 Write a program in C to read the file and store the lines into an array.
- 13 Write a program in C to Find the Number of Lines in a Text File.
- 14 Write a program in C to count a number of words and characters in a file.

15.0 University Result

Examination	S+	S	A	B	C	D	E	F	% Passing
NOV-2022									87.24

Prepared by	Checked by		
			
Prof. S. V. Manjaragi	Dr. M. G. Huddar	HOD	Principal

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Subject Title	INTRODUCTION TO ELECTRICAL ENGINEERING		
Subject Code	22ESC142	CIE Marks	50
Teaching hours/week(L:T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Exam Hours	100
CREDITS – 03			

FACULTY DETAILS:

Name: Prof. H. R. Zinage	Designation: Assistant Professor	Experience: 22 Years
No. of times course taught(including present): 20	Specialization: Power Systems	

1.0 Prerequisite Subjects:

Sl. No	Basics required	Class	Subject
01	Basic knowledge of electrical quantities like voltage, current, power and circuit elements like resistor, capacitor & inductor.	PUC I/II	Physics
02	Algebraic equations and its simplification.	PUC I/II	Mathematics
03	AC Fundamentals	PUC-II	Physics


2.0 Course Objectives

- To explain the laws used in the analysis of DC and AC circuits.
- To explain the behavior of circuit elements in single-phase circuits.
- To explain the construction and operation of transformers, DC generators and motors and induction motors.
- To introduce concepts of circuit protecting devices and earthing.
- To explain electric power generation, transmission and distribution, electricity billing, equipment and personal safety measures.

3.0 Course Outcomes

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

	Course Outcome	RBT Level	POs
C103.1	Understand the concepts of various energy sources and Electric circuits.	L2	PO1, PO2, PO3, PO5, PO6, PO7, PO8, PO12
C103.2	Apply the basic Electrical laws to solve circuits.	L2	PO1, PO2, PO3, PO4, PO5, PO6, PO12
C103.3	Discuss the construction and operation of various Electrical Machines.	L2	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO12
C103.4	Identify suitable Electrical machine for practical implementation.	L1	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO12
C103.5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.	L1,L2	PO1, PO2, PO3, PO5, PO6, PO7, PO8, PO11, PO12
Total Hours of instruction			40

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4.0 Course Content

MODULE-1

Introduction: Conventional and non-conventional energy resources; General structure of electrical power systems using single line diagram approach.

Power Generation: Hydel, Nuclear, Solar & wind power generation (Block Diagram approach).

DC Circuits: Ohm's Law and its limitations. KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical.

MODULE-2

A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical).

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

MODULE-3

DC Machines:

DC Generator: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical.

DC Motor: 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

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

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.

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5.0 Relevance to Real World

SL. No	Real World Mapping
1.	Calculating branch current in the circuits, measurement of power, evaluating performance analysis of electric machines, Use of Fuses and MCB.
2.	Installation of Electrical Earthing and Power Supply scheme for transmission and distribution.
3.	Understanding of Electric Safety measures and Electricity billing.

6.0 Gap Analysis and Mitigation

SL. No	Delivery Type	Details
1	Demonstration (Using Models, Charts and field visits)	Topic: 1) Visit to basic electrical engg. lab to understand dc circuits, Single and three phase circuit configurations, measurement of power and application of maximum power transfer theorem. 2) Visit to Electrical machines lab to observe the cut out section and actual machine parts. 3) Field visit of HT Substation, Power distribution control panel room and Generator to understand electricity billing and layout.

7.0 Books Used and Recommended to Students

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, 3rd edition, 2014.


8.0 Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

- <http://nptel.vtu.ac.in/econtent/BS.php>
- <https://www.electrical4u.com>

9.0 Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	Journal of Electrical Engg.	http://www.jee.ro
2	Electrical4U	http://www.electrical4u.com

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11.0 Examination Note

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; 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- 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 20marks. 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.

12.0 Course Delivery Plan

Module	Lecture No.	Content of Lecture	% of Portion coverage
I	1.	Introduction: Conventional and non-conventional energy resources.	20
	2.	General structure of electrical power systems using single line diagram approach.	
	3.	Power Generation: Hydrel, Nuclear.	
	4.	Solar & wind power generation (Block Diagram approach).	
	5.	DC Circuits: Ohm's Law and its limitations.	
	6.	KCL & KVL, series, parallel.	
	7.	Series-parallel circuits.	
	8.	Simple Numerical	
II	9.	A.C. Fundamentals: Equation of AC Voltage and current,	20

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		waveform, time period, frequency, amplitude.	
	10.	phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions)	
	11.	Voltage and current relationship with phasor diagrams in R, L, and C circuits.	
	12.	Concept of Impedance. Analysis of R-L.	
	13.	R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical).	
	14.	Three Phase Circuits: Generation of Three phase AC quantity, advantages and limitations.	
	15.	star and delta connection, relationship between line and phase quantities (excluding proof)	
	16.	Simple numerical.	
III	17.	DC Machines: DC Generator: Principle of operation, constructional details.	20
	18.	Induced emf expression, Relation between induced emf and terminal voltage. Simple numerical.	
	19.	Types of generators.	
	20.	DC Motor: Principle of operation, back emf and its significance.	
	21.	Torque equation, types of motors, characteristics and speed control (armature & field) of DC motors (series & shunt only).	
	22.	Characteristics and speed control (armature & field) of DC motors (series).	
	23.	Characteristics and speed control (armature & field) of DC motors (shunt).	
	24.	Applications of DC motors. Simple numerical.	
IV	25.	Transformers: Necessity of transformer, principle of operation,	20
	26.	Types and construction of single phase transformers.	
	27.	EMF equation, losses, variation of losses with respect to load. Efficiency	
	28.	Simple numerical.	
	29.	Three-phase induction Motors: Concept of rotating magnetic field, Principle of operation.	
	30.	Constructional features of motor, types – squirrel cage and wound rotor.	
	31.	Slip and its significance	
	32.	Simple numerical	
V	33.	Domestic Wiring: Requirements, Types of wiring: casing, capping.	20
	34.	Two way and three way control of load.	
	35.	Electricity Bill: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc	
	36.	Definition of "unit" used for consumption of electrical energy, two-	

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		part electricity tariff.	
	37.	calculation of electricity bill for domestic consumers.	
	38.	Equipment Safety measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.	
	39.	Personal safety measures: Electric Shock, Earthing and its types.	
	40.	Safety Precautions to avoid shock.	

13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1:	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 1	4	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.
2	Assignment 1:	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 2	6	Individual Submission in the standard format is expected	Books 1 and 2 of the text books..
3	Assignment 1:	Students study the Topics and write the Answers. Get practice to solve university questions	Module 3	8	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.
4	Assignment 2:	Students study the Topics and write the Answers. Get practice to solve university questions	Module 4	10	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.
5	Assignment 2:	Students study the Topics and write the Answers. Get practice to solve university questions	Module 5	12	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.

14.0 QUESTION BANK

MODULE-1

Introduction and Power Generation

1. Explain about conventional and non-conventional energy sources.
2. With neat block diagram Hydel power generation.
3. Explain nuclear power generation with neat block diagram.



4. Explain solar power generation with neat block diagram.
5. Explain wind power generation with neat block diagram.
6. Explain the general structure of electrical power systems using single line diagram.

DC circuits

7. Explain ohms law and state its limitations.
8. How the voltage and current is divided in series, parallel and series-parallel circuits? Also state the advantages & limitations of these circuits.
9. Find current through all the branches of the network shown in fig1.below.
10. For the circuit shown in fig.2 Calculate, a) equivalent resistance between the supply terminals b) Current supplied by the source c) Power consumed by the 16 ohm resistor.

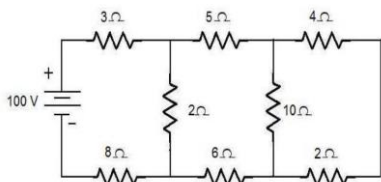


Fig.1

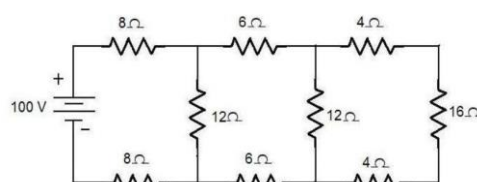


Fig.2

11. In the circuit shown in Fig3, determine the current through the 2 ohm resistor and the total current delivered by the battery. Use Kirchoff's laws.
12. In the network shown in fig 4, find the current delivered by the battery.

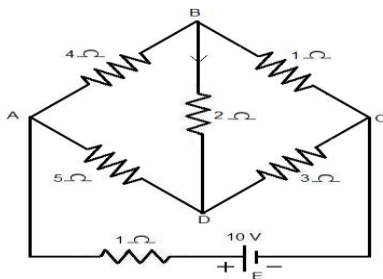


Fig.3

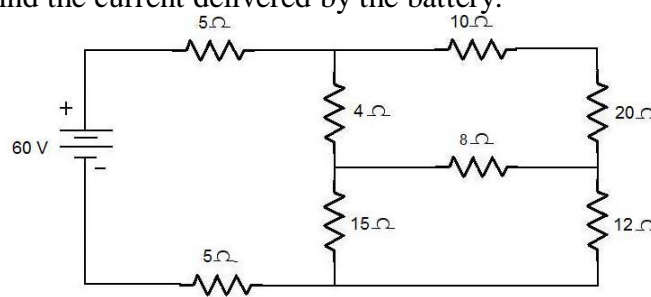


Fig.4

13. Find the unknown resistor R where power consumed by the network is 16W for the network shown in fig.5.
14. Find the currents I_1, I_2 and I_3 for the circuit shown in Fig.6. Also find potential difference between a and b.
15. Determine the potential difference between x and y. for the circuit shown in fig.7.

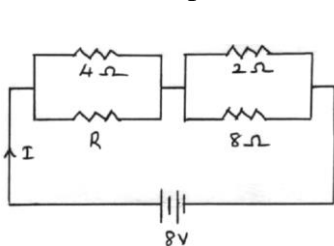


Fig.5

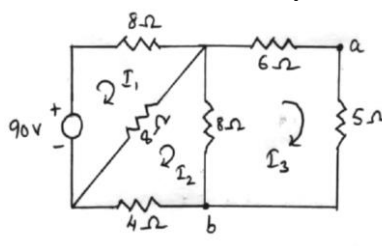


Fig.6

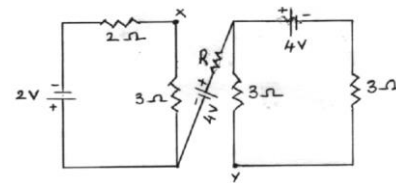
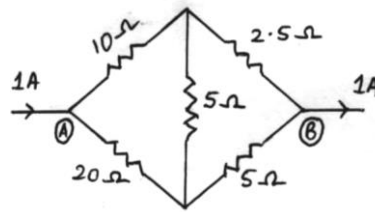


Fig.7

16. Find the currents in all the resistors of the network shown in the fig. Also find the potential at A w.r.t. that at B.




17. A resistance R is in series with a parallel combination of two resistances of $12\ \Omega$ and $8\ \Omega$. The total power dissipation in the circuit is $70\ \text{W}$ when the supply voltage is $20\ \text{V}$. Find R .
18. A current of $20\ \text{A}$ flows through two ammeters A and B in series. The p.d. across A is $0.2\ \text{V}$ and that across B is $0.3\ \text{V}$. Find how the same current will divide between A and B when they are in parallel.

MODULE -2

Single Phase Circuits

1. Define/Explain the following terms w.r.t alternating quantities: a) Phase & phase difference and b) Frequency and period.
2. Define and hence find the instantaneous value, peak value, RMS value, average value, form factor and peak factor of alternating quantities.
3. With a neat schematic, explain the principle of generation of alternating voltage.
4. Explain the generation of single-phase AC induced emf with sinusoidal diagram.
5. The equation for an AC voltage is given as $V = 0.04\sin(200t + 60^\circ)\ \text{V}$. Determine the frequency, the angular frequency, instantaneous voltage when $t = 160\ \mu\text{s}$. What is the time represented by 60° phase angle?
6. Show that the average power consumed in a pure capacitor and in a pure inductor is zero.
7. Define power factor, explain its significance and establish the phase relationship between voltage and current in series and parallel combinations of a) RL circuit, b) RC circuit and c) RLC circuits (for different cases). Sketch the phasor diagrams and impedance diagrams in all the cases.
8. A coil when connected to $200\ \text{V}$, $50\ \text{Hz}$ supply takes a current of $10\ \text{A}$ and dissipates $1200\ \text{W}$. Find the resistance & reactance of the coil. Find also the real power, reactive power and overall power. Sketch the phasor diagram.
9. A coil of $50\ \Omega$ and $0.5\ \text{H}$ is connected across $200\ \text{V}$, $50\ \text{Hz}$ supply. Find a) Inductive reactance, b) Circuit impedance, c) Supply current, d) Power factor, e) Phase angle, f) Voltages across R & L and g) Active, reactive and overall (apparent) power. Obtain expressions for voltage and current. Also sketch the complete phasor and vector diagrams.
10. A capacitor of $15\ \mu\text{F}$ is connected in series with a non-inductive resistance of $100\ \Omega$ across a $100\ \text{V}$, $50\ \text{Hz}$ supply. Find a) Capacitive reactance, b) Impedance, c) Current, d) Power factor, e) Phase angle, f) Voltages across R & C and g) Power dissipated. Obtain expressions for voltage and current. Also sketch the phasor diagrams.
11. An RLC series circuit has the following data. $R = 25\ \Omega$; $L = 150\ \text{mH}$; $C = 20\ \mu\text{F}$; $250\ \text{V}$ $50\ \text{Hz}$ supply. Determine the supply current and the various voltage drops. Represent them in a phasor diagram.
12. A choke is connected in series with a non-inductive resistor across a $250\ \text{V}$, $50\ \text{Hz}$ supply. It draws a current of $5\ \text{A}$. The voltage across the coil and the non-inductive resistance are $125\ \text{V}$ & $200\ \text{V}$ respectively. Find: a) R , X , Z & Y , b) Power loss in the coil, and c) Total power supplied. Sketch the phasor and impedance diagrams.
13. Two impedances $Z_1 = (150 - j157)\ \Omega$ & $Z_2 = (100 + j100)\ \Omega$ are connected in parallel across a $200\ \text{V}$, $50\ \text{Hz}$ supply. Find a) Branch currents, b) Total current and c) Complex power, and d) Total power. Sketch the complete phasor and admittance diagrams.

