

**NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)**



Affiliated to

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW



Evaluation Scheme & Syllabus

For

**Master Of Integrated Technology
Computer Science and Engineering**

First Year

(Effective from the Session: 2023-24)

**NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)**

**Master Of Integrated Technology
Computer Science and Engineering
EVALUATION SCHEME
SEMESTER-I**

| S. No. | Subject Codes | Subject | Periods | | | Evaluation Schemes | | | | End Semester | | Total | Credit |
|---|---------------|--|---------|---|---|--------------------|----|-------|----|--------------|----|------------|-----------|
| | | | L | T | P | CT | TA | TOTAL | PS | TE | PE | | |
| 3 WEEKS COMPULSORY INDUCTION PROGRAM | | | | | | | | | | | | | |
| 1 | BMIAS0103 | Engineering Mathematics-I | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | | 150 | 4 |
| 2 | BMIAS0101A | Engineering Physics | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | | 150 | 4 |
| 3 | BMIASL0101 | Acquiring Business Communication (ABC) | 2 | 0 | 0 | 30 | 20 | 50 | | 50 | | 100 | 2 |
| 4 | BMICSE0103 | Design Thinking-I | 2 | 1 | 0 | 30 | 20 | 50 | | 50 | | 100 | 3 |
| 5 | BMICSE0151 | Problem-Solving using Python | 0 | 0 | 6 | | | | | 50 | | 100 | 3 |
| 6 | BMIAS0151A | Engineering Physics Lab | 0 | 0 | 2 | | | | | 25 | | 25 | 1 |
| 7 | BMIASL0151 | Acquiring Business Communication (ABC) Lab | 0 | 0 | 4 | | | | | 50 | | 50 | 2 |
| 8 | BMIME0151 | CAD and Digital Manufacturing | 0 | 0 | 6 | | | | | 50 | | 100 | 3 |
| 9 | | MOOCs (For B.Tech. Hons. Degree) | | | | | | | | | | | |
| | | TOTAL | | | | | | | | | | 950 | 22 |

*** List of MOOCs Based Recommended Courses for first year (Semester-I) B. Tech Students**

| S.No. | Subject Code | Course Name | University / Industry Partner Name | No of Hours | Credits |
|-------|--------------|--|------------------------------------|-------------|------------|
| 1 | BMC0001 | Design Thinking for innovation | Infosys Springboard | 6 hrs | 0.5 |
| 2 | BMC0003 | Programming Fundamentals using Python - Part 1 | Infosys Springboard | 43h 25m | 3.5 |

Abbreviation Used:-

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

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**Master Of Integrated Technology
Computer Science and Engineering
EVALUATION SCHEME
SEMESTER-II**

| Sl. No. | Subject Codes | Subject | Periods | | | Evaluation Schemes | | | | End Semester | | Total | Credit |
|---------|---------------|--|---------|---|---|--------------------|----|-------|----|--------------|-----|------------|-----------|
| | | | L | T | P | CT | TA | TOTAL | PS | TE | PE | | |
| 1 | BMIAS0203 | Engineering Mathematics-II | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | | 150 | 4 |
| 2 | BMIEC0201 | Basic Electrical and Electronics Engineering | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | | 150 | 4 |
| 3 | | Foreign Language | 2 | 0 | 0 | 30 | 20 | 50 | | 50 | | 100 | 2 |
| 4 | BMICSE0252 | Advanced Python | 0 | 0 | 6 | | | | 50 | | 100 | 150 | 3 |
| 5 | BMIASL0251 | Communication for Career Enhancement | 0 | 0 | 4 | | | | 50 | | 50 | 100 | 2 |
| 6 | BMIEC0251 | Basic Electrical and Electronics Engineering Lab | 0 | 0 | 2 | | | | 25 | | 25 | 50 | 1 |
| 7 | BMICSE0251 | C Programming | 0 | 0 | 6 | | | | 50 | | 100 | 150 | 3 |
| 8 | | MOOCs (For B.Tech. Hons. Degree) | | | | | | | | | | | |
| | | TOTAL | | | | | | | | | | 850 | 19 |

***Foreign Language:**

1. BMIASL0202 French
2. BMIASL0203 German
3. BMIASL0204 Japanese

*** List of MOOCs Based Recommended Courses for first year (Semester-II) B. Tech Students.**

| S. No. | Subject Code | Course Name | University/ Industry Partner Name | N. of Hours | Credits |
|--------|--------------|-----------------------|-----------------------------------|-------------|---------|
| 1. | BMC0002 | Next Gen Technologies | Infosys Springboard | 10h 14m | 0.5 |
| 2 | BMC0004 | Programming In C | Infosys Springboard | 17h 7 m | 1 |

PLEASE NOTE:-

- **Internship (3-4 weeks) shall be conducted during summer break after II semester and will be assessed during III semester**

Abbreviation Used:-

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
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A student will be eligible to get Under Graduate degree with Honours only, if he/she completes the additional MOOCs courses such as Coursera certifications, or any other online courses recommended by the Institute (Equivalent to 20 credits). During Complete B.Tech. Program Guidelines for credit calculations are as follows.

1. For 6 to 12 Hours =0.5 Credit
2. For 13 to 18 =1 Credit
3. For 19 to 24 =1.5 Credit
4. For 25 to 30 =2 Credit
5. For 31 to 35 =2.5 Credit
6. For 36 to 41 =3 Credit
7. For 42 to 47 =3.5 Credit
8. For 48 and above =4 Credit

For registration to MOOCs Courses, the students shall follow Coursera registration details as per the assigned login and password by the Institute these courses may be cleared during the B. Tech degree program (as per the list provided). After successful completion of these MOOCs courses, the students shall provide their successful completion status/certificates to the Controller of Examination (COE) of the Institute through their coordinators/Mentors only.

The students shall be awarded Honours Degree as per following criterion.

- i. If he / she secures 7.50 as above CGPA.
- ii. Passed each subject of that degree program in the single attempt without any grace.
- iii. Successful completion of MOOCs based 20 credits

SYLLABUS

| B. Tech.- First Semester | | | | | | |
|---|----------|-------------------------------------|------------------|-----------------------------|-----------------------------------|------------|
| Branch- CSE/CSE-R/CS/IT/CSE(IOT)/ECE/ECE(VLSI)/ME/M.Tech.(Integrated) | | | | | | |
| Subject Code- BMIAS0103 | | | | L - T - P | | |
| | | | | 3 - 1 - 0 | | |
| Subject Name- ENGINEERING MATHEMATICS - I | | | | No. of hours- 42 | | |
| <p>Course Objective- The objective of this course is to familiarize the graduate engineers with techniques in linear algebra, differential calculus-I, differential calculus-II and multivariable calculus. It aims to equip the students with standard concepts and tools from intermediate to advanced level that will enable them to tackle more advanced level of mathematics and applications that they would find useful in their disciplines.</p> | | | | | | |
| <p>Course Outcome – After completion of this course students are able to:</p> <p>CO1 - Apply the concept of matrices to solve linear simultaneous equations</p> <p>CO2- Apply the concept of successive differentiation and partial differentiation to solve problems of Leibnitz theorems and total derivatives.</p> <p>CO3- Apply partial differentiation for evaluating maxima, minima, Taylor’s series and Jacobians.</p> <p>CO4- Apply the concept of multiple integral to find area, volume.</p> <p>CO5- Solve the problems of Profit, Loss, Number & Series, Coding & decoding, Algebra.</p> | | | | | | |
| Course Content | | | | | | |
| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/ Lab | CO Mapping |
| Unit 1 | Matrices | Types of Matrices: Symmetric, Skew- | Classroom, PP T, | 8 | 1.1, 1.2, 1.3, 1.4 | CO1 |

| | | | | | | |
|---------------|--|--|---|----------|----------------------|-------------------|
| | | <p>symmetric and Orthogonal Matrices; Complex Matrices, Inverse and Rank of matrix using elementary transformations, System of linear equations, Characteristic equation, Cayley-Hamilton Theorem and its application, Eigen values and eigenvectors; Diagonalisation of a Matrix.</p> | <p>M.Tutor, Smart Board</p> | | | |
| <p>Unit 2</p> | <p>Differential Calculus -I</p> | <p>Successive Differentiation (nth order derivatives), Leibnitz theorem and its application, Asymptotes, Curve tracing: Cartesian and Polar co-ordinates. Partial derivatives,</p> | <p>Classroom, PPT, M.Tutor, Smart Board</p> | <p>8</p> | <p>2.1, 2.2, 2.3</p> | <p>CO2</p> |

| | | | | | | |
|--------|----------------------------------|---|--------------------------------------|----|---------------|------------|
| | | Total derivative, Euler's Theorem for homogeneous functions | | | | |
| Unit 3 | Differential Calculus -II | Taylor and Maclaurin's theorems for a function of one and two variables, Jacobians, Approximation of errors. Maxima and Minima of functions of several variables, Lagrange Method of Multipliers. | Classroom,PP T, M.Tutor, Smart Board | 8 | 3.1, 3.2, 3.3 | CO3 |
| Unit 4 | Multivariable Calculus | Multiple integration: Double integral, Triple integral, Change of order of integration, Change of variables, Application: Areas and volumes, Beta & Gama function and | Classroom,PP T, M.Tutor, Smart Board | 10 | 4.1, 4.2, 4.3 | CO4 |

| | | | | | | |
|--------|-------------------|--|--------------------------------------|---|--------------------|------------|
| | | their properties, Dirichlet's integral and its applications. | | | | |
| Unit 5 | Aptitude-I | Simplification, Percentage, Profit, loss & discount, Average, Number & Series, Coding & decoding, Algebra. | Classroom, PPT, M.Tutor, Smart Board | 8 | 5.1, 5.2, 5.3, 5.4 | CO5 |

References-

Text Books:

1. B. V. Ramana, Higher Engineering Mathematics, Tata Mc Grew-Hill Publishing Company Ltd.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher.
3. R K. Jain & S R K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.

Reference Books:

1. E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons.
2. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning.
3. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole.
5. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi.
6. Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, Tata Mc-Grew-Hill; Sixth Edition.

7. P. Siva Ramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd
8. Advanced Engineering Mathematics. Chandrika Prasad, Reena Garg.
9. Engineering Mathematics – I. Reena Garg.
10. Quantitative Aptitude by R.S. Agrawal.

Links:

Unit 1: <https://www.youtube.com/watch?v=kcL5WWJjmIU>

<https://www.youtube.com/watch?v=VTHz4gjzsKI>

https://youtu.be/56dEt9EOZ_M

<https://www.youtube.com/watch?v=njDiwB43w80>

<https://www.youtube.com/watch?v=N33SOw1A5fo>

<https://www.youtube.com/watch?v=yLi8RxqfowA>

www.math.ku.edu/~lerner/LAnotes/Chapter5.pdf

<http://www.math.hawaii.edu/~lee/linear/sys-eq.pdf>

<https://youtu.be/41Y38WjHbtE>

https://www.youtube.com/watch?v=4jcvZmMK_28

<https://www.youtube.com/watch?v=G4N8vJpf7hM>

<https://www.youtube.com/watch?v=r5dIXpssvrA>

<https://youtu.be/ZX5YnDMzwbs>

<http://web.mit.edu/2.151/www/Handouts/CayleyHamilton.pdf>

<https://www.youtube.com/watch?v=iKQESPLDnnI>

<https://math.okstate.edu/people/binegar/3013-S99/3013-116.pdf>

Unit 2: https://www.youtube.com/watch?v=tQxk5IX9S_8&list=PLbu_fGT0MPstS3DTIyqkUecSW_7axdxKe

<https://www.youtube.com/watch?v=U5sGFf0DjLs&t=34s>

<https://www.youtube.com/watch?v=TCPPvRfHtXw>

https://www.youtube.com/watch?v=PkuPGKSacu0&list=PL2FUpm_Ld1Q3H00wVFuwjW0o1gtMXk1eb

<https://www.youtube.com/watch?v=QeWrQ9Fz3Wo&t=22s>

<https://www.youtube.com/watch?v=5dFrWCE6bHg>

<https://www.youtube.com/watch?v=WX6O9TiFYsA&t=110s>

<https://www.youtube.com/watch?v=GII1ssdR2cg&list=PLhSp9OSVmeyK2yt8hdoo3Qze3O0Y67qaY>

Unit 3: <https://www.youtube.com/watch?v=6tQTRlkbkc8>

<https://www.youtube.com/watch?v=McT-UsFx1Es>

<https://www.youtube.com/watch?v=1TNtFqiFQo>

<https://www.youtube.com/watch?v=X6kp2o3mGtA>

<https://www.youtube.com/watch?v=btLWNJdHzSQ>

<https://www.youtube.com/watch?v=jiEaKYI0ATY>

<https://www.youtube.com/watch?v=r6lDwJZmfGA>

<https://www.youtube.com/watch?v=Jk9xMY4mPH8>

https://www.youtube.com/watch?v=fqq_UR4zhfI

https://www.youtube.com/watch?v=G0V_y0jz5c

<https://www.youtube.com/watch?v=9-tir2V3vYY>

<https://www.youtube.com/watch?v=jGwA4hknYp4>

Unit 4: <https://www.youtube.com/watch?v=3BbrC9JcjOU> <https://www.youtube.com/watch?v=-DduB46CoZY>

<https://www.youtube.com/watch?v=VvKAuFBJLs0>

<https://www.youtube.com/watch?v=4rc3w1sGoNU>

<https://www.youtube.com/watch?v=X6kp2o3mGtA&t=1003s>

<https://www.youtube.com/watch?v=wtY5fx6VMGQ&t=1151s>

<https://www.youtube.com/watch?v=-I3HUeHi1Ys&t=1933s>

<https://www.youtube.com/watch?v=kfv9h3c46CI>

https://www.youtube.com/watch?v=9_m36W3cK74

<https://www.youtube.com/watch?v=HQM7XMd5QQo>

- <https://www.GovernmentAdda.com>

Unit 5: <https://www.GovernmentAdda.com>

B. Tech.- First Semester

Branch- CSE/CSE-

R/CS/CYS/IT/CSE(AI)/CSE(IOT)/CSE(DS)/CSE(AIML)/M. Tech. Integrated

Subject Code-BMIAS0101A

L - T - P

3 – 1- 0

Subject Name- ENGINEERING PHYSICS

No. of hours-40

Course Objective-

1. To provide the knowledge of Relativistic Mechanics and their uses to engineering applications.
2. To provide the knowledge of Quantum Mechanics and to explore possible engineering utilization.
3. To provide the knowledge of interference and diffraction.
4. To provide the knowledge of the phenomenon of semiconductors and its uses to engineering applications.

5. To provide the basic knowledge of Optical Fiber and Laser which is necessary to understand the working of modern engineering tools and techniques.

Course Outcome – After completion of this course students will be able to:

CO1 - Solve the relativistic mechanics problems.

CO2- Apply the concept of quantum mechanics.

CO3- Apply the laws of optics and their application in various processes.

CO4- Define the laws of semiconductors.

CO5- Explain the working of modern engineering tools and techniques of optical fiber and laser.

Course Content

| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment /Lab | CO Mapping |
|--------|-------------------------------|--|-----------------|--------------------------|-----------------------------------|------------|
| Unit 1 | Relativistic Mechanics | Frame of reference, Inertial & non-inertial frames, Galilean transformations, Michelson Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Velocity addition theorem, Variation of mass with velocity, Einstein's mass energy relation, Relativistic | Smartboard, PPT | 8 | Assignment 1.1,1.2,1.3 | CO1 |

| | | | | | | |
|--------|--------------------------|--|-----------------|----|---------------------------------------|-----|
| | | <p>relation between energy and momentum, Massless particle.</p> <p>Some engineering applications(qualitative): Global positioning system (GPS), Application to Satellites.</p> | | | | |
| Unit 2 | Quantum Mechanics | <p>Introduction to wave-particle duality, de Broglie matter waves, Phase and group velocities, Heisenberg's uncertainty principle and its applications, Wave function characteristics and significance, Time-dependent and time-independent Schrödinger's wave equations, Particle in one-dimensional rigid box, Theory of Quantum excitation of the Higgs field (Higgs Boson or GOD particle)(qualitative)</p> | Smartboard, PPT | 8 | Assignment 2.1, 2.2, 2.3/Exp. 7,5, 19 | CO2 |
| Unit 3 | Wave Optics | <p>Coherent sources, Interference in uniform and wedge shaped thin films, Necessity of</p> | Smartboard, PPT | 10 | Assignment 3.1, 3.2/Exp.1,2,4 | CO3 |

| | | | | | | |
|--------|---|--|-----------------|---|---|-----|
| | | <p>extended sources, Newton's Rings and its applications, Fraunhofer diffraction at single slit and at double slit, absent spectra, Diffraction grating, grating spectra, Rayleigh's criterion of resolution, Resolving power of grating, Optical filters.</p> | | | | |
| Unit 4 | <p>Semiconductor Physics and Information Storage</p> | <p>(a) Introduction to the concept of electrical conductivity, conductivity of conductors and semiconductors, Fermi-Dirac probability distribution function, Position of Fermi level in intrinsic semiconductors and extrinsic semiconductors, variation of Fermi level with temperature (qualitative), Photovoltaic effect, working of a solar cell on the basis of band diagrams and Applications.</p> | Smartboard, PPT | 6 | Assignment 4.1, 4.2/Exp.5, 8, 9, 11, 12, 20, 22 | CO4 |

| | | | | | | |
|--------|---------------------------------|---|-----------------|---|-------------------------------------|-----|
| | | (b) Basics of magnetic, and semiconductor memories | | | | |
| Unit 5 | Fiber Optics & Laser | <p>Fiber Optics: Introduction to fiber optics, Acceptance angle, Numerical aperture, Normalized frequency, Classification of fiber, Attenuation and Dispersion in optical fibers.</p> <p>Laser: Absorption of radiation, Spontaneous and stimulated emission of radiation, Einstein's coefficients, Population inversion, Ruby Laser, He-Ne Laser.</p> <p>Recent applications of optical fibers and Laser(Qualitative): Laser-guided UAV (Drone).</p> | Smartboard, PPT | 8 | Assignment 5.1, 5.2/ Exp.16, 17, 18 | CO5 |

References-

Text Books:

1. A. Beiser, Concepts of Modern Physics (McGraw Hill)

2. Brijlal & Subramanian, Optics (S. Chand)

3. Neeraj Mehta, Applied Physics for Engineers (PHI Learning, New)

Reference Books:

1. Robert Resnick, Introduction to Special Theory of Relativity (Wiley)

2. Katiyar and Pandey, Engineering Physics: Theory and Practical (Wiley India)

3. H. K. Malik and A. K. Singh, Engineering Physics- (McGrawHill)

4. J.W. Jewett , Jr. and R. A. Serway , Physics for Scientists and Engineers with Modern Physics,7th Edn. (CENGAGE Learning)

5. C. Kittel , Solid State Physics,7th Edn. (Wiley Eastern)

6. V. Raghavan, Materials Science and Engineering (Prentice Hall, India)

7. S.O. Pillai , Solid State Physics,5th Edn (New Age International)

8. R. Booker and E. Boysen , Nanotechnology (Wiley Publ.)

9. K.Rajagopal, Engineering Physics, 2nd Edn. (PHI Learning)

10. G. Aruldas , Engineering Physics (PHI Learning)

11. S.D. Jain and G.S. Sahasrabudhe , Engineering Physics (Universities Press)

12. L. F. Bates, Modern Magnetism, (Cambridge Univ. Press)

13. F.T.S. Yu , X.-Y. Yang, Introduction to Optical Engineering (Cambridge Univ.Press)

14. G.Keiser, Optical Communications Essentials (Tata McGrawHill)

Links:

UNIT1: https://www.youtube.com/watch?v=lzBKlY4f1XA&list=PL10WTjZXSIIHKMnU4UCxpPsHyAf_n1O6&index=11

UNIT2: <http://nptel.ac.in/> , <http://www.mit.edu/>

UNIT3: <https://www.youtube.com/watch?v=bWTxf5dSUBE> , <http://ocw.mit.edu/>, <http://nptel.ac.in/>

UNIT4: <https://www.youtube.com/watch?v=6vyYRnLvnqI>

UNIT5: <https://www.youtube.com/watch?v=0GD-18Jqnro>,
<https://www.youtube.com/watch?v=dQhcg8YZo>

B. Tech. – First Semester

**Branch – CS/CSE/ CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AIML)/CSE(AI)/CYS/
ECE/ECE(VLSI) /ME/M. Tech (Int)/BT**

Subject Code-BMIASL0101

**L - T -
P
2 - 0 -
0**

Subject Name- Acquiring Business Communication (ABC)

**No. of
hours-
24 +
48 =
72**

Course Objectives:

- To improve proficiency in the English language to the Intermediate level (B1/B2) of CEFR (Common European Framework of Languages).
- To impart business communication skills.
- To motivate students to look within and create a better version of ‘self.’
- To introduce the key concepts of ethics, etiquette, and life skills.
- To train for enhanced career prospects.

Course Outcomes:

After the completion of the course, the students will be able to

CO1 – Improve proficiency in English to the next level of CEFR.

CO2 - Develop business communication skills.

CO3 - Demonstrate improved versions of themselves.

CO4 – Acquire the concepts to cope better at the workplace.

CO5 – Participate in the placement process with confidence.