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14. An ac generator with an internal impedance of $(3+j2.4) \Omega$ is connected to load impedance consisting of two impedances $(12+j10) \Omega$ & $(16-j12) \Omega$ in parallel. If the supply voltage is 100V, determine a) the current in each branch, b) the power in each branch
15. Show that in a pure inductor the current lags behind the voltage by 90° . Also draw the voltage and current waveforms.


Three Phase Circuits:

16. With a schematic, explain the principle of generation of 3-phase emf. What are the characteristics of balanced supply? When is a load said to be balanced? Establish the relationship between the phase & line currents and voltages in a 3-phase delta. In the case of balanced supply and load, (a) are the phase voltages equal? (b) are the line currents equal? Justify your answers. Sketch the complete phasor diagrams in every case.
17. Explain the concept of 'phase sequence'. Establish the relationship between the phase & line currents and voltages in a 3Φ star with 3-wire and 4-wire systems. In the case of balanced supply and balanced load, (a) are the line voltages equal? (b) are the phase currents equal? Justify your answers. Sketch the complete phasor diagrams in every case.
18. Show with a relevant phasor diagram how 3-phase power can be measured by two wattmeters.
19. Two wattmeters are used to measure the power in a 3Φ balanced system. What is the power factor when a) both the meters read equal, b) one meter reads twice the other, c) one meter reads zero and d) one meter reads negative?
20. What are the advantages of a 3Φ system over a single-phase system?
21. Three coils each of impedance $20\angle 60^\circ \Omega$ are connected in star across a 400V, 3Φ , 50Hz supply. Find the reading on each of the two wattmeters connected to measure the power input. If the same impedances were connected in delta across the same supply, find the corresponding readings of the wattmeters. Find the reactive power and the apparent power.
22. A balanced 3phase star connected load of 150kw takes a leading current of 100A with a line voltage of 1100V, 50Hz. Find the circuit constants of the load per phase.
23. A 400V, delta connected 75 HP induction motor operates at 85% efficiency at 0.8pf. Find the readings of the wattmeters connected to measure power by the two-wattmeter method.

MODULE-3

DC Machines & DC Generators

1. Explain the principle of operation of a dc generator.
2. With a neat sketch explain the construction of a dc generator.
3. Derive the emf equation of a dc generator.
4. Explain the different types of dc generators & mention their applications.
5. A 4 pole, wave-wound dc generator has 50 slots and 24 conductors / slot. The flux/pole is 10mWb. Determine the induced emf in the armature if it is rotating at 600 rpm. Solve the same problem if the machine is lap-wound.
6. A 6 pole, wave-wound DC generator has 70 conductors & 12mWb flux/pole. Determine the speed of the armature if the induced emf is 400V. What will be the speed when it is lap wound and generating 400V?
7. A dc shunt generator supplies a load of 10kW at 250V. Calculate the induced emf if the armature resistance is 0.5Ω and shunt field resistance is 100Ω .
8. A shunt generator has an induced emf of 254V. When the machine is loaded the terminal voltage falls to

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240V. Find the load current if the armature resistance and field resistance are 0.04Ω & 24Ω respectively. Brush contact drop is 1.5V/brush.

9. A dc long shunt compound generator delivers a load current of 200A at 500V. The resistance of armature, series field and shunt field are 0.03Ω , 0.015Ω & 15Ω respectively. Calculate the emf induced in the armature. Assume a brush drop of 1V per brush.


DC Motor

10. Explain the principle of operation of a dc motor.
11. Explain the significance of back emf of a dc motor. Derive an expression for the back emf.
12. Derive the torque equation of a dc motor.
13. Explain the different types of dc motors. Mention their applications.
14. Sketch and explain the following characteristics for series, shunt motors.
Torque vs. Armature current, and Speed vs. Armature current.
15. A 20kW, 200V dc shunt generator has a armature and field resistances of 0.05Ω and 150Ω respectively. Determine the total current and power developed when working as a motor taking 20kW power.
16. A 250V dc series motor has an armature resistance of 0.05Ω and field resistance of 0.02Ω . It runs at 900rpm taking 30A. Determine its speed when it takes a current of 25A.
17. A dc shunt motor runs at 950 rpm on 200V with 40A armature current. Its armature resistance is 0.8Ω . What resistance is required to be connected in the armature circuit to reduce the speed to 725 rpm without changing the armature current?

MODULE-4

Transformers

1. Explain the construction & principle of operation of 1Φ transformer. Derive the emf equation of a transformer.
2. What are the losses in a transformer? On what factors do they depend? How are losses reduced in a transformer by construction?
3. Explain with neat sketches the core and shell type transformers.
4. Define and explain the term *efficiency* of a transformer.
5. A 125kVA transformer has a primary voltage of 2000V at 60Hz with 182 & 40 turns on primary and secondary respectively. Neglecting the losses calculate a) no load secondary emf b) full load primary & secondary currents and c) flux in the core.
6. A 25kVA transformer has an efficiency of 97% both at FL and at half load at 0.8pf. Determine a) full load iron & copper loss, b) efficiency at 75% FL and c) max efficiency.
7. A 25kVA, 2200/250V transformer has an iron loss of 600W & full load copper loss of 1000W.
8. Calculate efficiencies at i) full load ii) 75% load iii) 50% load iv) 25% load at upf & 0.8pf lag,
9. v) Losses at max. Efficiency vi) load for max. Efficiency and vii) max. Efficiency at upf.
10. The iron and full load copper losses in a 40kVA, 1Φ transformer are 450W & 850W respectively.
11. Find i) efficiency at full load, 0.8pf lag ii) max efficiency and iii) load at which the maximum
12. efficiency occurs.
13. A 50kVA transformer has an efficiency of 98% at full load 0.8pf and 97% at half load 0.9pf.
14. Determine the full load iron and copper losses. Find the load at which max. Efficiency occurs as
15. also the maximum efficiency.
16. Give reasons for the following: a) Core loss in a transformer remains almost constant
b) A laminated steel core is used in a transformer.
17. List different types of loss in a transformer and explain each one in brief.
18. A 12 pole, 3Φ alternator is coupled to an engine running at 500rpm. It supplies an induction motor which

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has a full load speed of 1440rpm. Find the percentage slip and the number of poles of the motor.

Three Phase Induction Motors:

1. Explain the principle of operation and constructional features of a 3Φ induction motor.
2. Define and explain slip in an induction motor.
3. What are squirrel cage and wound-rotor induction motors? What are their relative advantages and disadvantages? Mention their applications.
4. A 3Φ , 8 pole, 60Hz induction motor has a slip of 3% at full load. Find the synchronous speed and the frequency of rotor current at full load.
5. Explain the concept of rotating magnetic field and show that resultant flux remains same at different instants of time.

MODULE-5

Domestic wiring:

1. What are the requirements of domestic wiring system?
2. Mention the various types of wiring.
3. Explain casing-capping wiring with neat diagram.
4. Explain two way control of load with neat circuit diagram and truth table.
5. Explain three way control of load with neat circuit diagram and truth table.

Electricity bill:

1. What do you understand by Tariff? Discuss the objectives of Tariff.
2. Describe the desirable characteristics of a tariff.
3. Explain two part tariff.
4. A consumer has a maximum demand of 200 kW at 40% load factor. If the tariff is Rs. 100 per kW of maximum demand plus 10aise per kWh, Find the overall cost per kWh.
5. What is the unit for measure for electricity consumption?
6. What do you understand by term "unit" w.r.t. consumption of electrical energy.

Equipment Safety measures:




1. What is fuse? Discuss the advantages and disadvantages of a fuse.
2. What are desirable characteristics of fuse element.
3. Define and explain the following terms
 - i) Fusing current
 - ii) Cut off current
 - iii) Operating time
 - iv) Breaking capacity
4. Explain the term 'fusing factor' with respect to fuse element.
5. Explain the working principle of fuse and MCB. Also discuss their merits and demerits.
6. Write a short note on difference between fuse and miniature circuit breaker w.r.t. protection of electrical installation.


Personal Safety measures

1. What is the need of earthing in electrical installation?
2. What is earthing? Why earthing is required?
3. With the help of neat sketch, explain plate earthing.
4. With the help of neat sketch, explain pipe earthing.



5. Write a short note on precautions against electric shock.
6. What is electric shock? What are the precautions to be taken to prevent electric shocks?

Prepared and Checked By		
 Smt. H. R. Zinage	 HOD	 Principal

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Subject Title	INTRODUCTION TO ELECTRICAL ENGINEERING		
Subject Code	BESCK104x	CIE Marks	50
Teaching hours/week(L:T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Exam Hours	100
CREDITS – 03			

FACULTY DETAILS:		
Name: Dr. B. V. Madiggond	Designation: Professor & HOD	Experience: 29Years
No. of times course taught(including present): 20	Specialization: Power Electronics	

1.0 Prerequisite Subjects:

Sl. No	Basics required	Class	Subject
01	Basic knowledge of electrical quantities like voltage, current, power and circuit elements like resistor, capacitor & inductor.	PUC I/II	Physics
02	Algebraic equations and its simplification.	PUC I/II	Mathematics
03	AC Fundamentals	PUC-II	Physics


2.0 Course Objectives

- To explain the laws used in the analysis of DC and AC circuits.
- To explain the behavior of circuit elements in single-phase circuits.
- To explain the construction and operation of transformers, DC generators and motors and induction motors.
- To introduce concepts of circuit protecting devices and earthing.
- To explain electric power generation, transmission and distribution, electricity billing, equipment and personal safety measures.

3.0 Course Outcomes

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

	Course Outcome	RBT Level	POs
C103.1	Understand the concepts of various energy sources and Electric circuits.	L2	1, 2, 3, 5, 6, 7, 8, 12
C103.2	Apply the basic Electrical laws to solve circuits.	L2	1, 2, 3, 4, 5, 6, 12
C103.3	Discuss the construction and operation of various Electrical Machines.	L2	1, 2, 3, 4, 5, 6, 7, 8, 12
C103.4	Identify suitable Electrical machine for practical implementation.	L2	1, 2, 3, 4, 6, 7, 8, 12
C103.5	Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.	L2	1, 2, 3, 5, 6, 7, 8, 11, 12

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Total Hours of instruction	40
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4.0 Course Content

MODULE-1

Introduction: Conventional and non-conventional energy resources; General structure of electrical power systems using single line diagram approach.

Power Generation: Hydel, Nuclear, Solar & wind power generation (Block Diagram approach).

DC Circuits: Ohm's Law and its limitations. KCL & KVL, series, parallel, series-parallel circuits. Simple Numerical.

MODULE-2

A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions) Voltage and current relationship with phasor diagrams in R, L, and C circuits. Concept of Impedance. Analysis of R-L, R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical).

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

MODULE-3

DC Machines:

DC Generator: Principle of operation, constructional details, induced emf expression, types of generators. Relation between induced emf and terminal voltage. Simple numerical.

DC Motor: 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

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

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.

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5.0 Relevance to Real World

SL. No	Real World Mapping
1.	Calculating branch current in the circuits, measurement of power, evaluating performance analysis of electric machines, Use of Fuses and MCB.
2.	Installation of Electrical Earthing and Power Supply scheme for transmission and distribution.
3.	Understanding of Electric Safety measures and Electricity billing.

6.0 Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
1	Demonstration (Using Models, Charts and field visits)	Topic: 1) Visit to basic electrical engg. lab to understand dc circuits, Single and three phase circuit configurations, measurement of power and application of maximum power transfer theorem. 2) Visit to Electrical machines lab to observe the cut out section and actual machine parts. 3) Field visit of HT Substation, Power distribution control panel room and Generator to understand electricity billing and layout.

7.0 Books Used and Recommended to Students


Text Books: <ol style="list-style-type: none"> Basic Electrical Engineering by D C Kulshreshtha, Tata McGraw Hill, First Edition 2019 A text book of Electrical Technology by B.L. Theraja, S Chand and Company, reprint edition 2014
Reference Books: <ol style="list-style-type: none"> Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill 4th edition, 2019. Principles of Electrical Engineering & Electronics by V. K. Mehta, Rohit Mehta, S. Chand and Company Publications, 2nd edition, 2015. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI, 3rd edition, 2014.

8.0 Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References <ul style="list-style-type: none"> http://nptel.vtu.ac.in/econtent/BS.php https://www.electrical4u.com

9.0 Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	Journal of Electrical Engg.	http://www.jee.ro
2	Electrical4U	http://www.electrical4u.com

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10.0 Examination Note

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;

- 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
- 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 20marks. 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.

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11.0 Course Delivery Plan

Module	Lecture No.	Content of Lecture	% of Portion coverage
I	1.	Introduction: Conventional and non-conventional energy resources.	20
	2.	General structure of electrical power systems using single line diagram approach.	
	3.	Power Generation: Hydel, Nuclear.	
	4.	Solar & wind power generation (Block Diagram approach).	
	5.	DC Circuits: Ohm's Law and its limitations.	
	6.	KCL & KVL, series, parallel.	
	7.	Series-parallel circuits.	
	8.	Simple Numerical	
II	9.	A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude.	20
	10.	phase, phase difference, average value, RMS value, form factor, peak factor. (only definitions)	
	11.	Voltage and current relationship with phasor diagrams in R, L, and C circuits.	
	12.	Concept of Impedance. Analysis of R-L.	
	13.	R-C, R-L-C Series circuits. Active power, reactive power and apparent power. Concept of power factor. (Simple Numerical).	
	14.	Three Phase Circuits: Generation of Three phase AC quantity, advantages and limitations.	
	15.	star and delta connection, relationship between line and phase quantities (excluding proof)	
	16.	Simple numerical.	
III	17.	DC Machines: DC Generator: Principle of operation, constructional details.	20
	18.	Induced emf expression, Relation between induced emf and terminal voltage. Simple numerical.	
	19.	Types of generators.	
	20.	DC Motor: Principle of operation, back emf and its significance.	
	21.	Torque equation, types of motors, characteristics and speed control (armature & field) of DC motors (series & shunt only).	
	22.	Characteristics and speed control (armature & field) of DC motors (series).	
	23.	Characteristics and speed control (armature & field) of DC motors (shunt).	
	24.	Applications of DC motors. Simple numerical.	
IV	25.	Transformers: Necessity of transformer, principle of operation,	20
	26.	Types and construction of single phase transformers.	