Course Content

| Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/Lab | CO Mapping |
|--|---|---|-----------------------------|---|------------|
| I - Reading with Cognitive Skills | <p>Importance of communicating in English Overview of ABC</p> <p>Objective: To motivate the students to acquire the skill of communicating well. Outcome: The students realize the importance and understand the course and what is expected of them.</p> | <p>Video Clips of famous personalities who have learnt to communicate well e.g., Kapil Dev, Jahnvi Panwar, APJ Abdul Kalam, etc.</p> | 1 | <p>Assignment 1: Story Review (PDF of short stories to be shared to encourage reading habits)</p> | CO1 |
| | <p>Basics of Workplace Communication</p> <ul style="list-style-type: none"> • Process • Barriers <p>Objective: To facilitate the student's ability to identify and analyse</p> | <p>Video streaming followed by Discussions and problem-solving activities.</p> | 1 | <p>Humorous video clips on miscommunication - Students will analyse the video clips for a deeper understanding of the nuances of effective and</p> | CO2 |

| | | | | | |
|--|---|---|---|---|-----|
| | <p>aspects of miscommunication in real-life situations.</p> <p>Outcome: The students can identify impediments to effective communication and learn to overcome those.</p> | | | <p>ineffective communication.</p> | |
| | <p>Reading Comprehension</p> <p>Objective: To foster students' reading comprehension skills by engaging them in activities that involve comprehending texts - understanding instructions, filling forms, interpreting professional contents.</p> <p>Outcome: The students will become adept at navigating diverse texts, understanding, and following directions, and accurately filling out official forms.</p> | <p>Students will actively interact with the reading material by engaging in this activity, collaborating with their peers, and refining their comprehension skills. The think-pair-share approach fosters critical thinking, oral communication, and the ability to construct meaning from written texts.</p> | 1 | <p>Think-Pair-Share for Reading Comprehension (academic texts, Journals, research papers, general interest)</p> | CO1 |
| | <p>Reading Techniques for Time Management</p> | <p>Practice reading a variety of texts and focus on identifying</p> | 1 | <p>Activity 1: Skim and Scan Race</p> | CO4 |

| | | | | | |
|--|--|--|----------|--|------------|
| | <p>Objective: To develop students' ability to quickly locate relevant information in texts.</p> <p>Outcome: Students will learn to read and comprehend faster.</p> | <p>keywords, headings, and topic sentences. Also, to analyze and synthesize information from a selected text and use it for tasks such as paraphrasing, note making, chart and table representation.</p> | | <p>Activity 2: Speed Reading Challenge</p> <p>Activity 3: Information Gap Activity</p> | |
| | <p>Online Assessment: Apply the various reading techniques to extract information from a given text.</p> | <p>Online Assessment</p> | <p>1</p> | | |
| | <p>Critical Reading</p> <p>Objective: To promote critical thinking and engage students in thoughtful discussions about a selected reading material.</p> <p>Outcome: The students will develop skills in identifying key arguments, evaluating evidence, and challenging assumptions.</p> | <p>Group discussion on selected material.</p> | <p>1</p> | <p>Critical Reading Discussion Circle – On short stories, movies, reviews.</p> | <p>CO3</p> |
| | <p>Hansei Session</p> <p>Objective: To develop students' cognitive skills and critical thinking through a</p> <p>Outcome: The students will develop self-awareness, metacognition, and a</p> | <p>The students will be able to reflect on their reading experiences, evaluate their cognitive skills employed during the process, and identify</p> | <p>1</p> | <p>Hansei activity focused on reading comprehension.</p> | <p>CO4</p> |

| | | | | | |
|------------------------------|--|---|---|---|-----|
| | growth mindset, empowering students to become more effective and efficient readers. | strategies for improving their comprehension. | | | |
| II – Business Writing | <p>Vocabulary Building</p> <p>Objective: To expand participants' vocabulary and deepen their understanding of word formation.</p> <p>Outcome: Students will develop business vocabulary and effectively communicate in various professional settings.</p> | <p>Introduction to the General Service List of Words by Michael West, to familiarize students with word formation concepts in the context of business communication, enhancing their ability to understand and create a specialized vocabulary for effective professional interactions.</p> | 1 | <p>Activity 1: Word Association</p> <p>Activity 2: Vocabulary Charades</p> <p>Activity 3: Word Formation Relay using prefixes and suffixes.</p> <p>Activity 4: Root Word Finder</p> | CO2 |
| | <p>Language Toolbox</p> <p>Objective: To enhance language proficiency of the students by helping them bring in variety in their usage of words.</p> <p>Outcome: The students will become familiar with good workplace vocabulary and acquire linguistic versatility.</p> | <p>Studying and practising abbreviations, one-word substitutions, homophones, homonyms, synonyms, and antonyms. Students will develop a deeper understanding of these language tools and improve their ability to</p> | 2 | <p>Activity 1: Homophone Pictionary</p> <p>Activity 2: Synonym and Antonym Match-Up</p> <p>Activity 3: One-Word Substitution Brainstorm</p> <p>Activity 4: Abbreviation Scavenger Hunt</p> <p>Class Assignment: To fill in or identify the corporate terms, cliches and technical terminology in the assigned text.</p> | CO2 |

| | | | | | |
|---|---|--|---|---|-----|
| | | communicate effectively in various contexts. | | | |
| | <p>Sentence Construction</p> <p>Objective: To help the students know the correct sentence construction rules and techniques.</p> <p>Outcome: The students will be able to use effective and well-formed sentences.</p> | <p>The students will actively participate in the Sentence Building activities, thereby enhancing their understanding of the requisites of a good sentence.</p> | 2 | <p>Activity 1: Sculpting a good Sentence.</p> <p>Activity 2: Sentence Construction Masterclass</p> <p>Activity 3: Framing a story using jumbled sentences.</p> <p>Activity 4: Analysing famous dialogues from movies or novels.</p> | CO1 |
| | <p>Paragraph writing</p> <p>Objective: To make the students understand the fundamental organization of a paragraph.</p> <p>Outcome: Students will be able to compose effective paragraphs and express their views and opinions in an organized, and logical manner.</p> | <p>The students will participate in a blog writing activity wherein they will be asked to compose paragraphs based on visual and verbal prompts. Through the activity the students will be familiarised with the important aspects of paragraph writing like unity, coherence, clarity, etc.</p> | 2 | <p>Writing a blog through Visual and verbal prompts.</p> | CO1 |
| <p>III - Mastering the art of listening and Speaking</p> | <p>Art of Listening</p> <p>Objective: To practice active listening,</p> | <p>The module includes guided practice sessions, role-plays, and simulations to</p> | 1 | <p>Activity 1: Listening exercises.</p> | CO1 |

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| <p>(Professional I & Empathetic Listening)</p> | <p>empathy, and effective communication.</p> <p>Outcome: Participants will engage in focused listening and learn to comprehend and respond.</p> | <p>develop active listening skills and empathy. Reflection and discussion sessions encourage self-awareness and strategy exploration. Instructors provide personalized feedback to refine participants' listening abilities.</p> | | <p>Activity 2: Listening to various suggested podcasts.</p> <p>Class Assignment: Task-based listening exercise</p> | |
| | <p>Phonetic Understanding</p> <p>Objective: To develop participants' ability to enunciate each sound clearly in Standard Indian English (Neutral Accent).</p> <p>Outcome: Participants will improve their auditory perception skills and develop a heightened awareness of the subtle sound distinctions in Standard English.</p> | <p>It aims to develop participants' ability to enunciate sounds clearly in Standard Indian English. It includes focused practice on sound production, auditory perception training, and increasing awareness of sound distinctions in Standard English. This pedagogy enhances participants' communication</p> | <p>1</p> | <p>Activity1: Pronunciation exercises in English</p> <p>Activity 2: Identifying the common English words pronounced differently in different regions of the world.</p> | <p>CO1</p> |

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| | | clarity and comprehension in English. | | | |
| | <p>Nuances of Speaking</p> <p>Objective: To help participants understand, recognize and practice correct intonation, voice modulation, tone, pitch, and accent.</p> <p>Outcome: Participants will enhance their ability to differentiate between similar sounds and improve their pronunciation accuracy in Standard English words.</p> | <p>The pedagogy focuses on understanding, recognizing, and practicing correct intonation, voice modulation, tone, pitch, and accent. Through interactive activities and targeted exercises, participants develop a keen awareness of these aspects of speech and apply them in their communication. The outcome is improved differentiation between similar sounds and enhanced pronunciation accuracy in Standard English words.</p> | 1 | <p>Activity 1: Application-based exercises on the nuances of speaking.</p> <p>Activity 2: Listen to the suggested list of podcasts/ ted talks.</p> <p>Activity 3: Practicing correct pronunciation of commonly mispronounced words.</p> | CO3 |
| | <p>Art of Public Speaking</p> <p>Objective: To help students speak with confidence in public,</p> | <p>Through interactive exercises and practical application, students gain</p> | 1 | <p>Activity 1: Delivering extempore speeches on familiar topics</p> <p>Activity 2: JAM sessions</p> | CO2 |

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| | <p>using various verbal and non-verbal aspects of speech.</p> <p>Outcome: Students will gain awareness of speaking in a professional environment and enhance their overall communication in English.</p> | <p>awareness of professional speaking and improve their overall English communication abilities, leading to enhanced public speaking proficiency.</p> | | | |
| | <p>Facing an Interview</p> <p>Objective: To develop the ability to face an interview.</p> <p>Outcome: Students will be able to speak in a professional environment and answer the basic questions of any interview confidently.</p> | <p>It focuses on providing students with practical guidance and training in interview skills through interactive exercises, mock interviews, and feedback sessions.</p> | 1 | <p>Activity 1: Speaking tests.</p> <p>Activity 2: Mock Interview Sessions</p> | CO5 |
| | <p>Hansei Session</p> <p>Objective: To foster self-reflection and continuous growth in professional and empathetic listening and speaking skills through a Hansei activity.</p> <p>Outcome: By engaging in the Hansei activity,</p> | <p>Reflecting on their experiences</p> | 1 | <p>Hansei Activity: Create a video on a topic that will interest college students incorporating the nuances of speaking that you have learned.</p> | CO4 |

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| | <p>participants will reflect on their experiences with professional and empathetic listening and speaking, identify areas of strength and areas for improvement, and develop strategies to enhance their skills. This activity promotes self-awareness, active listening, effective communication, and empathy, empowering participants to build stronger relationships, enhance their professional interactions, and become more impactful communicators in various settings.</p> | | | | |
| <p>IV - Refining the Triad: (Ethical, Empathetic Leadership & Synergy)</p> | <p>Leadership role play:</p> <p>Objective: Recognize the values that leaders/celebrities demonstrate.</p> <p>Outcome: Students will get motivated to look within and create a better version of themselves.</p> | <p>The teaching pedagogy for the Leadership Role Play session involves interactive role-playing activities where students portray leaders or celebrities and demonstrate their values and qualities.</p> | <p>1</p> | <p>Activity1: Role-play activity</p> <p>(Hansei) Activity 2: Take the colored paper and write about the value that is closest to your heart and how you will demonstrate a leader in your life.</p> <p>Online Assessment: Links to videos of some famous leaders and celebrity interviews will be shared. Taking inspiration from them students will work in pairs and will enact and</p> | <p>CO 3</p> |

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| | | | | record their interview videos. | |
| | <p>Etiquette & Ethics:</p> <p>Objective: Students will recognize the key features of corporate etiquette</p> <p>Outcome: Students will be able to learn and imbibe corporate etiquette in real situations.</p> | <p>The teaching pedagogy for the Etiquette & Ethics module involves interactive discussions, case studies, and role-playing exercises to help students recognize key features of corporate etiquette.</p> | 1 | <p>Activity 1: Videos on corporate etiquette and recognizing the key features.</p> <p>Online Assessment: Hansei Activity - Take an interview of various working-class people.</p> | CO4 |
| | <p>Emotional Intelligence in real-life workplace scenarios</p> <p>Objective: To make students identify and be aware of emotions by introducing the concepts of values and life skills</p> <p>Outcome: Students will be able to harness the emotions and apply it to thinking and problem solving: Manage and regulate emotions.</p> | <p>It involves experiential learning through discussions, case studies, and interactive exercises to help students identify and be aware of their emotions.</p> | 1 | <p>Activity 1: Think- Pair-Share activities using various emojis and emotions in different situations.</p> <p>Activity 2: To show NDTV's Coverage on the lead actress of "SECRET SUPERSTAR" Zaira Wasim and her battle with Anxiety and Depression.</p> | CO4 |
| | <p>Hansei Activity</p> <p>Objective: To promote self-reflection and continuous growth in</p> | <p>Self - reflection</p> | 1 | <p>Activity: Hansei (Self-Reflection)</p> <p>Understanding themselves better in terms of</p> | CO4 |

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| | <p>ethical leadership, empathetic leadership, and creating synergy through a Hansei activity.</p> <p>Outcome: By engaging in the Hansei activity, participants will reflect on their experiences with ethical and empathetic leadership and creating synergy within teams or organizations.</p> | | | <p>Emotional Intelligence by Quick-Self Check (Situation based activity).</p> | |
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Course Book – There are no course books. Hand-outs and materials will be prepared by the teachers, who will have an instructional manual to help them.

Reference Books:

1. Cambridge English Business Benchmark (Pre-intermediate to Intermediate), 2nd edition, Norman Whitby, Cambridge University Press, 2006, UK.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
3. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
4. Talbot, Fiona. Improve Your Global Business English Kogan Page, 2012.
5. Leech Geoffery. Communicative Grammar of English. Pearson Education Harlow, United Kingdom, 1994.
6. Sethi. J. A Course in Phonetics and Spoken English Prentice Hall India Learning Private Limited; second edition (1999)
7. Anderson, Paul V. Technical communication. 8th ed. Cengage Learning, 2011.
8. IELTS 11: General Training with answers. Cambridge English

Links:

Online reference e books and other reference materials:

1. <http://promeng.eu/downloads/training-materials/ebooks/soft-skills/effective-communication-skills.pdf>

2. <http://ncert.nic.in/textbook/pdf/iees101.pdf>
3. <http://www.infocobuild.com/education/audio-video-courses/literature/CommunicationSkills-IIT-Kanpur/lecture-09.html>

Online Resources:

4. https://www.youtube.com/watch?v=JIKU_WT0BlS
5. <https://www.youtube.com/watch?v=6Q15mQdxWk>
6. https://www.youtube.com/watch?v=fE_cS75Lcvc

(MTUTOR LINK):

7. <https://www.m-tutor.com/courses-detail.php?tid=859133&topicid=198404&viewtype=&searchtopics=&selectedcourse=396&selectedsubject=5710&selectedunit=&filter=landing>
8. <https://www.m-tutor.com/courses-detail.php?tid=858987&topicid=198291&viewtype=&searchtopics=&selectedcourse=396&selectedsubject=5710&selectedunit=&filter=landing>
9. <https://www.m-tutor.com/courses-detail.php?tid=858472&topicid=197673&viewtype=&searchtopics=&selectedcourse=396&selectedsubject=5710&selectedunit=&filter=landing>
10. <https://www.m-tutor.com/courses-detail.php?tid=858967&topicid=198195&viewtype=&searchtopics=&selectedcourse=396&selectedsubject=5710&selectedunit=&filter=landing>

Free Apps to Practice English:

1. Memrise - <https://www.memrise.com>
2. Open Language - <https://open-language.en.uptodown.com>
3. Duolingo - <https://englishtest.duolingo.com/applicants>
4. Rosetta Stone - <https://www.rosettastone.com/product/mobile-apps/>
5. FluentU - <https://www.rosettastone.com/product/mobile-apps/>

B. Tech.-First Semester

Branch - CS/CSE/ CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AIML)/CSE(AI)/CYS/
ECE/ECE(VLSI) /ME/M. Tech (Int.)/BT

Subject Code-BMICSE0103

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Subject Name- Design Thinking- I

No. of hours-40

Course Objective- The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcome – After completion of this course students will be able to:

CO1 - Develop a strong understanding of the design process and apply it in a variety of business settings

CO2-Analyze self, culture, teamwork to work in a multidisciplinary environment and exhibit empathetic behaviour

CO3- Formulate specific problem statements of real time issues and generate innovative ideas using design tools

CO4- Apply critical thinking skills in order to arrive at the root cause from a set of likely causes

CO5- Demonstrate an enhanced ability to apply design thinking skills for evaluation of claims and arguments

Course Content

| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/ Lab | CO Mapping |
|--------|--------------|--|----------|--------------------------|--|------------|
| Unit 1 | Introduction | An overview of future skills, introduction to design thinking, traditional | | 10 | Practical Approach (Discussion and Activities), Workshop at School of Future Skills | |

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| | | <p>problem solving versus design thinking, history of design thinking, wicked problems. Innovation and creativity, the role of innovation and creativity in organizations, creativity in teams and their environments, design mindset. Introduction to elements and principles of design, 13 Musical Notes for Design Mindset, Examples of Great Design, Design Approaches across the world.</p> | <p>Smartboard/PPT/Text book/Reference book</p> | | <p>Activity related to observation & team building exercise</p> | <p>CO 1</p> |
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| Unit 2 | <p>Ethical Values and Empathy</p> | <p>Understanding humans as a combination of I (self) and body, basic physical needs up to actualization, prosperity, the gap between desires and actualization.</p> <p>Understanding culture in family, society, institution, startup, socialization process.</p> <p>Ethical behaviour: effects on self, society, understanding core values and feelings, negative sentiments and how to overcome them,</p> <p>definite human conduct:</p> | Smartboard/PPT/Text book/Reference book | 8 | <p>Practical Approach (Discussion and Activities)/ Assignment</p> <p>Activity related to Empathy Map and Journey Mapping</p> | CO 2 |
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| | | <p>universal human goal, developing human consciousness in values, policy, and character.</p> <p>Understand stakeholders , techniques to empathize, identify key user problems.</p> <p>Empathy tools-</p> <p>Interviews, empathy maps, emotional mapping, immersion and observations , Emotional Intelligence, customer journey maps, classifying insights after Observations, Classifying Stakeholders , Individual</p> | | | | |
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| | | activity- 'Moccasin walk' | | | | |
| Unit 3 | Problem Statement and Ideation | Defining the problem statement, creating personas, Point of View (POV) statements. Research identifying drivers, information gathering, target groups, samples, and feedbacks. Idea Generation basic design directions, Themes of Thinking, inspirations and references, brainstormin g, inclusion, sketching and presenting ideas, idea evaluation, double diamond approach, | Smartboard/PPT/T ext book/Reference book | 8 | Practical Approach (Discussion and Activities)/ Assignment Activity related to Brainstorming and Six Thinking Hats | CO 3 |

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| | | <p>analyze – four W’s, 5 why’s, “How Might We”, Defining the problem using Ice-Cream Sticks, Metaphor & Random Association Technique, Mind-Map, ideation activity games - six thinking hats, million-dollar idea, introduction to visual collaboration and brainstorming tools - Mural, JamBoard.</p> | | | | |
| Unit 4 | | <p>Fundamental concepts of critical thinking, the difference between critical and</p> | <p>Smartboard/PPT/Text book/Reference book</p> | 6 | <p>Practical Approach (Discussion and Activities)/Assignment</p> <p>Activity related to identifying Biases</p> | |

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| | <p>Critical Thinking</p> | <p>ordinary thinking, characteristics of critical thinkers, critical thinking skills-linking ideas, structuring arguments, recognizing incongruences, five pillars of critical thinking, argumentation versus rhetoric, cognitive bias, tribalism, and politics. Case study on applying critical thinking on different scenarios.</p> | | | | <p>CO 4</p> |
| <p>Unit 5</p> | | <p>The argument, claim, and statement, identifying premises and conclusion, truth and</p> | | | | |

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| | <p>Logic and Argumentation</p> | <p>logic conditions, valid/invalid arguments, strong/weak arguments, deductive argument, argument diagrams, logical reasoning, scientific reasoning, logical fallacies, propositional logic, probability, and judgment, obstacles to critical thinking. Group activity/role plays on evaluating arguments.</p> | <p>Smartboard/PPT/Text book/Reference book</p> | <p>8</p> | <p>Practical Approach (Discussion and Activities)/Assignment</p> | <p>CO 5</p> |
|--|---------------------------------------|--|--|----------|--|-------------|

References-

Text Books:

1. Arun Jain, UnMukt : Science & Art of Design Thinking, 2020, Polaris
2. Jeanne Liedta, Andrew King and Kevin Benett, Solving Problems with Design Thinking – Ten Stories of What Works,2013,Columbia Business School Publishing

3. RR Gaur, R Sangal, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, First Edition, 2009, Excel Books: New Delhi

Reference Books:

1. Vijay Kumar, 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization, 2013, John Wiley and Sons Inc, New Jersey
2. Mootee, I. (2013). Design thinking for strategic innovation: What they can't teach you at business or design school. John Wiley & Sons.
3. Gavin Ambrose and Paul Harris, Basics Design 08: Design Thinking, 2010, AVA Publishing SA
4. Roger L. Martin, Design of Business: Why Design Thinking is the Next Competitive Advantage, 2009, Harvard Business Press, Boston MA

Links:

Unit I

<https://nptel.ac.in/courses/110/106/110106124/>

<https://nptel.ac.in/courses/109/104/109104109/>

<https://designthinking.ideo.com/>

<https://blog.hypeinnovation.com/an-introduction-to-design-thinking-for-innovation-managers>

<https://www.creativityatwork.com/design-thinking-strategy-for-innovation/>

<https://www.youtube.com/watch?v=GFffb2H-gK0>

Unit II

<https://aktu.ac.in/hvpe/>

<http://aktu.uhv.org.in/>

<https://nptel.ac.in/courses/110/106/110106124/>

https://swayam.gov.in/nd1_noc19_mg60/preview

Unit III

<https://nptel.ac.in/courses/110/106/110106124/>

https://swayam.gov.in/nd1_noc19_mg60/preview

<https://www.udemy.com/course/design-thinking-for-beginners/>

<https://www.designthinking-methods.com/en/>

<https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them>

Unit IV

<https://www.forbes.com/sites/sap/2016/08/25/innovation-with-design-thinking-demands-critical-thinking/#340511486908>

<https://www.criticalthinking.org/pages/defining-critical-thinking/766>

Unit V

<https://www.udemy.com/course/critical-thinker-academy/>

https://swayam.gov.in/nd2_aic19_ma06/preview

List of Suggested projects: An indicative list of projects where you will have to be actively engaged in field work to interact with stakeholders & apply Design Tools, such as –

Institutional Projects

1. Improving canteen experience
2. Improving library usage by students
3. Facilitating interaction between students of diverse ethnic backgrounds
4. Making college campus plastic-free
5. Segregating different kind of domestic waste
6. Adopting to plastic-ban
7. How can we improve classroom experience of students?
8. How can we ensure better communication with our institution alumni?

Or

Social Projects

9. How can we ensure that clean drinking water is handled properly?
10. How might we feed everybody in the world?
11. How can we solve voters' dissatisfaction by changing the voting system?
12. How can we help the school drop-outs to continue the study?
13. How to solve issue of waste management?
14. How can we solve issue of insensitivity of peoples towards street animals?