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	27.	EMF equation, losses, variation of losses with respect to load. Efficiency	
	28.	Simple numerical.	
	29.	Three-phase induction Motors: Concept of rotating magnetic field, Principle of operation.	
	30.	Constructional features of motor, types – squirrel cage and wound rotor.	
	31.	Slip and its significance	
	32.	Simple numerical	
V	33.	Domestic Wiring: Requirements, Types of wiring: casing, capping.	20
	34.	Two way and three way control of load.	
	35.	Electricity Bill: Power rating of household appliances including air conditioners, PCs, laptops, printers, etc	
	36.	Definition of "unit" used for consumption of electrical energy, two-part electricity tariff.	
	37.	calculation of electricity bill for domestic consumers.	
	38.	Equipment Safety measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.	
	39.	Personal safety measures: Electric Shock, Earthing and its types.	
	40.	Safety Precautions to avoid shock.	

12.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1:	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 1	4	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.
2	Assignment 1:	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 2	6	Individual Submission in the standard format is expected	Books 1 and 2 of the text books..
3	Assignment 1:	Students study the Topics and write the Answers. Get practice to solve university questions	Module 3	8	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.
4	Assignment 2:	Students study the Topics and write the Answers. Get practice to solve university questions	Module 4	10	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.

5	Assignment 2:	Students study the Topics and write the Answers. Get practice to solve university questions	Module 5	12	Individual Submission in the standard format is expected	Books 1 and 2 of the text books.
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13.0 QUESTION BANK

MODULE-1

Introduction and Power Generation

1. Explain about conventional and non-conventional energy sources.
2. With neat block diagram Hydel power generation.
3. Explain nuclear power generation with neat block diagram.
4. Explain solar power generation with neat block diagram.
5. Explain wind power generation with neat block diagram.
6. Explain the general structure of electrical power systems using single line diagram.

DC circuits

1. Explain ohms law and state its limitations.
2. How the voltage and current is divided in series, parallel and series-parallel circuits? Also state the advantages & limitations of these circuits.
3. Find current through all the branches of the network shown in fig1.below.
4. For the circuit shown in fig.2 Calculate, a) equivalent resistance between the supply terminals b) Current supplied by the source c) Power consumed by the 16 ohm resistor.

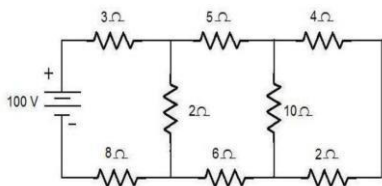


Fig.1

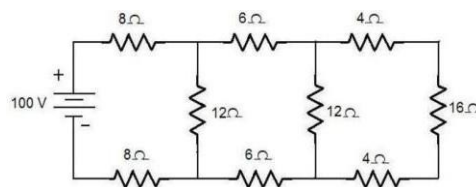


Fig.2

5. In the circuit shown in Fig3, determine the current through the 2 ohm resistor and the total current delivered by the battery. Use Kirchoff's laws.
6. In the network shown in fig 4, find the current delivered by the battery.

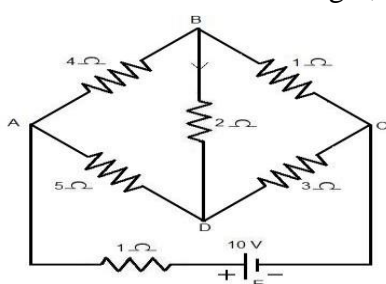


Fig.3

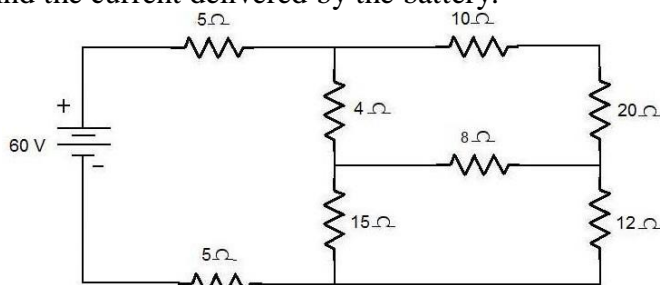


Fig.4



- Find the unknown resistor R where power consumed by the network is $16W$ for the network shown in fig.5.
- Find the currents I_1, I_2 and I_3 for the circuit shown in Fig.6. Also find potential difference between a and b.
- Determine the potential difference between x and y. for the circuit shown in fig.7.

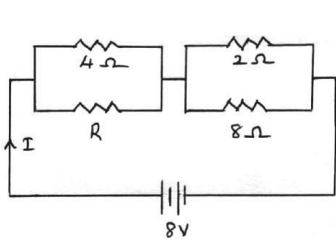


Fig.5

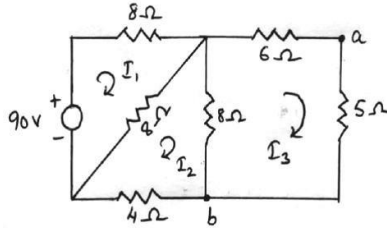


Fig.6

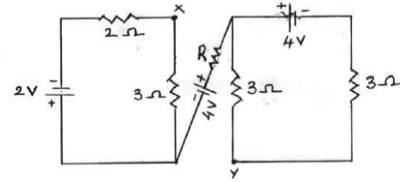
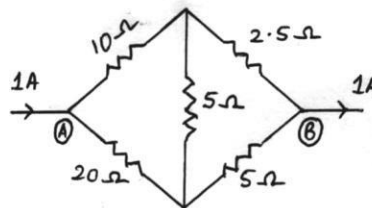


Fig.7

- Find the currents in all the resistors of the network shown in the fig. Also find the potential at A w.r.t. that at B.




- A resistance R is in series with a parallel combination of two resistances of $12\ \Omega$ and $8\ \Omega$. The total power dissipation in the circuit is $70\ W$ when the supply voltage is $20\ V$. Find R .
- A current of $20\ A$ flows through two ammeters A and B in series. The p.d. across A is $0.2\ V$ and that across B is $0.3\ V$. Find how the same current will divide between A and B when they are in parallel.

MODULE -2

Single Phase Circuits

- Define/Explain the following terms w.r.t alternating quantities: a) Phase & phase difference and b) Frequency and period.
- Define and hence find the instantaneous value, peak value, RMS value, average value, form factor and peak factor of alternating quantities.
- With a neat schematic, explain the principle of generation of alternating voltage.
- Explain the generation of single-phase AC induced emf with sinusoidal diagram.
- The equation for an AC voltage is given as $V= 0.04\sin (200t+60^\circ)\ V$. Determine the frequency, the angular frequency, instantaneous voltage when $t= 160\mu s$. What is the time represented by 60° phase angle?
- Show that the average power consumed in a pure capacitor and in a pure inductor is zero.
- Define power factor, explain its significance and establish the phase relationship between voltage and current in series and parallel combinations of a) RL circuit, b) RC circuit and c) RLC circuits (for different cases). Sketch the phasor diagrams and impedance diagrams in all the cases.
- A coil when connected to $200V, 50Hz$ supply takes a current of $10A$ and dissipates $1200W$. Find the resistance & reactance of the coil. Find also the real power, reactive power and overall power. Sketch the phasor diagram.


	S J P N Trust's	First Year Engg.
	Hirasugar Institute of Technology, Nidasoshi.	Academics
	<i>Inculcating Values, Promoting Prosperity</i>	Course Plan
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A coil of 50Ω and $0.5H$ is connected across $200V$, $50Hz$ supply. Find a) Inductive reactance, b) Circuit impedance, c) Supply current, d) Power factor, e) Phase angle, f) Voltages across R & L and g) Active, reactive and overall (apparent) power. Obtain expressions for voltage and current. Also sketch the complete phasor and vector diagrams.

1. A capacitor of $15\mu F$ is connected in series with a non-inductive resistance of 100Ω across a $100V$, $50Hz$ supply. Find a) Capacitive reactance, b) Impedance, c) Current, d) Power factor, e) Phase angle, f) Voltages across R & C and g) Power dissipated. Obtain expressions for voltage and current. Also sketch the phasor diagrams.
2. An RLC series circuit has the following data. $R=25\Omega$; $L=150mH$; $C=20\mu F$; $250V$ $50Hz$ supply. Determine the supply current and the various voltage drops. Represent them in a phasor diagram.
3. A choke is connected in series with a non-inductive resistor across a $250V$, $50Hz$ supply. It draws a current of $5A$. The voltage across the coil and the non-inductive resistance are $125V$ & $200V$ respectively. Find: a) R , X , Z & Y , b) Power loss in the coil, and c) Total power supplied. Sketch the phasor and impedance diagrams.
4. Two impedances $Z_1 = (150-j157)\Omega$ & $Z_2 = (100+j100)\Omega$ are connected in parallel across a $200V$, $50Hz$ supply. Find a) Branch currents, b) Total current and c) Complex power, and d) Total power. Sketch the complete phasor and admittance diagrams.
5. An ac generator with an internal impedance of $(3+j2.4)\Omega$ is connected to load impedance consisting of two impedances $(12+j10)\Omega$ & $(16-j12)\Omega$ in parallel. If the supply voltage is $100V$, determine a) the current in each branch, b) the power in each branch
6. Show that in a pure inductor the current lags behind the voltage by 90° . Also draw the voltage and current waveforms.

Three Phase Circuits:

7. With a schematic, explain the principle of generation of 3-phase emf. What are the characteristics of balanced supply? When is a load said to be balanced? Establish the relationship between the phase & line currents and voltages in a 3-phase delta. In the case of balanced supply and load, (a) are the phase voltages equal? (b) are the line currents equal? Justify your answers. Sketch the complete phasor diagrams in every case.
8. Explain the concept of „phase sequence“. Establish the relationship between the phase & line currents and voltages in a 3Φ star with 3-wire and 4-wire systems. In the case of balanced supply and balanced load, (a) are the line voltages equal? (b) are the phase currents equal? Justify your answers. Sketch the complete phasor diagrams in every case.
9. Show with a relevant phasor diagram how 3-phase power can be measured by two wattmeters.
10. Two wattmeters are used to measure the power in a 3Φ balanced system. What is the power factor when a) both the meters read equal, b) one meter reads twice the other, c) one meter reads zero and d) one meter reads negative?
11. What are the advantages of a 3Φ system over a single-phase system?
12. Three coils each of impedance $20 \angle 60^\circ \Omega$ are connected in star across a $400V$, 3Φ , $50Hz$ supply. Find the reading on each of the two wattmeters connected to measure the power input. If the same impedances were connected in delta across the same supply, find the corresponding readings of the wattmeters. Find the reactive power and the apparent power.
13. A balanced 3phase star connected load of $150kw$ takes a leading current of $100A$ with a line voltage of $1100V$, $50Hz$. Find the circuit constants of the load per phase.
14. A $400V$, delta connected 75 HP induction motor operates at 85% efficiency at $0.8pf$. Find the readings of the wattmeters connected to measure power by the two-wattmeter method.

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MODULE-3

DC Machines & DC Generators

1. Explain the principle of operation of a dc generator.
2. With a neat sketch explain the construction of a dc generator.
3. Derive the emf equation of a dc generator.
4. Explain the different types of dc generators & mention their applications.
5. A 4 pole, wave-wound dc generator has 50 slots and 24 conductors / slot. The flux/pole is 10mWb. Determine the induced emf in the armature if it is rotating at 600 rpm. Solve the same problem if the machine is lap-wound.
6. A 6 pole, wave-wound DC generator has 70 conductors & 12mWb flux/pole. Determine the speed of the armature if the induced emf is 400V. What will be the speed when it is lap wound and generating 400V?
7. A dc shunt generator supplies a load of 10kW at 250V. Calculate the induced emf if the armature resistance is 0.5Ω and shunt field resistance is 100Ω .
8. A shunt generator has an induced emf of 254V. When the machine is loaded the terminal voltage falls to 240V. Find the load current if the armature resistance and field resistance are 0.04Ω & 24Ω respectively. Brush contact drop is 1.5V/brush.
9. A dc long shunt compound generator delivers a load current of 200A at 500V. The resistance of armature, series field and shunt field are 0.03Ω , 0.015Ω & 15Ω respectively. Calculate the emf induced in the armature. Assume a brush drop of 1V per brush.

DC Motor

10. Explain the principle of operation of a dc motor.
11. Explain the significance of back emf of a dc motor. Derive an expression for the back emf.
12. Derive the torque equation of a dc motor.
13. Explain the different types of dc motors. Mention their applications.
14. Sketch and explain the following characteristics for series, shunt motors.
Torque vs. Armature current, and Speed vs. Armature current.
15. A 20kW, 200V dc shunt generator has a armature and field resistances of 0.05Ω and 150Ω respectively.
Determine the total current and power developed when working as a motor taking 20kW power.
16. A 250V dc series motor has an armature resistance of 0.05Ω and field resistance of 0.02Ω . It runs at 900rpm taking 30A. Determine its speed when it takes a current of 25A.
17. A dc shunt motor runs at 950 rpm on 200V with 40A armature current. Its armature resistance is 0.8Ω . What resistance is required to be connected in the armature circuit to reduce the speed to 725 rpm without changing the armature current?