15. How to solve the issue of gender inequality in society / college / schools?
16. How can we improve College Experiences and helping teachers?
17. How can we ensure secured financial transactions and minimize scams?
18. Facilitating Water Conservation in domestic households
19. Making the elderly adapt to mobiles/smartphones.
20. Use design thinking to use empty lot's in our neighbourhood.

Or

A project on the theme: teens, human rights, water, privacy, violence, equity, immigration, change with growth, food waste and robotics.

Or

Industrial Projects

21. Windsor Airline's consistent flight delays are hurting the company's bottom line. How might we ensure that Windsor Airlines flights leave on time.
22. Being part of an ever-connected society, many people in the Global North can barely fathom that still more than 1.5 billion people live off the grid. Instead of simply plugging in, they use kerosene lanterns that only illuminate spots in their home, walk miles to charge their mobile phones, or run a diesel genset for their business. How do you reinvent Solar Energy Supply for them?
23. NGO provides services and financial support to people with developmental disabilities. But for parents of children with disabilities, navigating the long and sometimes bewildering bureaucratic process required to get such services often challenges their patience and persistence. Before NGO can determine which services, if any, are best for a child, staffers conduct a thorough assessment that entails meetings with parents, home visits by social workers, and evaluations by medical professionals including speech pathologists, psychologists, and nurses. Design a process to ensure Better and faster Service.
24. A company wish to provide internet access to everyone. Design a low cost, easily applicable model.
25. Use 'design thinking' can help lose weight, stop worrying, and change life of peoples.
26. Assume you are called in to help the struggling community bank, with around 40 employees and six branches. You immediately noticed that all banks offered the same lousy experience: bland, boring, forgettable. Most banks offer the same products at basically the same rates, too. If Xling was able to come up with a great product, it would be copied by the bigger banks within days. What could you do to make the bank better?
27. Your city metro train service is facing issues of troublesome experiences of travelers. The team has notices that the queues often built up at the service counters because customers asked the same simple questions again and again. How would you improve the services.
28. Violent crime and the loss of young lives in assaults pose a frightening problem in many urban city districts. Use design thinking to find how to 'Designing Out Crime Research Center' as solution.
29. City Hospital simply wishes improving staff hand-washing habits could prevent these needless infections. While hospitals have plenty of communal sinks and hand-sanitizing dispensers, time-strapped caregivers simply don't use them, they noticed medical staff wiped their hands on their scrubs. Use design thinking to give solutions.
30. The Wiley produces traditionally crafted 'Dutch Wax Print' fabrics for Indian markets. Lately, the organization faces disrupted markets, competition, and Chinese counterfeit. Use design thinking to come up with a new vision to secure its future.

Or any of your Startup Idea as project

| B. Tech.- First Semester | | | | | | |
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| Branch-CSE/CSE- R/CS/IT/M.Tech.(int.)/CSE(IOT)/CSE(DS)/CSE(AI)/CSE((AIML)/CYS/ECE/ECE(VLSI)/ME/B T | | | | | | |
| Subject Code-BMICSE0151 | | | | | L - T - P 0 – 0 – 6 | |
| Subject Name- Problem Solving using Python | | | | | No. of hours-68 | |
| Course Objective- To provide Basic knowledge of Python programming and to implement programming skills for solving real-world problems. | | | | | | |
| Course Outcome – | | | | | | |
| CO1 - Understanding basic programming logic. | | | | | | |
| CO2- Implement python programs using decision control statements. | | | | | | |
| CO3- Implement user defined functions and modules in python. | | | | | | |
| CO4- Implement python data structures –lists, tuples, set, dictionaries. | | | | | | |
| CO5- Apply programming concepts to solve real world problem | | | | | | |
| Course Content | | | | | | |
| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/ Lab | CO Mapping |

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|------------|-------------------------------------|---|---|--------|--|---|
| Unit 1. | Basics of python programming | Problem Solving, Techniques, Algorithm, Building blocks of algorithms (statements, state, control flow, functions), Notation, Flow chart, Pseudo code, programming language, Categories of programming languages. | Lecture , Hands-on exercise, Demonstration, practical lab | 6(4+2) | Implementation of basic Python programs. | 1 |
| | | A Brief History of Python, Applications areas of python, The Programming Cycle for Python, Python IDE, Interacting with Python Programs. | | 3(1+2) | Installation of IDE and Command Prompt. | 1 |
| | | Elements of Python: keywords and identifiers, variables, data types | | 3(1+2) | Demonstrate the use of these in python programs. | 1 |

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| | | and type conversion, | | | | |
| | | operators in python, expressions in python, strings. | | 3(1+2) | Develop python program to demonstrate use of Operators. | 1 |
| Unit 2 | Decision Control Statements | Conditionals: Conditional statement in Python (if-else statement, its working and execution) | Hands-on exercise, Demonstration, lectures, practical lab | 3(1+2) | Develop programs for the use of conditional statements. | 2 |
| | | Nested-if statement and elif statement in Python, Expression Evaluation & Float Representation. | | 4(1+3) | Develop programs of different types of statements. | 2 |
| | | Loops: Purpose and working of loops, while loop, For Loop, Nested Loops, Break and Continue, pass statement. | | 7(2+5) | Hands on practice on Loops. | 2 |

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| Unit 3 | Function and Modules | Introduction of Function, calling a function, Function arguments, built in function, scope rules | Lecture , Hands-on exercise, Demonstration, practical lab | 4(1+3) | Learn about how to call or create the functions. | 3 |
| | | Passing function to a function, recursion, Lambda functions | | 7(4+3) | Hands-on functions . | |
| | | Modules and Packages: Importing Modules, writing own modules, Standard library modules, dir() Function, Packages in Python | | 4(1+3) | Develop python programs for modules. | |
| Unit 4 | Basic Data structures in Python | Strings: Basic operations, Indexing and Slicing of Strings, Comparing strings | Lecture , Hands-on exercise, Demonstration, practical lab | 3(1+2) | Implement and play with strings. | 4 |

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| | | Regular expressions. Python Basic Data Structure: Sequence, Unpacking Sequences, Mutable Sequences, | | 4(1+3) | Demonstration of the regular expression. | |
| | | Lists, Looping in lists, Tuples, Sets, Dictionaries. Map, filter, Reduce, Comprehension | | 7(3+4) | Implement different methods for these data structures. | |
| Unit 5 | File and Exception handling | Files and Directories: Introduction to File Handling in Python, Reading and Writing files, Additional file methods, Working with Directories. | Lecture , Hands-on exercise, Demonstration, practical lab | 4(1+3) | Learn Python file handling methods and python file operations | 5 |
| | | Exception Handling, Errors, Run Time Errors, Handling IO Exception, Try-except | | 6(2+4) | Learn about Python exception handling methods | 5 |

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| | | statement, Raise | | | | |
|--|--|---------------------|--|--|--|--|

References-

Text Books:

1. Magnus Lie Hetland, "Beginning Python-From Novice to Professional"—Third Edition, Apress
2. Python Programming using Problem solving approach by ReemaThareja OXFORD Higher education
3. Kenneth A. Lambert, —Fundamentals of Python: First Programs, CENGAGE Learning, 2012.

Reference Books:

1. John V Guttag, —Introduction to Computation and Programming Using Python“, Revised and expanded Edition, MIT Press , 2013
2. Charles Dierbach, —Introduction to Computer Science using Python: A Computational Problem Solving Focus, Wiley India Edition, 2013.
3. Allen B. Downey, “Think Python: How to Think Like a Computer

Links:

UNIT 1: <https://nptel.ac.in/courses/106/106/106106182/>

UNIT 2: <https://nptel.ac.in/courses/106/106/106106212/>

<https://www.youtube.com/watch?v=PqFKRqpHrijw>

UNIT 3: <https://nptel.ac.in/courses/106/106/106106145/>

<https://www.youtube.com/watch?v=m9n2f9lhtrw>

<https://www.youtube.com/watch?v=oSPMmeaiQ68>

UNIT 4: <https://nptel.ac.in/courses/106/106/106106145/>

<https://www.youtube.com/watch?v=ixEeeNjjOJO&t=4s>

UNIT 5: <https://nptel.ac.in/courses/106/106/106106145/>

<https://www.youtube.com/watch?v=NMTEjQ8-AJM>

LAB:

| Total No. of Practicals : 228 | | | | |
|--------------------------------------|-------------|---|--|-------------------|
| List of Practicals | | | | |
| Lab No. | Unit | Topic | Program Logic Building | CO Mapping |
| 1.1 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Python Program to Print Statement | CO1 |
| 1.2 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Swap two variables without using a temporary variable. | CO1 |
| 1.3 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Check if a given number is even or odd. | CO1 |
| 1.4 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Find the largest of three numbers. | CO1 |
| 1.5 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Convert a string to an integer. | CO1 |
| 1.6 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Convert an integer to a string. | CO1 |

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| 1.7 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Convert a string to a floating-point number. | CO1 |
| 1.8 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Convert a floating-point number to an integer. | CO1 |
| 1.9 | 1 | Basic Python(Syntax, Variable, Type Conversion) | WAP to demonstrate implicit and explicit type conversion. | CO1 |
| 1.10 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Convert Employee Count to Binary | CO1 |
| 1.11 | 1 | Basic Python(Syntax, Variable, Type Conversion) | Convert Revenue to Currency Format | CO1 |
| 1.12 | 1 | Operators | Write a program to Calculate Sum of 5 Subjects and Find Percentage (Max Mark in each subject is 100). | CO1 |
| 1.13 | 1 | Operators | Write a program to find gross salary. | CO1 |
| 1.14 | 1 | Operators | Write a program to Calculate Area of Rectangle, Square. | CO1 |
| 1.15 | 1 | Operators | Write a program to Calculate Area of Scalene Triangle and Right-angle Triangle. | CO1 |
| 1.16 | 1 | Operator | Write a program to find the perimeter of a circle, rectangle and triangle. | CO1 |

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| 1.17 | 1 | Operator | Write a program to Compute Simple Interest. | CO1 |
| 1.18 | 1 | Operator | Write a program to Convert Fahrenheit temperature in to Celsius. | CO1 |
| 1.19 | 1 | Operator | Write a program to Find the Gravitational Force Acting Between Two Objects. | CO1 |
| 1.20 | 1 | Operator | Write a program to swap the values of two variables with and without using third variable. | CO1 |
| 1.21 | 1 | Operator | Write a program to perform arithmetic operations on a = 8, b = 3. | CO1 |
| 1.22 | 1 | Operator | Write a program to apply relational operations on a=8, b=3. | CO1 |
| 1.23 | 1 | Operator | Write a program to apply assignment operations on a=8, b=3. | CO1 |
| 1.24 | 1 | Operator | Write a program to apply logical operations on a=8, b=3. | CO1 |
| 1.25 | 1 | Operator | Write a program to apply bitwise operations on a=8, b=3. | CO1 |
| 1.26 | 1 | Operator | Write a program to apply identity operators. | CO1 |
| 1.27 | 1 | Operator | Write a program to Swap the Contents of two Numbers using Bitwise XOR Operation | CO1 |
| 1.28 | 1 | Operator | WAP to find the absolute value of the given number. | CO1 |

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| 1.29 | 1 | Operator | Write a program to Add two Complex Numbers. | CO1 |
| 1.30 | 1 | Operator | Write a Program to find roots of a quadratic expression. | CO1 |
| 1.31 | 1 | Arithmetic Operator | Program to perform basic arithmetic operations (addition, subtraction, multiplication, division) on two numbers. | CO1 |
| 1.32 | 1 | Arithmetic Operator | Program to calculate the area of a rectangle using the multiplication operator. | CO1 |
| 1.33 | 1 | Arithmetic Operator | Program to calculate the average of a list of numbers using the division operator. | CO1 |
| 1.34 | 1 | Comparison Operator | Program to compare two numbers and determine if they are equal. | CO1 |
| 1.35 | 1 | Comparison Operator | Program to compare two numbers and determine whether they are greater than or less than . | CO1 |
| 1.36 | 1 | Comparison Operator | Program to check if a given string is equal to a specific value. | CO1 |
| 1.37 | 1 | Logical Operator | Write a program to apply Logical AND operator on two operands. | CO1 |
| 1.38 | 1 | Logical Operator | Write a program to apply Logical OR operator on two operands. | CO1 |

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| 1.39 | 1 | Logical Operator | Write a program to apply Logical NOT operator on an operand. | CO1 |
| 1.40 | 1 | Assignment operator | Program to increment or decrement a variable using assignment operators. | CO1 |
| 1.41 | 1 | Assignment operator | Program to calculate compound interest using compound assignment operators. | CO1 |
| 1.42 | 1 | Bitwise Operator | Program to perform bitwise AND, OR, XOR, left shift, and right shift operations. | CO1 |
| 1.43 | 1 | Bitwise Operator | Program to check if a given number is odd or even using bitwise operators. | CO1 |
| 2.1 | 2 | Conditional Statements | Write a program to Accept two Integers and Check if they are Equal. | CO 2 |
| 2.2 | 2 | Conditional Statements | Write a program to Check if a given Integer is Positive or Negative and Odd or Even. | CO 2 |
| 2.3 | 2 | Conditional Statements | Write a program to Check if a given Integer is Divisible by 7 or not. | CO 2 |
| 2.4 | 2 | Conditional Statements | Write a program to find the greatest of three numbers using else if ladder. | CO 2 |
| 2.5 | 2 | Conditional Statements | Write a program to find the greatest of three numbers using Nested if. | CO 2 |
| 2.6 | 2 | Conditional Statements | Write a program to convert an Upper-case character into lower case and vice-versa. | CO 2 |

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| 2.7 | 2 | Conditional Statements | Write a program to check whether an entered year is leap year or not. | CO 2 |
| 2.8 | 2 | Conditional Statements | Write a Program to check whether an alphabet entered by the user is a vowel or a constant. | CO 2 |
| 2.9 | 2 | Conditional Statements | Write a program to print day according to the day number entered by the user. | CO 2 |
| 2.10 | 2 | Conditional Statements | Write a program to print color name, if user enters the first letter of the color name. | CO 2 |
| 2.11 | 2 | Conditional Statements | Write a program to Simulate Arithmetic Calculator. | CO 2 |
| 2.12 | 2 | Conditional Statements | Write a menu driven program for calculating area of different geometrical figures such as circle, square, rectangle, and triangle. | CO 2 |
| 2.13 | 2 | Conditional Statements | WAP that accepts the marks of 5 subjects and finds the percentage marks obtained by the student. It also prints grades according to the following criteria: Between 90-100% Print 'A', 80-90% Print 'B', 60-80% Print 'C', 50-60% Print 'D', 40-50% Print 'E', Below 40% Print 'F'. | CO 2 |
| 2.14 | 2 | Conditional Statements | WAP to enter a character and then determine whether it is a vowel, consonants, or a digit. | CO 2 |
| 2.15 | 2 | Loops | Write a program to display all even numbers from 1 to 20 | CO 2 |
| 2.16 | 2 | Loops | Write a program to print all the Numbers Divisible by 7 from 1 to 100. | CO 2 |

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| 2.17 | 2 | Loops | Write a program to print table of any number. | CO 2 |
| 2.18 | 2 | Loops | Write a program to Find the Sum of first 50 Natural Numbers using for Loop. | CO 2 |
| 2.19 | 2 | Loops | Write a program to calculate factorial of a given number using for loop and also using while loop. | CO 2 |
| 2.20 | 2 | Loops | Write a program to count the sum of digits in the entered number. | CO 2 |
| 2.21 | 2 | Loops | Write a program to find the reverse of a given number. | CO 2 |
| 2.22 | 2 | Loops | Write a program to Check whether a given Number is Perfect Number. | CO 2 |
| 2.23 | 2 | Loops | Write a program to Print Armstrong Number from 1 to 1000. | CO 2 |
| 2.24 | 2 | Loops | Write a program to Compute the Value of X^n . | CO 2 |
| 2.25 | 2 | Loops | Write a program to Calculate the value of ${}^n C_r$. | CO 2 |
| 2.26 | 2 | Loops | Write a program to generate the Fibonacci Series. | CO 2 |
| 2.27 | 2 | Loops | Write a program to check whether a given Number is Palindrome or Not. | CO 2 |
| 2.28 | 2 | Loops | Write a program to Check whether a given Number is an Armstrong Number. | CO 2 |
| 2.29 | 2 | Loops | Write a program to print all prime numbers from 1-500. | CO 2 |

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| 2.30 | 2 | Loops | Write a program to find the Sum of all prime numbers from 1-1000. | CO 2 |
| 2.31 | 2 | Loops | Write a program to display the following pattern: * * * * * * * * * * * * * * * * * * * * * * * * * | CO 2 |
| 2.32 | 2 | Loops | Write a program to display the following pattern: * * * * * * * * * * * * * * * | CO 2 |
| 2.33 | 2 | Loops | Write a program to display the following pattern: 1 1 2 1 2 3 1 2 3 4 | CO 2 |

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| | | | 1 2 3 4 5 | |
| 2.34 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> A B B C C C D D D D E E E E E </pre> | CO 2 |
| 2.35 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> * * * * * * * * * * * * * * * </pre> | CO 2 |
| 2.36 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> 1 2 3 4 5 1 2 3 4 1 2 3 1 2 1 </pre> | CO 2 |
| 2.37 | 2 | Loops | <p>Write a program to display the following pattern:</p> | CO 2 |

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| | | | <pre> * * * * * * * * * * * * * * * * </pre> | |
| 2.38 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> * </pre> | CO 2 |
| 2.39 | 2 | Loops | <p>Write a program to display the following pattern (Pascal Triangle):</p> <pre> 1 1 1 1 2 1 1 3 3 1 1 4 6 4 1 1 5 10 10 5 1 </pre> | CO 2 |
| 2.40 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> 1 </pre> | CO 2 |

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| | | | <p>2 3</p> <p>4 5 6</p> <p>7 8 9 10</p> | |
| 2.41 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> A B C D E F G F E D C B A A B C D E F F E D C B A A B C D E E D C B A A B C D D C B A A B C C B A A B B A A A </pre> | CO 2 |
| 2.42 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> * ** *** **** ***** ***** </pre> | CO 2 |

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| | | | <pre> * * * * * * * * * * </pre> | |
| 2.43 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> 0 0 01 10 010 010 0101 1010 0101001010 </pre> | CO 2 |
| 2.44 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> A B C D E F G H I J K L M N O </pre> | CO 2 |
| 2.45 | 2 | Loops | <p>Write a program to display the following pattern:</p> <pre> A BAB </pre> | CO 2 |

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| | | | <p style="text-align: center;">CBABC</p> <p style="text-align: center;">DCBABCD</p> <p style="text-align: center;">EDCBABCDE</p> | |
| 2.46 | 2 | Loops | Write a program to Find the Sum of A.P Series. | CO 2 |
| 2.47 | 2 | Loops | Write a program to Find the Sum of G.P Series. | CO 2 |
| 2.48 | 2 | Loops | Write a program to Find the Sum of H.P Series. | CO 2 |
| 2.49 | 2 | Loops | Write a program to print the following sequence of integers. 1, 2, 4, 8, 16, 32 | CO 2 |
| 2.50 | 2 | Loops | <p>Write a program to find the Sum of following Series:</p> $(1*1) + (2*2) + (3*3) + (4*4) + (5*5) + \dots + (n*n)$ | CO 2 |
| 2.51 | 2 | Loops | <p>Write a program to find the Sum of following Series:</p> $(1^1) + (2^2) + (3^3) + (4^4) + (5^5) + \dots + (n^n)$ | CO 2 |
| 2.52 | 2 | Loops | <p>Write a program to find the Sum of following Series:</p> $(1!/1) + (2!/2) + (3!/3) + (4!/4) + (5!/5) + \dots + (n!/n)$ | CO 2 |
| 2.53 | 2 | Loops | <p>Write a program to print the following Series:</p> <p style="text-align: center;">1, 2, 3, 6, 9, 18, 27, 54, ... upto n terms</p> | CO 2 |
| 2.54 | 2 | Loops | Write a program to print the following Series: | CO 2 |

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| | | | 2, 15, 41, 80, 132, 197, 275, 366, 470, 587 | |
| 2.55 | 2 | Loops | Write a program to print the following Series:1, 3, 4, 8, 15, 27, 50, 92, 169, 311 | CO 2 |
| 2.56 | 2 | Loops | Write a program to Convert the given Binary Number into Decimal. | CO 2 |
| 2.57 | 2 | Loops | Write a program to Convert Binary to Hexadecimal. | CO 2 |
| 2.58 | 2 | Loops | Write a program to find out L.C.M. of two numbers. | CO 2 |
| 2.59 | 2 | Loops | Write a program to find out H.C.F. of two numbers. | CO 2 |
| 2.60 | 2 | Loops | Python Program to Accept Three Digits and Print all Possible Combinations from the Digits. | CO 2 |
| 2.61 | 2 | Loops | Python Program to Print Odd Numbers within a Given Range. | CO 2 |
| 2.62 | 2 | Loops | Python Program to Find the Smallest Divisor of an Integer. | CO 2 |
| 2.63 | 2 | Loops | Python Program to Count the Number of Digits in a Number | CO 2 |
| 2.64 | 2 | Loops | Python program to find GCD between two given integer numbers. | CO 2 |
| 3.1 | 3 | Functions | Write a Python function to find the Max of three numbers. | CO3 |
| 3.2 | 3 | Functions | Write a Python function to sum all the numbers in a list. Sample List : (8, 2, 3, 0, 7) Expected Output : 20 | CO3 |

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| 3.3 | 3 | Functions | Write a Python program to reverse a string. Sample String : "1234abcd" Expected Output : "dcba4321" | CO3 |
| 3.4 | 3 | Functions | Write a Python function to check whether a number falls in a given range. | CO3 |
| 3.5 | 3 | Functions | Write a Python function that accepts a string and calculate the number of upper-case letters and lower-case letters. Sample String: 'The quick Brow Fox' Expected Output : No. of Upper case characters : 3 No. of Lower case Characters : 1 | CO3 |
| 3.6 | 3 | Functions | Write a Python function that takes a number as a parameter and check the number is prime or not. | CO3 |
| 3.7 | 3 | Functions | Write a Python function that checks whether a passed string is palindrome or not. | CO3 |
| 3.8 | 3 | Functions | Write a Python function that prints out the first n rows of Pascal's triangle. | CO3 |
| 3.9 | 3 | Functions | Write a Python function that accepts a hyphen-separated sequence of words as input and prints the words in a hyphen-separated sequence after sorting them alphabetically. <i>Sample Items:</i> green-red-yellow-black-white Expected Result: black-green-red-white-yellow | CO3 |
| 3.10 | 3 | Functions | Python function to convert height (in feet and inches) to centimeters | CO3 |