MODULE-4

Transformers

1. Explain the construction & principle of operation of 1Φ transformer. Derive the emf equation of a transformer.
2. What are the losses in a transformer? On what factors do they depend? How are losses reduced in

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- a transformer by construction?
3. Explain with neat sketches the core and shell type transformers.
 4. Define and explain the term *efficiency* of a transformer.
 5. A 125kVA transformer has a primary voltage of 2000V at 60Hz with 182 & 40 turns on primary and secondary respectively. Neglecting the losses calculate a) no load secondary emf b) full load primary & secondary currents and c) flux in the core.
 6. A 25kVA transformer has an efficiency of 97% both at FL and at half load at 0.8pf. Determine a) full load iron & copper loss, b) efficiency at 75% FL and c) max efficiency.
 7. A 25kVA, 2200/250V transformer has an iron loss of 600W & full load copper loss of 1000W.
 8. Calculate efficiencies at i) full load ii) 75% load iii) 50% load iv) 25% load at upf & 0.8pf lag,
 9. v) Losses at max. Efficiency vi) load for max. Efficiency and vii) max. Efficiency at upf.
 10. The iron and full load copper losses in a 40kVA, 1 Φ transformer are 450W & 850W respectively.
 11. Find i) efficiency at full load, 0.8pf lag ii) max efficiency and iii) load at which the maximum
 12. efficiency occurs.
 13. A 50kVA transformer has an efficiency of 98% at full load 0.8pf and 97% at half load 0.9pf.
 14. Determine the full load iron and copper losses. Find the load at which max. Efficiency occurs as
 15. also the maximum efficiency.
 16. Give reasons for the following: a) Core loss in a transformer remains almost constant
b) A laminated steel core is used in a transformer.
 17. List different types of loss in a transformer and explain each one in brief.
 18. A 12 pole, 3 Φ alternator is coupled to an engine running at 500rpm. It supplies an induction motor which has a full load speed of 1440rpm. Find the percentage slip and the number of poles of the motor.

Three Phase Induction Motors:

19. Explain the principle of operation and constructional features of a 3 Φ induction motor.
20. Define and explain slip in an induction motor.
21. What are squirrel cage and wound-rotor induction motors? What are their relative advantages and disadvantages? Mention their applications.
22. A 3 Φ , 8 pole, 60Hz induction motor has a slip of 3% at full load. Find the synchronous speed and the frequency of rotor current at full load.
23. Explain the concept of rotating magnetic field and show that resultant flux remains same at different instants of time.

MODULE-5

Domestic wiring:

1. What are the requirements of domestic wiring system?
2. Mention the various types of wiring.
3. Explain casing-capping wiring with neat diagram.
4. Explain two way control of load with neat circuit diagram and truth table.
5. Explain three way control of load with neat circuit diagram and truth table.

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Electricity bill:


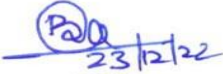

6. What do you understand by Tariff? Discuss the objectives of Tariff.
7. Describe the desirable characteristics of a tariff.
8. Explain two part tariff.
9. A consumer has a maximum demand of 200 kW at 40% load factor. If the tariff is Rs. 100 per kW of maximum demand plus 10 paise per kWh, Find the overall cost per kWh.
10. What is the unit for measure for electricity consumption?
11. What do you understand by term "unit" w.r.t. consumption of electrical energy.


Equipment Safety measures:

12. What is fuse? Discuss the advantages and disadvantages of a fuse.
13. What are desirable characteristics of fuse element.
14. Define and explain the following terms
 - i) Fusing current ii) Cut off current iii) Operating time iv) Breaking capacity
15. Explain the term „fusing factor“ with respect to fuse element.
16. Explain the working principle of fuse and MCB. Also discuss their merits and demerits.
17. Write a short note on difference between fuse and miniature circuit breaker w.r.t. protection of electrical installation.

Personal Safety measures

18. What is the need of earthing in electrical installation?
19. What is earthing? Why earthing is required?
20. With the help of neat sketch, explain plate earthing.
21. With the help of neat sketch, explain pipe earthing.
22. Write a short note on precautions against electric shock.
23. What is electric shock? What are the precautions to be taken to prevent electric shocks?

Prepared and Checked By		
 Dr. B. V. Madiggond	 HOD	 Principal

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Subject Title	Introduction to Internet of Things (IOT)		
Subject Code	BETCK105x	IA Marks (30) +Assignments (10) +Quiz(10)=50	50
Number of Lecture Hrs/Week /	03	Exam Marks (appearing for)	50 (100)
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:		
Name: Dr. R. R. Maggavi	Designation: Associate Professor	Experience: 18 years
No. of times course taught: 0	Specialization: Digital Electronics	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Students should have the knowledge of recent trends in electronics and internet	-----	Physics

2.0 Course Objectives

The course objective is to make students of all the branches of engineering to understand the fundamentals of Internet of things and its building blocks along with their characteristics, recent application domains of IoT in everyday life which are pervasive in engineering applications.


3.0 Course Outcomes

Having successfully completed this course, the student will be able to

	Course Outcome	Cognitive Level	PO's
CO1	Describe the evolution of IoT, IoT networking components.	U	1,5,6,7,8,11,12
CO2	Classify various sensing devices and actuator types.	U	1,5,6,7,8,11,12
CO3	Demonstrate the processing in IoT.	U	1,5,6,7,8,11,12
CO4	Explain Associated IOT Technologies	U	1,5,6,7,8,11,12
CO5	Illustrate architecture of IOT Applications	U	1,5,6,7,8,11,12
Total Hours of instruction		40	

Course Content

Modules	Teaching Hours	Bloom's Taxonomy (RBT) level
Module 1		
Basics of Networking: Introduction, Network Types, Layered network models Emergence of IOT: Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components	08	L1, L2
Module -2		

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IOT Sensing and Actuation: Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics.	08	L1, L2
Module-3		
IOT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading.	08	L1, L2,L3
Module-4		
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	08	L1, L2
Module-5		
IOT Case Studies And Future Trends: Vehicular IoT – Introduction, Healthcare IoT – Introduction, Case Studies. IoT Analytics – Introduction	08	L1, L2

5.0 Relevance to future subjects


Sl. No	Semester	Subject	Topics
01	VIII	Project Work	IOT based projects

6.0 Relevance to Real World

SL.No	Real World Mapping
01	Build a application based on IoT

7.0 Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	Tutorial	Topic: Vehicular IoT
02	Tutorial	Topic: Health Care IoT

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		Academics
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Books Used and Recommended to Students

Text Books

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.

Note: E-book versions are available at 'https://www.knimbus.com/' of the VTU consortium. Remote

9.0 Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

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

10.0 Magazines/Journals Used and Recommended to Students

Sl. No	Magazines/Journals	Website
1	IEEE Internet of Things-Magazine- IEEEIoTM	https://www.comsoc.org/publications/magazines/ieee-internet-things-magazine

11.0 Examination Note

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). 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:

Three Tests each of 20 Marks;

1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.

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:


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


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Course Delivery Plan

Module No.	Lecture No.	Content of Lecture	Teaching Method	% of Portion
1	1	Introduction	Chalk and talk, Video	20
	2	Network Types	Chalk and talk, video	
	3	Layered network models	Chalk and talk, PPT	
	4	Layered network models	Chalk and talk, PPT	
	5	Introduction, Evolution of IoT	Chalk and talk, PPT	
	6	Enabling IoT and the Complex Interdependence of Technologies	Chalk and talk, PPT	
	7	Enabling IoT and the Complex Interdependence of Technologies	Chalk and talk, PPT	
	8	IoT Networking Components	Chalk and talk, PPT	
2	9	Introduction, Sensors	Chalk and talk, PPT	20
	10	Introduction, Sensors	Chalk and talk, PPT	
	11	Sensor Characteristics	Chalk and talk	
	12	Sensorial Deviations	Chalk and talk	
	13	Sensing Types	Chalk and talk	
	14	Sensing Types	Chalk and talk	
	15	Sensing Considerations, Actuators	Chalk and talk	
	16	Actuator Types, Actuator Characteristics	Chalk and talk	
3	17	Data Format	Chalk and talk, PPT	20
	18	Importance of Processing in IoT	Chalk and talk, PPT	
	19	Importance of Processing in IoT	Chalk and talk	
	20	Processing Topologies	Chalk and talk, PPT	
	21	IoT Device Design and Selection Considerations	Chalk and talk	
	22	IoT Device Design and Selection Considerations	Chalk and talk	
	23	Processing Offloading	Chalk and talk	
	24	Processing Offloading	Chalk and talk	
4	25	Introduction	Chalk and talk	20
	26	Virtualization	Chalk and talk	
	27	Cloud Models	Chalk and talk, PPT	
	28	Service-Level Agreement in Cloud Computing	Chalk and talk, PPT	
	29	Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.	Chalk and talk, PPT	
	30	Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.	Chalk and talk	
	31	Introduction and Case Studies	Chalk and talk	
	32	Introduction and Case Studies	Chalk and talk	
5	33	Vehicular IoT – Introduction	Chalk and talk, PPT	20
	34	Vehicular IoT – Introduction	Chalk and talk, PPT	
	35	Vehicular IoT – Introduction	Chalk and talk, PPT	
	36	Health Care-IoT-Introduction	Chalk and talk, PPT	
	37	Health Care-IoT-Introduction	Chalk and talk, PPT	
	38	IoT Analytics – Introduction	Chalk and talk, PPT	
	39	IoT Analytics – Introduction	Chalk and talk, PPT	
	40	IoT Analytics	Chalk and talk, PPT	

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Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment : Introduction, Evolution of IoT, Actuator Types, Actuator Characteristics. Processing Offloading, Introduction and Case Studies. IoT Analytics	Students study the Topics and will prepare for Final Exam.	Module 1,2 and Half of syllabus	8	Individual Activity	Book 1 of the text list.
2	QUIZ: Processing Offloading, Introduction and Case Studies. IoT Analytics	Students study the Topics and will prepare for Final Exam.	Module 2 and half,4,5 of syllabus	16	Individual Activity	Book 1 of the text list.

14.0 University Result

NEW SCHME


15.0 QUESTION BANK

Module – 1

1. Differentiate between point-to-point and point-to-multipoint connection types.
2. Discuss the pros and cons of the following network topologies:
 - (a) Star
 - (b) Ring
 - (c) Bus
 - (d) Mesh
3. How are PANs different from LANs?
4. How are MANs different from WANs?
5. What is the ISO-OSI model?
6. Discuss the highlights of the seven layers of the OSI stack.
7. What is the Internet protocol suite?
8. How is the Internet protocol suite different from the ISO-OSI model?
9. What is smart dust?
10. Differentiate between IoT and M2M.
11. Differentiate between IoT and WoT.
12. What is Web of Things (WoT)?
13. What are the various IoT connectivity terminologies?
14. Differentiate between an IoT proxy and an IoT gateway.

Module -2

1. Differentiate between sensors and actuators.
2. Differentiate between sensors and transducers.
3. How is sensor resolution different from its accuracy?
4. Differentiate between scalar and vector sensors.

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5. Differentiate between analog and digital sensors.
6. What is an offset error?
7. What is a hysteresis error?
8. What is a quantization error?
9. What is aliasing error?
10. Differentiate between hydraulic and pneumatic actuators with examples.
11. What are shape memory alloys (SMA)?
12. What are soft actuators?
13. What are the main features of shape memory polymers?
14. What are light activated polymers?

Module -3


1. What are the different data formats found in IoT network traffic streams?
2. Depending on the urgency of data processing, how are IoT data classified?
3. Highlight the pros and cons of on-site and off-site processing.
4. Differentiate between structured and unstructured data.
5. How is collaborative processing different from remote processing?
6. What are the critical factors to be considered during the design of IoT devices?
7. What are the typical data offload locations available in the context of IoT?
8. What are the various decision making approaches chosen for offloading data in IoT?
9. What factors are to be considered while deciding on the data offload location.

Module – 4


1. How is fog computing different from cloud computing?
2. List the characteristics of a fog node.
3. How can fog computing be used in a smart city?
4. What is the role of the "protocol abstraction layer" of a fog node?
5. What are roles of software backplane in the software view of a fog computing architecture?
6. What do you mean by time sensitiveness in fog computing?
7. How is the fog computing architecture useful in a hospital scenario/environment?
8. Why is autonomous decision making important in fog computing?
9. What do you mean by community fog node?
10. List the type of sensors which can be used for agricultural IoT.
11. Explain two use cases where drones can be used for agricultural IoT.
12. Design a scenario where we can use fog computing in agriculture.
13. How can agricultural IoT help in the efficient distribution of water in agricultural fields?
14. What are the roles of the various IoT components in an agri-chain?
15. What are the advantages of agricultural IoT?
16. List a few communication modules used for agricultural IoT?
17. Design a case study to develop an IoT-based agricultural planter. In the case study, you should include the requirement analysis of different components and justify their usability in the planter.
18. What is the importance of satellites in agricultural IoT?


Module – 5

1. What is the role of cloud and fog computing in vehicular IoT?
2. What are the applications of IoT in transportation?
3. What are the advantages of vehicular IoT?
4. Give an example of image processing in vehicular IoT.
5. What are roadside units (RSUs)?
6. How can data analytics help in a vehicular IoT system?
7. What are the uses of a camera sensor in vehicular IoT?
8. How can a vehicular IoT system ensure the safety of drivers?

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1. Design a use case for developing an IoT-based driver sleep detection system.
2. Please mention all types of sensors required for developing the same.
3. List the components of healthcare IoT.
4. Why privacy and security is important for healthcare?
5. What is a wireless body area network (WBAN)?
6. What is the difference between electrocardiogram (ECG) and electromyogram (EMG) sensors?
7. List the advantages of healthcare IoT.
8. List the risks associated with healthcare IoT systems.
9. How can data analysis be used in healthcare IoT?
10. What is a local processing unit (LPU)?
11. Discuss an idea for developing an IoT-based healthcare system, where we can include fingerprint sensor
12. Why is cloud computing important for a healthcare IoT system?
13. What is machine learning (ML)? Why do we use ML?
14. What are the major challenges in ML?
15. What are the types of ML?

Prepared by	Checked by		
Dr.R.R.Maggavi	Dr.R.R.Maggavi	HOD	Principal

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Subject Title	Internet of Things		
Subject Code	22ETC15/25H	IA Marks (30) +Assignments (10) +Quiz(10)=50	50
Number of Lecture Hrs/Week /	03	Exam Marks (appearing for)	50 (100)
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:		
Name: Prof. Sunita. S. Malaj	Designation: Asst Professor	Experience: 24 years
No. of times course taught: 0	Specialization: Electronics & Telecommunication	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Students should have the knowledge of basic subjects, Internet	-----	Physics


2.0 Course Objectives

The course objective is to make students of all the branches of engineering to understand the fundamentals of Internet of things and its building blocks along with their characteristics, recent application domains of IoT in everyday life which are pervasive in engineering applications.