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| 3.11 | 3 | Functions | Python function to Convert Celsius to Fahrenheit. | CO3 |
| 3.12 | 3 | Functions | Implement a function to check if two strings are anagrams of each other. | CO3 |
| 3.13 | 3 | Functions | Python function to display all the Armstrong number from 1 to n. | CO3 |
| 3.14 | 3 | Recursion | Write a program using recursion to compute factorial of a given number. | CO3 |
| 3.15 | 3 | Recursion | Write a program to print Fibonacci Series using recursion. | CO3 |
| 3.16 | 3 | Recursion | Write a program to calculate sum of numbers 1 to N using recursion. | CO3 |
| 3.17 | 3 | Recursion | Write a program to Find Sum of Digits of the Number using Recursive Function. | CO3 |
| 3.18 | 3 | Recursion | Write a program to print Tower of Hanoi using recursion. | CO3 |
| 3.19 | 3 | Recursion | Python Program to Determine How Many Times a Given Letter Occurs in a String Recursively | CO3 |
| 3.20 | 3 | Recursion | Python Program to Find the Binary Equivalent of a Number Recursively | CO3 |
| 3.21 | 3 | Recursion | Python Program to Find the GCD of Two Numbers Using Recursion | CO3 |
| 3.22 | 3 | Recursion | Python Program to Find the Power of a Number Using Recursion | CO3 |

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| 3.23 | 3 | Recursion | WAP to compute the sum of all the elements of the list using reduce() function. | CO3 |
| 3.24 | 3 | Modules and Pacakges | A) Write a program to create a module and import the module in another python program. | CO3 |
| 3.25 | 3 | Modules and Pacakges | Write a program program to import all objects from a modules, specific objects from module and provide custom import name to the imported object from the module. | CO3 |
| 3.26 | 3 | Modules and Pacakges | Create a python package having atleast two modules in it. | CO3 |
| 3.27 | 3 | Modules and Pacakges | Create a python package having atleast one subpackage in it. | CO3 |
| 4.1 | 4 | String | Python program to check whether the string is Symmetrical or Palindrome | CO 4 |
| 4.2 | 4 | String | Ways to remove i'th character from string in Python | CO 4 |
| 4.3 | 4 | String | Python program to Check if a Substring is Present in a Given String | CO 4 |
| 4.4 | 4 | String | Find length of a string in python (4 ways) | CO 4 |

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| 4.5 | 4 | String | Python program to print even length words in a string | CO 4 |
| 4.6 | 4 | String | Python program to accept the strings which contains all vowels | CO 4 |
| 4.7 | 4 | String | Remove all duplicates from a given string in Python | CO 4 |
| 4.8 | 4 | String | Python program to Maximum frequency character in String | CO 4 |
| 4.9 | 4 | String | Python Program to Replace all Occurrences of 'a' with \$ in a String | CO 4 |
| 4.10 | 4 | String | Python Program to Form a New String where the First Character and the Last Character have been Exchanged | CO 4 |
| 4.11 | 4 | String | Python Program to Count the Number of Vowels in a String | CO 4 |
| 4.12 | 4 | String | Python Program to Take in a String and Replace Every Blank Space with Hyphen | CO 4 |
| 4.13 | 4 | String | Python Program to Calculate the Length of a String Without Using a Library Function | CO 4 |
| 4.14 | 4 | String | Python Program to Remove the Characters of Odd Index Values in a String | CO 4 |
| 4.15 | 4 | String | Python Program to Calculate the Number of Words and the Number of Characters Present in a String | CO 4 |
| 4.16 | 4 | String | Python Program to Take in Two Strings and Display the Larger String without Using Built-in Functions | CO 4 |

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| 4.17 | 4 | String | <p>Python Program to Check if a String is a Pangram or Not</p> <p>(A pangram is a sentence that uses all 26 letters of the English alphabet at least once. like” The quick brown fox jumps over the lazy dog”)</p> | CO 4 |
| 4.18 | 4 | String | <p>Python Program to Accept a Hyphen Separated Sequence of Words as Input and Print the Words in a Hyphen-Separated Sequence after Sorting them Alphabetically</p> | CO 4 |
| 4.19 | 4 | String | <p>Python Program to Form a New String Made of the First 2 and Last 2 characters From a Given String</p> | CO 4 |
| 4.20 | 4 | String | <p>Python Program to Count the Occurrences of Each character in a Given String Sentence</p> | CO 4 |
| 4.21 | 4 | String | <p>Python Program to Check if a Substring is Present in a Given String</p> | CO 4 |
| 4.22 | 4 | String | <p>Python Program to Find the Most Repeated Word in a String.</p> | CO 4 |
| 4.23 | 4 | Regular Expression | <p>Write a python program to check the validity of a password given by the user. The password should satisfy the following criteria:</p> <ul style="list-style-type: none"> i) Contain atleast 1 letter between a and z. ii) Contain atleast 1 number between 0 and 9. iii) Contain atleast 1 letter between A and Z. iv) Contain atleast 1 character from \$,#,@. v) Maximum length of password 6. vi) Maximum length of password:12. | CO 4 |

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| 4.24 | 4 | Regular Expression | Write a python program to validate mobile number. | CO 4 |
| 4.25 | 4 | Regular Expression | <p>Given an input file which contains a list of names and phone numbers separated by spaces in the following:</p> <p>i) Phone number contains a 3- or 2-digit area code and a hyphen followed by an 8-digit number.</p> <p>ii) Find all names having phone number with a 3digit area code using regular expression.</p> | CO 4 |
| 4.26 | 4 | List | Program to interchange first and last elements in a list | CO 4 |
| 4.27 | 4 | List | WAP to find min, max and average of elements of a list having numeric data | CO 4 |
| 4.28 | 4 | List | Program to check if element exists in list | CO 4 |
| 4.29 | 4 | List | Program for Reversing a List | CO 4 |
| 4.30 | 4 | List | Program to Multiply all numbers in the list | CO 4 |
| 4.31 | 4 | List | Program to find smallest and largest number in a list | CO 4 |
| 4.32 | 4 | List | Program to find second largest number in a list | CO 4 |
| 4.33 | 4 | List | Program to print all even numbers in a range | CO 4 |
| 4.34 | 4 | List | Program to print all negative numbers in a range | CO 4 |
| 4.35 | 4 | List | Program to Remove multiple elements from a list in Python | CO 4 |
| 4.36 | 4 | List | Program to Cloning or Copying a list | CO 4 |

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| 4.37 | 4 | List | Program to Count occurrences of an element in a list | CO 4 |
| 4.38 | 4 | List | Program to find Cumulative sum of a list | CO 4 |
| 4.39 | 4 | List | Program to Break a list into chunks of size N in Python | CO 4 |
| 4.40 | 4 | List | Python Program to transpose of Matrix. | CO 4 |
| 4.41 | 4 | List | Python Program to Add Two Matrices. | CO 4 |
| 4.42 | 4 | List | Python Program to Multiply Two Matrices. | CO 4 |
| 4.43 | 4 | List | Program to get K th Column of Matrix | CO 4 |
| 4.44 | 4 | List | WAP to print all even numbers of a list using list comprehension. | CO 4 |
| 4.45 | 4 | List | WAP that prompts user to enter an alphabet and then print all the words that starts with that alphabet from the list of words. | CO 4 |
| 4.46 | 4 | List | WAP to transpose a given matrix using list comprehension. | CO 4 |
| 4.47 | 4 | List | Print All the characters of a string using list Comprehension | CO 4 |
| 4.48 | 4 | List | Write a program to calculate square of numbers upto n using list comprehension. | CO 4 |
| 4.49 | 4 | Tuple | Python program to Find the size of a Tuple | CO 4 |
| 4.50 | 4 | Tuple | Python – Maximum and Minimum K th elements in Tuple | CO 4 |

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| 4.51 | 4 | Tuple | Create a list of tuples from given list having number and its cube in each tuple | CO 4 |
| 4.52 | 4 | Tuple | Python – Flatten tuple of List to tuple | CO 4 |
| 4.53 | 4 | Set | Python Program to Count the Number of Vowels Present in a String using Sets | CO 4 |
| 4.54 | 4 | Set | Python Program to Check Common Letters in Two Input Strings | CO 4 |
| 4.55 | 4 | Set | Python Program that Displays which Letters are in the First String but not in the Second | CO 4 |
| 4.56 | 4 | Set | Python Program that Displays which Letters are Present in Both the Strings | CO 4 |
| 4.57 | 4 | Set | Python Program that Displays which Letters are in the Two Strings but not in Both | CO 4 |
| 4.58 | 4 | Dictionary | Python Program to Add a Key-Value Pair to the Dictionary | CO 4 |
| 4.59 | 4 | Dictionary | Python Program to Concatenate Two Dictionaries into One. | CO 4 |
| 4.60 | 4 | Dictionary | Python Program to Check if a Given Key Exists in a Dictionary or Not | CO 4 |
| 4.61 | 4 | Dictionary | Python Program to Generate a Dictionary that Contains Numbers (between 1 and n) in the Form (x,x*x). | CO 4 |
| 4.62 | 4 | Dictionary | Python program to create an instance of an Ordered dict using a given dictionary. Sort the dictionary | CO 4 |

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| | | | during the creation and print the members of the dictionary in reverse order. | |
| 4.63 | 4 | Dictionary | Python Program to Sum All the Items in a Dictionary | CO 4 |
| 4.64 | 4 | Dictionary | WAP to create dictionary which has characters of given string as keys and frequency of characters as values. | CO 4 |
| 4.65 | 4 | Dictionary | Python Program to Multiply All the Items in a Dictionary | CO 4 |
| 4.66 | 4 | Dictionary | Python Program to Remove the Given Key from a Dictionary | CO 4 |
| 4.67 | 4 | Dictionary | Python Program to Form a Dictionary from an Object of a Class | CO 4 |
| 4.68 | 4 | Dictionary | Python Program to Map Two Lists into a Dictionary | CO 4 |
| 4.69 | 4 | Comprehension | Write a program Filtering even numbers from a list using tuple comprehension | CO 4 |
| 4.70 | 4 | Comprehension | Creating a list of tuples from two lists using comprehension function | CO 4 |
| 4.71 | 4 | Comprehension | Extracting the first character from each word in a list of strings | CO 4 |
| 4.72 | 4 | Comprehension | Swapping keys and values in a dictionary | CO 4 |
| 4.73 | 4 | Comprehension | Filtering even numbers from a dictionary: | CO 4 |
| 4.74 | 4 | Comprehension | Write a Program to calculate square of number using dictionary comprehension | CO 4 |