3.0 Course Outcomes

Having successfully completed this course, the student will be able to

	Course Outcome	Cognitive Level	PO's
CO1	Describe the evolution of IoT, IoT networking components.	U	1,5,6,7,8,11,12
CO2	Classify various sensing devices and actuator types.	U	1,5,6,7,8,11,12
CO3	Demonstrate the processing in IoT.	U	1,5,6,7,8,11,12
CO4	Explain Associated IOT Technologies	U	1,5,6,7,8,11,12
CO5	Illustrate architecture of IOT Applications	U	1,5,6,7,8,11,12
Total Hours of instruction			40

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4.0 Course Content

Modules	Teaching Hours	Bloom's Taxonomy (RBT) level
Module 1		
Basics of Networking: Introduction, Network Types, Layered network models Emergence of IoT: Introduction, Evolution of IoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components	08	L1, L2,L3
Module -2		
IoT Sensing and Actuation: Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuator Types, Actuator Characteristics.		
Module-3		
IoT Processing Topologies and Types: Data Format, Importance of Processing in IoT, Processing Topologies ,IoT Device Design and Selection Considerations, Processing Offloading.	08	L1, L2,L3
Module-4		
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	08	L1, L2,L3
Module-5		
IOT CASE STUDIES AND FUTURE TRENDS Vehicular IoT – Introduction Healthcare IoT – Introduction, Case Studies IoT Analytics – Introduction	08	L1, L2, L3

5.0 Relevance to future subjects


Sl. No	Semester	Subject	Topics
01	VIII	Project Work	IOT based projects

6.0 Relevance to Real World

SL.No	Real World Mapping
01	Build a application based on IoT

7.0 Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	Tutorial	Topic: Vehicular IoT
02	Tutorial	Topic: Health Care IoT

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8.0 Books Used and Recommended to Students

Text Books
<ol style="list-style-type: none"> Sudip Misra, Anandarup Mukherjee, Arijit Roy, "Introduction to IoT", Cambridge University Press 2021. <p>Reference:</p> <ol style="list-style-type: none"> S. Misra, C. Roy, and A. Mukherjee, 2020. Introduction to Industrial Internet of Things and Industry 4.0. CRC Press. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013. <p>Note: E-book versions are available at 'https://www.knimbus.com/' of the VTU consortium. Remote</p>

9.0 Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References
<ul style="list-style-type: none"> 1. https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs31/

10.0 Magazines/Journals Used and Recommended to Students


Sl.No	Magazines/Journals	website
1	IEEE Internet of Things-Magazine-IEEEIoTM	https://www.comsoc.org/publications/magazines/iee-e-internet-things-magazine

11.0 Examination Note

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). 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:
 Three Tests each of 20 Marks;
 1st, 2nd, and 3rd tests shall be conducted after completion of the syllabus of 30-35%, 70-75%, and 90-100% of the course/s respectively.
 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:
 Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)


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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

12.0 Course Delivery Plan

Module No.	Lecture No.	Content of Lecture	Teaching Method	% Of Portion
1	1	Introduction	Chalk and talk,	20
	2	Network Types	Chalk and talk, PPT	
	3	Layered network models	Chalk and talk	
	4	Layered network models	Chalk and talk	
	5	Introduction, Evolution of IoT	Chalk and talk	
	6	Enabling IoT and the Complex Interdependence of Technologies	Chalk and talk,	
	7	Enabling IoT and the Complex Interdependence of Technologies	Chalk and talk	
	8	IoT Networking Components	Chalk and talk,	
2	9	Introduction, Sensors	Chalk and talk,	20
	10	Introduction, Sensors	Chalk and talk	
	11	Sensor Characteristics	Chalk and talk, PPT	
	12	Sensorial Deviations	Chalk and talk,	
	13	Sensing Types	Chalk and talk,	
	14	Sensing Types	Chalk and talk,	
	15	Sensing Considerations, Actuators	Chalk and talk,	
	16	Actuator Types, Actuator Characteristics	Chalk and talk,	
3	17	Data Format	Chalk and talk, PPT	20
	18	Importance of Processing in IoT	Chalk and talk, PPT	
	19	Importance of Processing in IoT	Chalk and talk	
	20	Processing Topologies	Chalk and talk	
	21	IoT Device Design and Selection Considerations	Chalk and talk	
	22	IoT Device Design and Selection Considerations	Chalk and talk	
	23	Processing Offloading	Chalk and talk	
	24	Processing Offloading	Chalk and talk	
	25	Introduction	Chalk and talk	
	26	Virtualization	Chalk and talk	
	27	Cloud Models	Chalk and talk	
	28	Service-Level Agreement in Cloud Computing	Chalk and talk	

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4	29	Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.	Chalk and talk	20
	30	Cloud Implementation, Sensor-Cloud: Sensors-as-a-Service.	Chalk and talk	
	31	Introduction and Case Studies	Chalk and talk	
	32	Introduction and Case Studies	Chalk and talk	
5	33	Vehicular IoT - Introduction	Chalk and talk,PPT	20
	34	Vehicular IoT - Introduction	Chalk and talk,PPT	
	35	Vehicular IoT - Introduction	Chalk and talk,PPT	
	36	Health Care-IoT-Introduction	Chalk and talk,PPT	
	37	Health Care-IoT-Introduction	Chalk and talk,PPT	
	38	IoT Analytics – Introduction	Chalk and talk,PPT	
	39	IoT Analytics – Introduction	Chalk and talk,PPT	
	40	IoT Analytics – Introduction	Chalk and talk,PPT	

13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl.No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: University Questions on Network Types, Layered Network models, Sensors and sensing considerations and Actuators ,Processing Topologies IoT Device design and selection considerations, Vehicular IoT, Health care IoT, IoT Analytics	Students study the Topics and will prepare for Final Exam.	Module-1,2,3,4,5 of the syllabus	3	Individual Activity	Book 1 of the text list.


14.0 University Result

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15.0 QUESTION BANK

Module – 1

1. Differentiate between point-to-point and point-to-multipoint connection types.
2. Discuss the pros and cons of the following network topologies:
 - (a) Star
 - (b) Ring
 - (c) Bus
 - (d) Mesh
3. How are PANs different from LANs?
4. How are MANs different from WANs?

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5. What is the ISO-OSI model?
6. Discuss the highlights of the seven layers of the OSI stack.
7. What is the Internet protocol suite?
8. How is the Internet protocol suite different from the ISO-OSI model?
9. What is smart dust?
10. Differentiate between IoT and M2M.
11. Differentiate between IoT and WoT.
12. What is Web of Things (WoT)?
13. What are the various IoT connectivity terminologies?
14. Differentiate between an IoT proxy and an IoT gateway.

Module -2


1. Differentiate between sensors and actuators.
2. Differentiate between sensors and transducers.
3. How is sensor resolution different from its accuracy?
4. Differentiate between scalar and vector sensors.
5. Differentiate between analog and digital sensors.
6. What is an offset error?
7. What is a hysteresis error?
8. What is a quantization error?
9. What is aliasing error?
10. Differentiate between hydraulic and pneumatic actuators with examples.
11. What are shape memory alloys (SMA)?
12. What are soft actuators?
13. What are the main features of shape memory polymers?
14. What are light activated polymers?

Module -3

1. What are the different data formats found in IoT network traffic streams?
2. Depending on the urgency of data processing, how are IoT data classified?
3. Highlight the pros and cons of on-site and off-site processing.
4. Differentiate between structured and unstructured data.
5. How is collaborative processing different from remote processing?
6. What are the critical factors to be considered during the design of IoT devices?
7. What are the typical data offload locations available in the context of IoT?
8. What are the various decision making approaches chosen for offloading data in IoT?
9. What factors are to be considered while deciding on the data offload location.

Module – 4

1. How is fog computing different from cloud computing?
2. List the characteristics of a fog node.
3. How can fog computing be used in a smart city?
4. What is the role of the "protocol abstraction layer" of a fog node?
5. What are roles of software backplane in the software view of a fog computing architecture?
 6. What do you mean by time sensitiveness in fog computing?
 7. How is the fog computing architecture useful in a hospital scenario/environment?
 8. Why is autonomous decision making important in fog computing?
 9. What do you mean by community fog node?


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		Academics
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10. List the type of sensors which can be used for agricultural IoT.
11. Explain two use cases where drones can be used for agricultural IoT.
12. Design a scenario where we can use fog computing in agriculture.
13. How can agricultural IoT help in the efficient distribution of water in agricultural fields?
14. What are the roles of the various IoT components in an agri-chain?
15. What are the advantages of agricultural IoT?
16. List a few communication modules used for agricultural IoT?
17. Design a case study to develop an IoT-based agricultural planter. In the case study, you should include the requirement analysis of different components and justify their usability in the planter.
18. What is the importance of satellites in agricultural IoT?

Module – 5

1. What is the role of cloud and fog computing in vehicular IoT?
2. What are the applications of IoT in transportation?
3. What are the advantages of vehicular IoT?
4. Give an example of image processing in vehicular IoT.
5. What are roadside units (RSUs)?
6. How can data analytics help in a vehicular IoT system?
7. What are the uses of a camera sensor in vehicular IoT?
8. How can a vehicular IoT system ensure the safety of drivers?
9. Design a use case for developing an IoT-based driver sleep detection system.
10. Please mention all types of sensors required for developing the same.
11. List the components of healthcare IoT.
12. Why privacy and security is important for healthcare?
13. What is a wireless body area network (WBAN)?
14. What is the difference between electrocardiogram (ECG) and electromyogram (EMG) sensors?
15. List the advantages of healthcare IoT.
16. List the risks associated with healthcare IoT systems.
17. How can data analysis be used in healthcare IoT?
18. What is a local processing unit (LPU)?
19. Discuss an idea for developing an IoT-based healthcare system, where we can include fingerprint sensor
20. Why is cloud computing important for a healthcare IoT system?
21. What is machine learning (ML)? Why do we use ML?
22. What are the major challenges in ML?
23. What are the types of ML?

Prepared by	Checked by		
Prof. S.S.Malaj	Dr.R.R.Magavi	HOD	Principal

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Communicative English			
Subject Code	22ENG16	CIE Marks: IA-Tests(20) + Assignments(10)+ Quiz/GD/Seminar(20)	50
Teaching Hours/Week (L:T:P:S)	1:0:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Total marks (CIE + SEE)	100
Credits	01	SEE Hours	01

FACULTY DETAILS:		
Name: Prof. B. S. Hooli	Designation: Lecturer	Experience: 20 Yrs
No. of times course taught: 2	Specialization: English	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	-	-	Basic English Skills

2.0 Course Objectives


The course Communicative English (22ENG16) will enable the students,

- ✓ To know about Fundamentals of Communicative English and Communication Skills in general.
- ✓ To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better Communication skills.
- ✓ To impart basic English grammar and essentials of important language skills.
- ✓ To enhance with English vocabulary and language proficiency for better communication skills.
- ✓ To learn about Techniques of Information Transfer through presentation.

3.0 Course Outcomes [C112]

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

CO	Course Outcome	Cognitive Level	POs
C123	Understand and apply the Fundamentals of Communication Skills in their communication skills.	L1,L2	1,2,3,8,10
C123	Identify the nuances of phonetics, intonation and enhance pronunciation skills.	L1,L2,L3	1,2,3,8,10
C123	To impart basic English grammar and essentials of language skills as per present requirement.	L1,L2,L3	1, 2, 3,8,10

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		Academics
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C123	Understand and use all types of English vocabulary and language proficiency.	L1,L2,L3	1, 2,3,8,10
C123	Adopt the Techniques of Information Transfer through presentation.	L1,L2,L3	1, 2,3,8,10

4.0 Course Content

Module-1

Introduction to Communicative English: Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.

Module -2

Introduction to Phonetics : 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.

Module- 3

Basic English Communicative Grammar and Vocabulary PART - I : 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.

Module- 4


Basic English Communicative Grammar and Vocabulary PART - II: 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.

Module-5

Communication Skills for Employment : 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.

5.0 Books Used and Recommended to Students

Text Books
<ol style="list-style-type: none"> Communication Skills by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.
Reference Books
<ol style="list-style-type: none"> Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019. English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited [Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019. A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press – 2020. Practical English Usage by Michael Swan, Oxford University Press – 2016.

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6.0 Examination Note

Assessment Details (both CIE and SEE)

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

Continuous Internal Evaluation (CIE)

Three Unit Tests each of 20 Marks (duration 01 hour)

- First test after the completion of 30-35 % of the syllabus
- Second test after completion of 35-70% of the syllabus
- Third test after completion of 70-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best three 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 three 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.

7.0 Course Delivery Plan

Module	Lecture No.	Content of Lecture	Teaching-Learning Process	% of Portion
		PART - A		
1	1	Introduction to Communicative English	Chalk &board, PPT, Animation, Active	20
	2	Fundamentals of Communicative English		
	3	Process of Communication		
	4	Barriers to Effective Communicative English		
	5	Different styles and levels in Communicative English		


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	6	Interpersonal and Intrapersonal Communication Skills	Learning	
2	7	Introduction to Phonetics, Phonetic Transcription, English Pronunciation	Chalk & board, Active Learning, Problem based learning	20
	8	Pronunciation Guidelines to consonants and vowels		
	9	Sounds Mispronounced, Silent and Non silent Letters		
	10	Word Accent, Stress Shift and Intonation		
	11	Spelling Rules and Words often Misspelt		
	12	Common Errors in Pronunciation		
3	13	Grammar: Basic English Grammar and Parts of Speech	Chalk & board, PPT, Animation, NPTEL, Active Learning	20
	14	Articles and Preposition		
	15	Question Tags, One Word Substitutes		
	16	Question Tags, One Word Substitutes		
	17	Strong and Weak forms of words		
	18	Introduction to Vocabulary. All Types of Vocabulary – Exercises on it		
4	19	Basic English Communicative Grammar and Vocabulary PART - II	Chalk& board, Problem based learning	20
	20	Words formation - Prefixes and Suffixes		
	21	Contractions and Abbreviations		
	22	Word Pairs (Minimal Pairs) – Exercises		
	23	Tense and Types of tenses		
	24	The Sequence of Tenses (Rules in use of Tenses) and Exercises on it		
5	25	Communication Skills for Employment :Information Transfer: Oral Presentation and its Practice	Chalk& board, Problem based learning	20
	26	Difference between Extempore/Public Speaking		
	27	Communication Guidelines		
	28	Mother Tongue Influence (MTI)		
	29	Various Techniques for Neutralization of Mother Tongue Influence		
	30	Reading and Listening Comprehensions – Exercises		

8.0 QUESTION BANK

Choose the correct option from those given in each of the sentences below.

- The direction in which the formal communication flows is always _____.
A. Upward B. Downward C. Horizontal D. All of the Above
- Communication in an organization should ideally flow _____
A. From top to bottom B. From bottom to top C. Both ways D. None of these
- Which one of the following cannot become a type of written communication _____
A. Pictures and visual aids B. Meetings and conferences C. Letters and suggestions D. Rules and Instructions

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4. Consider the following statements about communication,

1. It is a process of interaction with people and environment
2. Two or more individuals interact and influence the ideas, beliefs and attitudes of each other.
3. They can exchange information through words, gestures, signs and symbols, expressions etc.

Answer using the following codes: A. 1 and 2 B. 2 and 3 C. 1 and 3 D. 1, 2 and 3

5. Which of the following is/are not included in the tools of verbal communication?

- A. Listening B. Reading C. Writing D. Graphics

6. Which of the following statements explain Interpersonal skills?

- A. The skills that a person uses to interact with other people.
 B. People skills or communication skills
 C. It explains how people relate to one another D. All the above.

7. Which of the following is not a way to improve interpersonal skills?

- A. Think positively, and enter the mindset to work well with others and maintain good relationships. B. Criticise others or yourself. B. Do not criticize others or yourself.
 C. Be patient. D. Be clear

8. Consider the following:

- A. Common frame of reference B. Mutual Interest C. Common Language D. Common environment

Which of the above is/are features of effective communication? Answer using codes:

- A. 1, 2, 3 and 4 B. 1, 2 and 3 C. 1 and 2 D. 1 and 3

9. In communication, when people do not talk much, question even less, and actually do very little it is called,

- A. Assertive style B. Passive style C. Passive – aggressive style D. Aggressive style

10. Which of the following are the key elements of communication?

- A. Communication is a two way process B. There has to be a message
 C. Commonness of understanding D. All the above

Choose the correct option from those given in each of the sentences below.

11. Interpersonal communication is the process by which people exchange information, feelings, and meaning through verbal and non-verbal messages.


- A. True B. False C. possible D. may be

12. Communicating the right way is not equally important in every walk of life, be it in personal, professional or social life.

- A. True B. False C. possible D. may be

13. The success of any business lies as much in networking and building sound professional relationships as it does in individual tact and business acumen. Communication is a crucial decisive factor in business relations.

- A. True B. False C. possible D. may be

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14. Maintaining professional etiquette in oral and written business communication is of utmost importance and must not be taken lightly.

A. True B. False C. possible D. may be

15. Communication is not indeed, the very lubricant that makes the machinery of human relations function smoothly.

A. True B. False C. possible D. may be

Choose the best word to describe the PARTS OF SPEECH from those given in each of the sentences below as underlined.

16. I always go to the park on the weekends. A. Noun B. Adjective C. Verb D. Adverb

17. On cold winter days, I love to have a cup of hot chocolate.

A. Adverb B. Adjective C. Verb D. Pronoun

18. Dinosaurs were very large, and they lived millions of years ago.

A. Noun B. Verb C. Adjective D. Preposition

19. Those flowers are very beautiful. How much do they cost?

A. Adjective B. Verb C. Conjunction D. Preposition

20. Stewart can speak Arabic very well because he lived in Egypt for a year.

A. Verb B. Adjective C. Adverb D. Conjunction

Choose the correct option from those given in each of the sentences below.

21. According to phonetic method, the unit of a word is : A. Sentence B. Word C. Sound D. Letter

22. Total number of sounds in English language is : A. 12 B. 8 C. 20 D. 44

23. Which of the following has /i:/ sound : A. Car B. Seat C. fit D. Books

24. The word "Doctor" has : A. Two syllables with stress on one B. Two syllables with stress on both C. Two syllables with stress on first D. Two syllables with stress on second


25. According to phonetic method, the unit of a word is : A. Sentence B. Word C. Letter D. Sound

26. Majority of staff members were not satisfied with the new director. (Which word is a compound noun?) A. director B. staff members C. new D. majority

27. I want see justice served. (Which word is an abstract noun?)

A. i B. seen C. want D. justice

28. Alice's father is a surgeon, he mostly does not have time to spend with his family. (Which word is a singular possessive noun?) A. surgeon B. time C. family D. Alice's

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29. Australian government will bring together anti-terror laws. (Which word is a nominative noun?)
 A. bring B. Australian C. anti-terror D. government

30. They discussed the problems, but could not find the solution. (Which word is a uncountable noun?)
 A. could not B. find C. solution D. discussed

choose the whether the underlined nouns are common, proper, collective or abstract.

31. Honesty is the best policy. A. Common B. Proper C. Collective D. Abstract
 32. Solomon was famous for his wisdom. A. Common B. Proper C. Collective D. Abstract
 33. James is a bright student . A. Common B. Proper C. Collective D. Abstract
 34. My family lives in that house. A. Common B. Proper C. Collective D. Abstract
 35. A committee of five was appointed. A. Common B. Proper C. Collective D. Abstract

Silent and non Silent Letters

Select the missing silent letters from the options given. Check the spelling carefully.

36. I ___ now London very well. A. w B. k C. w D. k
 37. Reading is easier than ___riting. A. ing B. r C.w D. ng
 38. I always ___rap up warm in winter. A. a B. s C. g D. w
 39. Did you see the mangled ___eck? A. wr B. ek C. s D. n
 40. People read ___salms and sing hymns in church. A. p B. psa C. ssl D. pis

Choose the most suitable answer that identifies the homophones in the sentence.

41. India _____ the cricket match by 26 runs. A) One B) Won C) Ones D) Owned
 42. The fisherman _____ a big fish. A) Court B) Caught C) Catch D) Collect
 43. The doctor took blood from my _____. A) Vein B) Vain C) Vaien D) Vyine
 44. It was good to be back in _____. A) Sink B) Sync C) synchronic D) Sinken
 45. She _____ after standing for two hours in a queue. A) Fainted B) Feinted C) Faint D) Feint

Questions (46-50) test your ability to use articles. Select the correct option in the series.

46. Travelling by flight is really _____ experience to be remembered. (A) an (B) a (C) the (D) no article
 47. The sun rises in _____ east. (A) an (B) a (C) the (D) no article
 48. I go to _____ school every morning. (A) no article (B) the (C) a (D) an
 49. I carried _____ umbrella with me while going to school. (A) the (B) an (C) a (D) no article
 50. Ravi is _____ tallest boy among his friends. (A) an (B) the (C) no article (D) a

Speech Sounds

51. Which of the following has / ə / sound : (A) but (B) am (C) about (D) aunt
 52. Diphthong is a : (A) Pure vowel sound (B) Pure consonant sound
 (C) Vowel glides or mixed vowel sounds (D) none of the above

Preposition : Choose the suitable prepositions and darken correct option in the series (1) (2) (3) & (4) from the options given.

53. My parents live _____ New Zealand now. (A) in (B) to (C) live (D) now
 54. We slept _____ the open sky. (A) under (B) below (C) in (D) on



55. Our friends in the apartment ____ us are really noisy. (A) over (B) below (C) above (D) inside
56. I am planning to meet all my friends _____ these holidays. (A) on (B) within (C) during (D) over
57. I was waiting ____ the bus stop. (A) on (B) at (C) in (D) for
58. There are two students _____ the class. (A) next (B) in (C) on (D) front
59. The oranges are not in the basket. They are _____ the table. (A) in (B) between (C) on (D) next
60. My pencil is _____ the books and the notebooks. (A) between (B) inside (C) outside (D) above

Word Stress : Select the correctly spelt/ stressed word

61. I want to be a photographer.
(A) PHO-to-grAPH-er (B) PHO-to-graph-er (C) pho-TO-graph-er (D) pho-TO-Graph-er
62. How do you pronounce this word?
(A) PRO-nOUNce (B) pro-NOUNce (C) pro-NOUNCE (D) PRO-nounce
63. We had a really interesting conversation.
(A) con-ver-SA-tion (B) con-VER-SA-tion (C) con-VER-sa-tion (D) con-Ver-SA-tion

Tag Questions : Choose the correct question tag to complete each sentence.


64. Nobody called, ____ (A) do they? (B) didn't they? (C) did they? (D) do not they?
65. They will wash the car, ____ (A) will it? (B) won't they? (C) wouldn't they? (D) do not they?
66. We must lock the doors, ____ (A) mustn't they? (B) shouldn't we? (C) mustn't we? (D) do they?
67. I'm right, ____ (A) amn't I? (B) am not I? (C) aren't I? (D) do I ?
68. So you bought a car, ____ (A) did you? (B) haven't you? (C) weren't you? (D) don't I ?
69. You wouldn't like to invite my Dad, ____ (A) did you? (B) would you? (C) won't you? (D) don't you ?
70. We won't be late, ____ (A) won't we? (B) will we? (C) are we? (D) don't we ?

Synonyms: Choose the word that is closest in meaning.

71. Mendacity : (A) Insolence (B) Risk taking nature or recklessness (C) Untruthfulness (D) Susceptibility
72. Juxtaposing : (A) Posting (B) Placing side by side (C) Contrasting (D) Combining
73. Obscure : (A) Block (B) Obstruct (C) Constrain (D) Vague
74. Altercation : (A) Adjustment (B) Option (C) Row (D) Modification
75. Massive : (A) Lump sum (B) Strong (C) Little (D) Huge
76. Difer : (A) Indiferent (B) Defy (C) Differ (D) Postpone
77. Animosity : (A) Agony (B) Hostility (C) Wrath (D) Displeasure
78. Boisterous : (A) Ultimate (B) Suave (C) Noisy (D) Childish
79. Effluent : (A) Abundant (B) Costly (C) Full (D) Waste
80. Decadence : (A) Destroy (B) Declining (C) Sick (D) Go weak

Antonyms: Choose the word that is opposite in meaning.

81. Absence : (A) untidy (B) wise (C) presence (D) above
82. Abundant : (A) wrong, left (B) scarce (C) accidental (D) wide
83. Accept : (A) wet, left (B) aid, help (C) worst (D) refuse

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Prefixes and suffixes :Choose the correct prefix or suffix from the options given to complete thegap.

84. In many countries it islegal to keep a gun in your house (A) ill (B) un (C) il (D) el
 85. Which of the following is the suffix of 'Suit....'? (A) Ary (B) Able (C) Ness (D) un
 86. Which of the following is the prefix of '....Polite'? (A) im (B) dis (C) in (D) il
 87. The assignment is ...complete. (not finished). (A) not (B) un (C) in (D) on
 88. I just can't believe it! The story is ___believable! (A) un (B) in (C) not (D) unn
 89. I had a sleep__night last night (I did not sleep). (A) less (B) able (C) ing (D) ept

Select the correct or preferred spelling for each of these commonly misspelled words.Which of the following spellings is correct?

90. (A) accommodate (B) accomodate (C) acommodate (D) accomodate
 91. (A) argument (B) arguments (C) arguemint (D) arguemintes
 92. (A) acknowledgment (B) acknowledgement (C) acknowlegment (D) acknowlegement

Choose the correct verb/ tense form from the options given to complete the gap.

93. Our Holy Books tell us that man ----- mortal. (A) is (B) was (C) will be (D) are
 94. The teacher asked the boys whether they----- the problems.
 (A) solve (B) have solved (C) had solved (D) solves

Choose the pairs of word/ phrases from the options given that best expresses a similarrelationship to that of the given pair.

95. Patient : Hospital, (A) Teacher : School (B) Pilot : Aeroplane (C) Litigant : Court (D) Priest : Church
 96. Truck : Cargo, (A) Ship : Water (B) Aircraft : Fuel (C) Bus : Passengers (D) Theatre : Movie
 97. Entomology : Insects (A) Oncology : Cancer (B) Gerontology : Germs (C) Tantology : Tortoises (D) Phonology : Telephones
 98. See : Invisible (A) Sell : Insoluble (B) Alien : Inalienable (C) Satisfy : Insatiable (D) Differ : Indifferent
 99. Duck : Drake (A) Bull : Cow (B) Dog : Kennel (C) Deer : Fawn (D) Goose : Gander
 100. Gemini : Zodiac (A) Star : Galaxy (B) Ministry : Government (C) May : Year (D) Channels : Television

101. In, an Organization, when a colleague shares official information with the other of an equal hierarchical level, this kind of communication is _____.

- a) Horizontal b) Vertical c) Radial d) Informal

102. In communication, the observation of a receiver's response is called _____.


- a) Survey b) Feedback c) Channel d) Message

103. This type of communication takes place within an individual:_____.


- a) Extra personal b) Intrapersonal c) Organizational d) Interpersonal

104. Which of the following is an oral communication?

- a) Dictation b) Brochures c) Notice d) Letters

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105. Who encodes a message in communication?
 a) Sender b) Receiver c) transmitting medium d) Both (a) and (b)
106. Proposal prepared for submission to the boss _____.
 a) Vertical b) Downward c) Upward d) Diagonal
107. No communication is complete without _____.
 a) Noise b) Semantic barrier c) Interpersonal d) Feedback
108. Announcement of the changes of Internals date _____.
 a) Radial b) Vertical c) Diagonal d) Horizontal
109. Communication takes place between managers and workers located in different functional units _____.
 a) Horizontal b) Downward c) Upward d) Diagonal
110. This kind of communication moves in all direction _____.
 a) Spiral b) Vertical c) Diagonal d) Horizontal
111. Feedback given to a student by a teacher about his/her performance in an assignment
 a) Upward b) Downward c) Horizontal d) Spiral
112. I _____ tennis every Sunday.
 a) Playing b) play c) am playing d) am play
113. You can keep my iPod if you like. I _____ it any more
 a) don't use b) doesn't use c) didn't use d) not using
114. Sara _____ her blue jeans today, but usually she wears a skirt or a dress.
 a) Wears b) wearing c) wear d) is wearing
115. John _____ his teeth before breakfast every morning.
 a) will cleaned b) is cleaning c) cleans d) clean
116. Which of these is a communication skill?
 a) Swimming b) Running c) Sleeping d) Asking question
117. I complimented him _____ his brilliant success in the examination.
 a) Over b) for c) to d) on
118. "Our blessings come from **above**". The underlined word is
 a) Noun b) pronoun c) verb d) adverb
119. Which of the following Nouns is generally used as plural forms?
 a) Economics b) Furniture's c) Public d) News
120. "None **but** the brave deserve the best". The underlined word is
 a) Preposition b) Noun c) Conjunction d) verb

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121. You and Ahmed have wasted _____ time.
 a) they b) your c) yours d) him
122. The abstract noun of the verb "Go" is
 a) Goit b) Glutton c) gone d) go
123. As I approached _____ him, he turned and walked away
 a) To b) by c) beside d) no preposition needed
124. The horse and carriage _____ ready.
 a) Is b) are c) were d) have
125. He is wise _____ he is young.
 a) Though b) where c) before d) because
126. Our teacher has read _____ book of this library.
 a) Small b) little c) every d) very
127. Those flowers are very **beautiful**. The underlined word is
 a) Adjective b) preposition c) Conjunction d) verb
128. India _____ the cricket match by 26 runs
 a) one b) won c) ones d) owned
129. Woman is looking _____ her diamond ring.
 a) to b) at c) in d) inside
130. I'm _____. I'm late, my car broke down.
 a) wrong b) bad c) sorry d) unhappy
131. The antonym for the word POSTPONE: _____.
 a) before b) prepone c) advance d) soon
132. The silent letter in the word COM _____.
 a) D b) F c) E d) B
133. The silent letter in the word _____ NEUMONIA.
 a) P b) CH c) GH d) PH
134. The synonym of the word Friend: _____.
 a) dear b) close c) foe d) comrade
135. The synonym of the word Decadence : _____.
 a) destroy b) declining c) sick d) go weak
136. Which of these is an intrapersonal communication barrier?



a) Lack of knowledge b) reading c) listening d) writing

137. Which of the following is called as an Aspiration?

a) actual song b) forceful release of air c) sound d) pronunciation

138. Which of the following skill has the largest share in communication time in school/colleges?

a) reading b) listening c) writing d) speaking

139. In general, the oral communication is the interchange of _____ between the sender and the receiver.

a) cues and clues b) written messages c) signs and gestures d) verbal messages

140. Comparatively, oral communication is better than written communication in

a) conveying feelings b) conveying facts c) saving time d) conveying opinions

141. The total number of sounds in English language is _____

a) 12 b) 8 c) 20 d) 44

142. Question tag : I'm right, _____.

a) amn't I? b) am not I? c) aren't I? d) don't I?

143. Question tag : We shouldn't be late, _____.

a) shouldn't we? b) will we? c) should we? d) won't we?

144. Which of the following is the suffix of 'Suit'?

a) ary b) able c) ness d) un

145. Which of the following is the prefix of 'Polite'?

a) im b) dis c) in d) ill

146. "The stars are shining above the sky" the underline word is

a) noun b) pronoun c) adjective d) adverb

147. The meaning of the noun 'Advices' is

a) counsel b) opinion c) information d) advise

148. The plural form of the compound noun 'son-in-law' is

a) son-in-laws b) sons-in-law c) sons-in-laws d) son-in-law

149. The police _____ arrested the thief.

a) has b) have c) has been d) will

150. My brother likes comics' _____ much.

a) very b) too c) most d) so

151. My pencil is _____ the books and the notes.



a) between b) inside c) outside d) above

152. There are two students _____ the class.

a) next b) in c) on d) front

153. I am planning to meet all my friends _____ these holidays.

a) on b) within c) during d) over

154. I go to _____ School every morning.

a) no article b) a c) the d) an

155. The antonym for the word INTEREST: _____.

a) Uninterest b) disinterest c) non-interest d) curious

156. It is _____ hot to drink.

a) much b) very c) more d) too

157. _____ boys passed with distinction.

a) full b) a few c) little d) a number

158. Our holy book tell us that man _____ mortal.

a) is b) was c) will be d) are

159. The teacher asked the boys whether they _____ the problems.

a) solve b) have solved c) had solved d) solves

160. He is _____ not recovered from yesterday's shock.

a) till b) until c) still d) but

161. According to phonetics method, the unit of a word is _____.

a) sentence b) word c) sound d) Letters

162. Which of the following has / :i / sound _____.

a) car b) seat c) fit d) books

163. The word "**Doctor**" has _____ syllable.

a) two syllable with one stress b) two syllable with stress on both c) two syllable with stress on first
d) two syllable with stress on second

164. I _____ now London very well. (**Find out the missing letter**)

a) now b) know c) knew d) known

165. People read _____ salms and sing hymns in church.

a) phsalms b) psalms c) sslams d) pisalms

166. I completed my homework _____ my mother prepared the dinner. (Find the right preposition)



a) for b) while c) as if d) within

167. The oranges are not in the basket. They are _____ the table. (**Find the right preposition**)

a) in b) between c) on d) next

168. The **synonym** of the word **Effluent**: _____.

a) abundant b) waste c) costly d) full

169. The **synonym** of the word **Massive**: _____.

a) lump sum b) strong c) little d) huge

170. The **antonym** of the word **Fresh**: _____.

a) stale b) stole c) steal d) steel

171. The **antonym** of the word **Hostile**: _____.

a) innocent b) friendly c) lazy d) crazy

172. Choose the appropriate **Homophone** for **Ad**: _____.

a) had b) odd c) and d) add

173. Choose the appropriate **Homophone** for **Scene**: _____.

a) seen b) rain c) see d) saw

174. They have reached the place _____ time.

a) on b) in c) at d) over

175. The _____ of an earthquake is the movement of tectonic plates.

a) reason b) cause c) habit d) wind

176. One who knows many languages is called _____.

a) linguist b) emigrant c) omnipotent d) fatalist

177. A person walking and not using vehicle is called _____.

a) pedestrian b) patriot c) pessimist d) usurer

178. Choose the **prefix** for _____ **driven**.

a) wise b) self c) un d) re

179. Choose the **prefix** for _____ **chairman**.


a) wise b) vice c) nice d) un

180. Choose the **suffix** for **affection** _____.

a) ade b) es c) eat d) ate

181. Choose the **suffix** for **Astro** _____.

a) logo b) logist c) loger d) ist

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182. Identify the word with one syllable.

- a) fulfil b) awesome c) space d) phonetics

183. My aunt _____ on the ice and broke her leg.

- a) fall b) felt c) fell d) felled

184. _____ woman was seen pushing the car along the street.

- a) an b) a c) that d) these

185. I've never _____ to the USA.

- a) gone b) been c) being d) going

186. The doctor took blood from my _____.

- a) vein b) vain c) vaine d) vyine

187. The fisherman _____ a big fish.

- a) court b) catch c) caught d) collect

188. Would you like _____ cup of tea.

- a) another b) other c) an another d) author

189. I have worked here _____ three years.

- a) since b) in c) for d) from

190. Are you _____ get up soon?

- a) going to b) will c) be d) go to

191. They _____ in the basement for three months.

- a) were made sleeping b) were made sleep c) were made to sleep d) made to sleep

192. If success _____ we need to prepare ourselves for every possible scenario.

- a) is to be achieved b) is achieved c) will be achieved d) is due to achieve

193. Which of the following spelling is correct?

- a) acknowlegment b) acknowledgement c) acknowlegment d) acknowledgement

194. Diphthong is a

- a) pure vowel sound b) pure consonant sound
c) vowel glides or mixes vowel sound d) none of the above

Choose the option that is the most appropriate synonym.

195. Foment.

- a) vex b) waste c) renounce d) instigate

196. Placate.

- a) rouse b) harass c) pacify d) rejoice

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197. Solicitous.

a) obscene b) wise c) wholesome d) confident

198. Adulation.

a) approval b) extension c) applause d) greeting

199. Sordid.

a) harmful b) dirty c) splendid d) dangerous


200. Debunk

a) expose b) cheat c) threaten d) pacify

9.0 University Result

Examination	S+	S	A	B	C	D	E	F	% Passing
JAN - 2021									
JAN - 2020									
JAN - 2019									

Prepared by	Checked by		
Prof. B. S. Hooli	Dr. K. B. Manwade	HOD	Principal

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Subject Title	Course Title: INDIAN CONSTITUTION		
Subject Code	BICOK107	SEE Marks	50
Number of Lecture Hrs / Week	01	CIE Marks	50
Total Number of Lecture Hrs	15	Exam Hours	02
CREDITS – 01			

FACULTY DETAILS:

Name: Prof. M. S. Futane	Designation: Asst. Prof.	Experience: 17Years
No. of times course taught: 1	Specialization: CIM	

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Mechanical Engg.		

2.0 Course Objectives


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

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.

3.0 Course Outcomes

After study of the course, the students are able to

	Course Outcome	Cognitive Level	Pos
CO1	Analyse the basic structure of Indian Constitution.	U	1, 5
CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.	U	1, 5
CO3	know about our Union Government, political structure & codes, procedures.	U	1, 5
CO4	Understand our State Executive & Elections system of India.	U	1, 5
CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution	U	1, 5
Total Hours of instruction		50	

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		Academics
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4.0 Course Content

Module-1

an 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

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

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

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

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.

5.0 Books Used and Recommended to Students

Text Books

1. "Constitution of India" (for Competitive Exams) - Published by Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2. "Introduction to the Constitution of India", (Students Edition.) by Durga Das Basu (DD Basu): Prentice –Hall, 2008.

Reference Books


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.

6.0 Examination Note

Internal Assessment: 50 Marks

7.0 Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
1	1	The Necessity of the Constitution, The Societies before and after the Constitution adoption.	20
	2	Introduction to the Indian constitution, The Making of the Constitution, The Role of the Constituent Assembly	
	3	Preamble and Salient features of the Constitution of India. Fundamental Rights and its Restriction and limitations in different Complex Situations.	

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2	4	Directive Principles of State Policy (DPSP) and its present relevance in our society with examples.	
	5	Fundamental Duties and its Scope and significance in Nation building.	
	6	Parliamentary System, Federal System, Centre-State Relations.	20
3	7	Union Executive – President, Prime Minister, Union Cabinet, Parliament	20
	8	LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism	
	9	State Executives – Governor, Chief Minister, State Cabinet, State Legislature, High Court and Subordinate Courts,	
4	10	Special Provisions (Articles 370,371,371J) for some States.	20
	11	Elections, Electoral Process, and Election Commission of India, Election Laws.	
	12	Amendments - Methods in Constitutional Amendments (How and Why) and Important Constitutional Amendments.	
5	13	Amendments – 7,9,10,12,42,44, 61, 73,74, ,75, 86, and some important Case Studies.	20
	14	Amendments - 91,94,95,100,101,118	
	15	Emergency Provisions, types of Emergencies and its consequences.	

8.0


QUESTION BANK

Module– I:

- The_____Act transferred the power of the Crown to the Secretary of state of India .
 - Indian Councils Act 1858
 - Morley Minto reforms 1909
 - Indian Council Act 1861
 - Montague –Chelmsford reforms 1919.
- The first meeting of the Constituent Assembly was held on _____.
 - 9th January 1947
 - 9th December 1946
 - 9th August 1945
 - 9th September 1944
- The governor General at the time of the India Independence Act 1947 was
 - Lord Curzon
 - Lord Wavell
 - Lord Mount batten
 - Sir Cripps
- The President of the Constituent Assembly was
 - Dr. B.R.Ambedkar
 - Dr. Rajendra Prasad
 - Jawaharlal Nehru
 - Mahatma Gandhiji.
- The Chairman of the Drafting Committee was
 - Dr. Rajendra Prasad
 - Dr.B.R.Ambedkar
 - Dr. K.N.Rao
 - Dr. K.Krishna murthy

Module – II:

- The Final draft of the Constitution was signed on
 - 26th Jan 1947
 - 26th Dec 1948
 - 26th Nov 1949
 - 26th jan 1950.
- The whole of the Constitution came into force on
 - 26th Jan 1950
 - 15th Aug 1947
 - 26th Dec 1950
 - 15th Aug 1950.
- Every Citizen of India is eligible to vote in an Election after Attaining ____
 - 21
 - 16
 - 25
 - 18 .
- The Mountbatten plan was executed in the year
 - 1946
 - 1949
 - 1950
 - 1947.
- The Constitution is divided into____ Parts
years .

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- a. 21 b. 22 c. 23 d. 24.

Module – III:

- The Words "We the People of India" in the preamble of the Indian Constitution refer to all
 - The members of the Drafting committee
 - The Members of the Drafting committee & Constituent Assembly
 - People of India
 - None of these.
- The Preamble of Indian Constitution indicates
 - The Date of Commencement of the Indian Constitution
 - The Rights given to socially and economically backward class
 - The role to be played by the Judiciary in securing Social, Political and economic justice to the Citizen of India.
 - None of these.
- The Secular Nature of the Preamble recognizes
 - All religion
 - Only one religion
 - attitude of neutrality towards all religions
 - None of these.
- The nature of our Constitution is
 - Federal
 - Unitary
 - Federal with unitary features
 - Unitary with feral features.
- The Preamble tells us the
 - Source of the Constitution
 - Number of religions
 - The importance of the Constitution
 - None of these.

Module – IV:

- The Fundamental rights are contained in _____ part of the Constitution
 - I
 - II
 - III
 - IV
- The Fundamental rights are classified into _____
 - 5 groups
 - 6 groups
 - 7 groups
 - 8 groups
- The provisions of Article 14 does not apply to
 - President & Governor
 - Prime-minister & Chief-ministers
 - Chief-minister & Governor
 - President & Prime-minister.
- Article 15 applies to
 - Citizens only
 - Aliens only
 - both a & b
 - None of these.
- Article 19 gives us ___ freedoms
 - 4
 - 5
 - 6
 - 7
- Article 32 refers to
 - Right against exploitation
 - Right to Equality
 - Cultural & Educational rights
 - Right to Constitutional remedies
- Which of the following has been dropped from the List of fundamental rights?
 - Right to liberty
 - Right to Property
 - Right to Religion
 - Right against Exploitation.
- Which Article of the constitution guarantees the Right to life and personal liberty?
 - 20
 - 21
 - 22
 - 23
- Which Article of the Constitution has been described as the very soul of the Constitution and the very heart of it?
 - 32
 - 19
 - 21
 - 21A
- Cultural and Educational rights are contained in Articles?
 - 25-26
 - 27-28
 - 29-30
 - 73-74

Module – V:


- The Directive Principles of state policy aim at
 - Establishing a free society
 - Establishing a genuine political democracy.
 - Establishing social, economic base for democracy
 - All of the above.
- The Constitution makers have taken the idea of Directive Principles from the Constitution of
 - Ireland
 - America
 - Britain
 - Canada.
- The Enforcement of the Directive Principles depends upon
 - People
 - Judiaciary
 - Opposition Party
 - Ruling Party.
- Who has aptly described the Directive Principles of State policy as a "Novel Feature" of the Constitution of India
 - L.M.Singhvi
 - Motilal Nehru
 - N.Madhava Rao
 - Dr.B.R.Ambedkar

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5. Which directive Principle has not been enforced till now?
 - a. Belief in Peace
 - b. Free Education upto certain classes
 - c. Protection of Animals
 - d. Enforcement of prohibition.
6. Which is not a Directive Principle of State Policy?
 - a. Participation of workers in the management of industries
 - b. Organization of agriculture and Animal Husbandry
 - c. Uniform Civil Code for all the citizens
 - d. Abolition of titles.

		
Prof. M. S Futane	HOD	Principal



Subject Title	Scientific Foundation of Health		
Subject Code	BSFHK158	CIE Marks	50
Number of Lecture Hrs / Week	2 hrs	SEE Marks	50
Total Number of Lecture Hrs	15	Exam Hours	01
CREDITS – 01			

FACULTY DETAILS:

Name: Dr. M.S. Hanagadakar	Designation: Associate Professor	Experience: 18Years
Name: Dr. Shashikant Walki	Designation: Assistant Professor	Experience: 06Years
No. of times course taught: 03		Specialization: Chemistry

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
01	Basic Knowledge about chemistry and biology	I	Chemistry and Biology

2.0 Course Objectives


To know about Health and wellness (and its Beliefs)

- To acquire Good Health & It's balance for positive mind-set
- To Build the healthy lifestyles for good health for their better future
- To Create of Healthy and caring relationships to meet the requirements of MNC and LPG world
- To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future
- To Prevent and fight against harmful diseases for good health through positive mindset

3.0 Course Outcomes

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

CO'S	Course Outcome	Cognitive Level	Pos
CO	To know about Health and wellness (and its Beliefs) & It's balance for positive mindset.	L1 and L2	PO1, PO2, PO3, PO6, PO7, PO12
CO	To Build the healthy lifestyles for good health for their better future.	L1 and L2	PO1, PO2, PO3, PO6, PO7, PO12
CO	To Create a Healthy and caring relationships to meet the requirements of good/social/positive life.	L1 and L2	PO1, PO2, PO3, PO6, PO7, PO12
CO	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future	L1 and L2	PO1, PO2, PO3, PO6, PO7, PO12

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CO	To Prevent and fight against harmful diseases for good health through positive mindset	L1 and L2	PO1, PO2, PO3, PO6, PO7, PO12
Total Hours of instruction		15	

4.0 Course Content

Module-1

Good Health and 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

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

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.

Avoiding risks and harmful habits:


Module-4

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

Preventing and 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.

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5.0 Relevance to future subjects

Health awareness is important for all to lead life happily in the world

6.0 Relevance to Real World

SL.No	Real World Mapping
01	Understand and apply the Fundamentals of Health.
02	inculcate and develop the healthy lifestyle habits for good health

7.0 Gap Analysis and Mitigation

--


8.0 Books Used and Recommended to Students

Suggested Books
<ol style="list-style-type: none"> 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.
Additional Study material & e-Books
<ol style="list-style-type: none"> 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, 3. McGraw Hill Education (India) Private Limited - Open University Press. 4. SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos and other materials / notes. 5. Scientific Foundations of Health (Health & Wellness) - General Books published for university and colleges references by popular authors and published by the reputed publisher.

9.0 Relevant Websites (Reputed Universities and Others) for Notes /Animation / Videos Recommended

Website and Internet Contents References
SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos and other materials / notes

10.0 Magazines/Journals Used and Recommended to Students

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11.0 Examination Note

Assessment Details (both CIE and SEE)

methods of CIE need to be defined topic wise i.e.- Tests, MCQ, Quizzes, Seminar or micro project/Course Project, Term Paper)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 35% of maximum marks in SEE and a minimum of 40% of maximum marks in CIE. Semester End Exam (SEE) is conducted for 50 marks (1hours' duration) .. Based on this grading will be awarded.

The student has to score 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:

Three Unit Tests each of **20 Marks (duration 01 hour)**

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester
- 4.

(All tests are similar to the SEE pattern i.e question paper pattern is MCQ)

Two assignments each of **10 Marks**

5. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Report writing /Group discussion/Seminar any one of three suitably planned to attain the COs and POs for **20 Marks (duration 01 hours)**

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

CIE methods /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 hours**

12.0 Course Delivery Plan

Module	Lecture No.	Content of Lecturer	Teaching Method	Laboratory Component	% of Portion
1	1	Good Health & It's balance for positive mindset: Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health,	Chalk and talk method, Videos, Power Point presentation Creating real time stations in classroom discussions, (Connecting Campus & community with companies real time situations).		20%
	2	Health & Behavior, Health & Society, Health & family, Health & Personality			
	3	Psychological disorders-Methods to improve good psychological health, Changing health habits for good health.			
2	4	Building of healthy lifestyles for better future: Developing healthy diet for good health, Food & health, Nutritional guidelines for good health,	Chalk and talk method, Videos, Power Point presentation and	https://www.englishclub.com/pronunciation/phone-mic-chart-ia.htm	20%
	5	Obesity & overweight disorders and its management, Eating disorders,			

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	6	Fitness components for health, Wellness and physical function, How to avoid exercise injuries.	Animation videos to teach phonetics in Practical method, creating real time stations in classroom		
3	7	Creation of Healthy and caring relationships : Building communication skills, Friends and friendship .	Chalk and talk method, Videos, Power Point presentation and Animation videos to teach phonetics in Practical method, creating real time stations in classroom		20%
	8	Education, the value of relationship and communication skills, Relationships for Better or worsening of life,			
	9	understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering.			
4	10	Avoiding risks and harmful habits : Characteristics of health compromising behaviors	Chalk and talk method, PowerPoint presentation to teach		20%
	11	Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions,	Grammar and phonetics, Animation videos on communication and language skills		
	12	Differences between addictive people and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions.			
5	13	Preventing & fighting against diseases for good health: How to protect from different types of infections, How to reduce risks for good health,	Chalk and talk method, PowerPoint presentation to teach Grammar and phonetics, Animation videos on communication and language skills		20%
	14	Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life,			
	15	Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status.			

15.0 QUESTION BANK

- Which of these is not a definition of health?
 - Health as not ill
 - Health despite disease
 - Health means not seeing a doctor
 - Health as vitality
- Which of these things is health psychology concerned with?
 - What causes illness?
 - Who is responsible for illness?
 - How should illness be treated?
 - All of the above
- Which of these is not an example of a health behaviour?
 - Smoking
 - Taking regular exercise
 - Eating healthy food
 - Going to the gym
- The models of health behaviour are also known as...
 - Mental models of health behaviour
 - Cognition models of health behaviour
 - Brain models of health behaviour
 - Thought models of health behaviour
- Which of these is not an element of the Health Belief Model?
 - Threat
 - Expectations
 - Cure
 - Socio-demographic factors
- Which of these is a stage in the Stages of Change Model?
 - Study
 - Contemplation
 - Deliberation
 - Meditation
- What does the term 'mortality' refer to?
 - Death
 - Illness
 - Health
 - Morbidity
- Which law relates to a person's right to choose whether they want treatment or not?
 - The Misuse of Drugs Act 1971
 - The Health and Safety at Work e.t.c. Act 1974

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- c) The Mental Capacity Act 2005 d) The Medicines Act 1968
9. Why is it important to pharmacists that research is carried out in a rigorous way?
- a) So that they know that the research was done properly
 b) To increase the income for the pharmacy c) To get more people to take medicines
 d) To get doctors to prescribe more medicines
10. The World Health Day is celebrated on ____.
- a) 1st March b) 7th April c) 6th October d) 10th December
11. Cleanliness, physical exercise, rest and sleep are a part of ____.
- a) Hygiene b) Social hygiene c) Personal hygiene d) None of the above
12. Which one of the following is an unhealthy habit?
- a) Sharing food b) Bathing twice a day
 c) Drinking boiled water d) Eating without washing one's hand
13. Which one of the following is not a bacterial disease?
- a) AIDS b) Dengue c) Measles d) All of the above
14. Which of the following diseases is also called as "Salmonella enterica serotype Typhi"?
- a) Typhoid b) Malaria c) Diarrhea d) Yellow fever
15. Which of the following is the main cause for transmission of the Hepatitis virus?
- a) The bite of a mosquito b) Sharing drug needles
 c) Drinking contaminated water d) All of the above
16. Which of the following statements is true about contamination?
- a) Contamination is caused by the entry of germs by an insect bite
 b) Contamination is caused by the entry of germs by an animal bite
 c) Contamination is caused by the entry of germs into drinking water or edible foods.
 d) None of the above
17. Which of the following diseases is not caused by bacteria?
- a) Typhoid b) Poliomyelitis c) Tuberculosis d) All of the above.
18. The main cause of contagious disease is ____.
- a) Contaminated Air b) Contaminated Food
 c) Poor hygienic conditions d) All of the above
19. Which of the following factors is necessary for a healthy person?
- a) Vaccination b) Balanced diet
 c) Personal hygiene d) All of the above
20. Which of the following statements is correct?
- a) Health promotion can refer to any event, process or activity that facilitates the protection or improvement of the health status of individuals, groups, communities or populations.
 b) The objective of health promotion is to prolong life and to improve quality of life.
 c) Health promotion practice is often shaped by how health is conceptualized.
 d) All of these
21. This approach to health promotion is based on the assumption that humans are rational decision-makers, this approach relies heavily upon the provision of information about risks and benefits of certain behaviours.
- a) Behaviour change approach b) Community development approach
 c) Biomedical approach d) None of these
22. This approach to health promotion aims to improve and promote health by addressing socioeconomic and environmental determinants of health within the community.
- a) Behaviour change approach b) Community development approach
 c) Biomedical approach d) None of these
23. Which of the following is a criticism of the behaviour change approach to health promotion?
- a) It is unable to target the major causes of ill health.
 b) The choice of which behaviour to target lies with 'experts' whose task it is to communicate and justify this choice to the public.
 c) The behaviour change paradigm does not address the many variables other than cognitions that influence human actions.
 d) All of these
24. ____ refers to the application of consumer-oriented marketing techniques in the design, implementation and evaluation of programmes aimed towards influencing behaviour change
- a) Health education b) Social marketing



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- c) Consumer health d)None of these
25. When can we say that we are not healthy?
- When we feel good physically
 - When we are able to cope well with the social pressure
 - When we have a positive outlook towards life
 - When we constantly suffer from headaches due to a stressful life
26. The term 'health' is defined in many ways. The most accurate definition of the health would be *
- Health is a state of body and mind in a balanced condition
 - Health is a reflection of a smiling face
 - Health is a state of complete physical, mental and social well-being
 - Health is a symbol of economic prosperity
27. Which of the following is not dimension of health?
- Nutrition b) Physical c) Social d) Mental
30. ICDS stands for
- Integrated child development scheme b)Indian child development scheme
 - Integrating child development scheme d) None of these
- 31.The top priority of Janani Suraksha Yojana is
- Decrease the fertility rate b) Reduce the birth rate
 - Reduction of MMR d) None of these
32. In which year NRHM was launched in India?
- 2005 b) 2008 c) 2004 d) 2007
33. NRHM covers
- Improve accessibility to quality health care for the rural population
 - Bridge gaps in health care
 - facilitate decentralized planning in the health sector
 - All of the above
34. NHRM seeks to strengthen
- Private healthcare system b) Public and private health care system
 - Public health care system d) None of these
35. NFHS stands for
- National full health status b) National family health survey
 - National family health status d)None of these
36. National Population Policy of India was introduced in which year?
- 2001 b) 2005 c) 2012 d) 2000
37. As per WHO the principles of health is
- Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.
 - The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.
 - The health of all peoples is fundamental to the attainment of peace and security and is dependent on the fullest cooperation of individuals and States.
 - All of the above
38. The importance of good health in a person's life
- To serve himself, nation, and community
 - To save the cost of treatment and the hassle of going to hospitals
 - To feel comfortable and happy
 - All of the above
- 39.Which of the following is not a benefit of living healthy? *
- Feel Better About Yourself b) High levels of stress
 - Avoid Addictions d)Lower Medical Costs
40. How one can achieve good health and well-being? *
- Drink a lot of water b)Add more fruits and vegetables to your diet
 - Protect your skin d)All of the above


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41. What influences our health?
 a) Economic environment b) Cultural environment c) Both d) None
42. Which are the factors that impact health?
 a) Air, water, and soil quality b) Racism, sexism, political participation
 c) Diet, exercise, and addictions d) All of the above
43. Which is not the category of health behavior?
 a) Preventive health behavior b) Easy-going behaviour
 c) Illness behavior d) Sick-role behavior
44. A child buckled into a safety seat is participating in
 a) Health-related behaviour b) Health-directed behaviour c) Both d) None
45. Self-care behavior includes
 a) The actions such as eating chicken soup, drinking liquids, or taking over-the-counter medications for cold or flu-like symptoms
 b) The use of alternative and complementary medical treatments, without medical supervision
 c) Treating minor injuries such as bruises, scrapes, and twisted ankles when a person does not think a health care professional is needed
 d) All of the above
46. Which of these is not a definition of health?
 a) Health as not ill b) Health despite disease
 c) Health means not seeing a doctor d) Health as vitality
47. Which of these is not an example of a health behaviour?
 a) Smoking b) Taking regular exercise
 c) Eating healthy food d) Going to the gym
48. Which of these is not an element of the Health Belief Model?
 a) Threat b) Expectations c) Cure d) Socio-demographic factors
49. What does the term 'mortality' refer to?
 a) Death b) Illness c) Health d) Morbidity
50. is a physical response
 a) Habit b) Emotions c) Feelings d) Thinking


16.0 University Result

Examination	S ⁺	S	A	B	C	D	E	F	% Passing

Prepared by	Checked by		
			
Dr. M.S. Hanagadakar Dr. S.J. Walaki	Dr. M.S. Hanagadakar	HOD	Principal

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