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| 5.1 | 5 | File handling and Exceptional Handling | Python program to read file word by word | CO 5 |
| 5.2 | 5 | File handling and Exceptional Handling | Python program to read character by character from a file | CO 5 |
| 5.3 | 5 | File handling and Exceptional Handling | Python – Get number of characters, words, spaces and lines in a file | CO 5 |
| 5.4 | 5 | File handling and Exceptional Handling | Program to Find 'n' Character Words in a Text File | CO 5 |
| 5.5 | 5 | File handling and Exceptional Handling | Python Program to obtain the line number in which given word is present | CO 5 |
| 5.6 | 5 | File handling and Exceptional Handling | Count number of lines in a text file in Python | CO 5 |
| 5.7 | 5 | File handling and Exceptional Handling | Python Program to remove lines starting with any prefix | CO 5 |
| 5.8 | 5 | File handling and Exceptional Handling | Python Program to Eliminate repeated lines from a file | CO 5 |
| 5.9 | 5 | File handling and Exceptional Handling | Python Program to read List of Dictionaries from File | CO 5 |
| 5.10 | 5 | File handling and Exceptional Handling | Python – Append content of one text file to another | CO 5 |

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| 5.11 | 5 | File handling and Exceptional Handling | Python program to copy odd lines of one file to other | CO 5 |
| 5.12 | 5 | File handling and Exceptional Handling | Python Program to merge two files into a third file | CO 5 |
| 5.13 | 5 | File handling and Exceptional Handling | Python program to Reverse a single line of a text file | CO 5 |
| 5.14 | 5 | File handling and Exceptional Handling | Python program to reverse the content of a file and store it in another file | CO 5 |
| 5.15 | 5 | File handling and Exceptional Handling | Python Program to handle divide by zero exception. | CO 5 |
| 5.16 | 5 | File handling and Exceptional Handling | WAP to handle multiple exception. | CO 5 |
| 5.17 | 5 | File handling and Exceptional Handling | Python program to combine each line from first file with the corresponding line in second file. | CO 5 |
| 5.18 | 5 | File handling and Exceptional Handling | Write a program to copy the contents of one file to another. | CO 5 |
| 5.19 | 5 | File handling and Exceptional Handling | Write a program to print First 5 line in a file | CO 5 |
| 5.20 | 5 | File handling and Exceptional Handling | <p>a) Write a program to catch the following exception:</p> <p>i) Value error</p> <p>ii) Index error</p> <p>iii) Name error</p> | CO 5 |

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| | | | iv) Type error v) Divide zero error b) Write a program to create user defined exceptions. c) Write a program to understand the use of else and finally block with try block. d) Write a python program that uses raise and exception class to throw an exception. | |
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LAB:

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|---|----------------------|----------|----------|
| Subject Code-BMIAS0151A | L | T | P |
| | 0 | 0 | 2 |
| Subject Name- ENGINEERING PHYSICS LAB (Common for all branches except CSBS) | No. of Hours: | | |
| Course Objective- | | | |
| 1. To provide the practical knowledge of the phenomenon of interference, diffraction and polarization. | | | |

2. To provide the practical knowledge of energy band gap and resistivity.
3. To provide the practical knowledge of the measurement techniques of magnetism.
4. To provide the practical knowledge of the flow of liquids and characteristics of photoelectric cell.
5. To provide the practical knowledge of Planck's constant and dielectric constant.

Course Outcome- After completion of this course students will be able to:

CO1- Apply the practical knowledge of the phenomenon of interference, diffraction and polarization.

CO2- Understand energy band gap and resistivity.

CO3- Develop the measurement techniques of magnetism.

CO4- Analyze the flow of liquids and characteristics of photoelectric cell.

CO5- Understand Planck's constant and dielectric constant.

Total No. of Practicals: 22(Minimum Ten experiments should be performed)

List of Practicals

| Lab No. | Unit | Topic | Program Logic Building | CO Mapping |
|---------|------|---|------------------------|------------|
| 1 | | To determine the wavelength of monochromatic light by Newton's ring. | | CO1 |
| 2 | | To determine the focal length of two lenses by nodal slide and to verify the formula for the focal length of combination of two lenses. | | CO1 |
| 3 | | To determine the specific rotation of cane sugar solution using Polarimeter. | | CO1 |

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| 4 | | To determine the wavelength of spectral lines using plane transmission grating. | | CO1 |
| 5 | | To determine the specific resistance of a given wire using Carey Foster's bridge. | | CO2 |
| 6 | | To study the variation of magnetic field along the axis of current carrying - circular coil and then to estimate the radius of the coil. | | CO3 |
| 7 | | To verify Stefan's Law by electrical method. | | CO2 |
| 8 | | To study the Hall effect and determine the Hall Coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup. | | CO2 |
| 9 | | To determine the energy band gap of a given semiconductor material. | | CO2 |
| 10 | | To determine the coefficient of viscosity of a liquid. | | CO4 |
| 11 | | To calibrate a voltmeter using potentiometer. | | CO2 |
| 12 | | To calibrate a ammeter using potentiometer. | | CO2 |
| 13 | | To determine E.C.E. of copper using Tangent or Helmholtz galvanometer. | | CO3 |
| 14 | | To determine the magnetic susceptibility of a ferromagnetic salt (FeCl_3) by using Quincke's tube method. | | CO3 |
| 15 | | To study the hysteresis curve and then to estimate the retentivity and coercivity of a given ferromagnetic material. | | CO3 |

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| 16 | | To determine the angle of divergence of laser beam using He-Ne Laser. | | CO1 |
| 17 | | To determine the wavelength of laser using diffraction grating. | | CO1 |
| 18 | | To determine the numerical aperture of optical fiber. | | CO1 |
| 19 | | To determine the Planck's constant using LEDs of known wavelength. | | CO5 |
| 20 | | To determine the resistivity of given material using four probe method. | | CO2 |
| 21 | | To determine the dielectric constant of the material by charging and discharging of capacitor. | | CO5 |
| 22 | | To determine the characteristics of photoelectric cell. | | CO4 |

| Subject Code-BMIASL0151 | | | L | T | P |
|-------------------------------------|----------------|----------------------------------|--|----------|-------------------|
| Subject Name- ABC (Lab) | | | 0 | 0 | 4 |
| | | | Total No. of Hours: 48 | | |
| Total No. of Activities – 24 | | | | | |
| List of Activities | | | | | |
| Activity | Modules | Topic | Program Logic Building | | CO Mapping |
| Anubhava Activities | 1 | Getting rid of stage fear | Participants will gain confidence in expressing themselves through dance, overcome inhibitions, and develop a sense of freedom and creativity. | | CO2 |

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| Dumb Charades | 1 | Enhancing communication skills and non-verbal expressions | Participants will improve their ability to communicate effectively using non-verbal cues, develop teamwork and collaboration skills, and enhance their creativity in conveying messages. | CO1 |
| Chinese Whisper | 1 | Developing active listening and accurate communication skills | Participants will enhance their listening skills, practice conveying information accurately, and understand the importance of clear communication and active listening in avoiding miscommunication. | CO1 |
| Picture Reading – Story Telling | 2 | Practice sessions for storytelling skills | Participants will enhance their ability to comprehend and interpret information from visual aids, develop storytelling skills, and engage in imaginative and creative thinking. | CO3 |
| Reading Diagrams, Graphs, and Pie Charts | 2 | Exercises based on charts and diagrams | Participants will improve their ability to interpret and analyse data presented in diagrams, graphs, and pie charts, develop critical thinking skills, and make informed decisions based on visual information. | CO1 |
| Assessment | 2 | Online Assessment | | |
| Analysing Case Studies | 2 | Case Study: Badger Mining Corp Case Study | Participants will develop critical thinking skills, analyse the effectiveness of communication practices, and gain insights into real-world communication challenges and their solutions. | CO4 |
| Reading Comprehension Exercise | 2 | Exercises based on reading comprehension | Participants will enhance their reading comprehension abilities, improve vocabulary and language skills, and develop strategies for efficient and effective reading. | CO1 |

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| Filling a Form | 1 | Filling forms accurately | Participants will improve their ability to understand and follow instructions, enhance their attention to detail, and develop proficiency in accurately filling out forms. | CO2 |
| Flipped Classroom | 1 | Interactive reading experience through flipped class methodology | Participants will actively engage with reading materials, participate in discussions and activities that deepen understanding, and develop independent learning skills. | CO1 |
| Infographics | 1 | Analysing information based on infographics | Participants will improve their ability to interpret and analyse information presented in infographics, develop visual literacy skills, and effectively communicate complex concepts using visual aids. | CO1 |
| Songs and decoding the lyrics. | 1 | Decoding song lyrics | Participants will enhance their listening skills, improve understanding of language nuances through song lyrics, and develop an appreciation for different genres of music. | CO1 |
| Assessment | 2 | Online Assessment | | |
| Listening to instructions and directions | 1 | Listening based activity | Participants will improve their listening comprehension, enhance their ability to follow instructions & directions, and practice attention to detail. | CO2 |
| Speech Analysis | 2 | Speech Analysis | Participants will develop critical thinking skills, analyze speech techniques and delivery styles, and gain insights into effective public speaking strategies. | CO3 |
| Views on News | 2 | News Analysis | Participants will develop active listening skills, gain knowledge of current events, and engage in thoughtful discussions to express their views and opinions. | CO4 |

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| Introducing your partner | 4 | Introducing others and oneself | Participants will improve their active listening skills, develop clarity in communication, and effectively convey specific information about their partner and themselves to others. | CO2 |
| Role Plays | 4 | Role Playing Situations | Participants will practice effective communication strategies, develop empathy and understanding, and improve their ability to handle real-life situations through role-playing exercises. | CO4 |
| GD (Group Discussion) | 4 | Group Discussions | Participants will enhance their ability to express their opinions, actively listen to others, and engage in constructive discussions to develop well-rounded perspectives. | CO5 |
| Interview Handling Skills | 4 | Mock Interviews: Practising Behavioural and FAQs | The students will be able to respond to behavioural interview questions efficiently. | CO5 |
| Presentation Skills | 4 | Articulating insights: Presentations | Participants will enhance their ability to deliver engaging presentations, effectively communicate their ideas, and exhibit confidence in public speaking. | CO5 |
| Final Assessment | 2 | Writing Task for the Final Internal Assessment | Final Assessment | |
| Final Assessment | 2 | Group Presentations for Final Internal Assessment | Final Assessment | |

| B. Tech.-First Semester | | | | | | |
|--|----------------------------|--|---|---------------------------------|---|-------------------|
| Branch- CS/CSE/ CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AIML)/CSE(AI)/CYS/ ECE/ECE(VLSI) /ME/M. Tech (Int.)/BT | | | | | | |
| Subject Code-BMIME0151 | | | | | L - T - P 0 - 0 - 6 | |
| Subject Name- Computer Aided Design (CAD) and Digital Manufacturing | | | | | No. of hours- | |
| Course Objective- To Impart and familiarize the concepts of engineering graphics using CAD Software's. To impart knowledge of 2-Dimensional Drawing and 3-Dimensional Drawing Commands. To make the students to experience digital manufacturing processes. To explain current and emerging digital technologies in industries. | | | | | | |
| Course outcome: At the end of course, the students will be able to | | | | | | |
| CO1 | | Understand the importance of drawing in engineering. | | | | |
| CO2 | | Draw in 2-Dimensional spaces. | | | | |
| CO3 | | Create models in 3-Dimensional spaces. | | | | |
| CO4 | | Understand the concept of digital manufacturing. | | | | |
| CO5 | | Apply the knowledge of digital manufacturing in industries. | | | | |
| Course Content | | | | | | |
| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/Lab | CO Mapping |
| 1 | Introduction to CAD | Introduction to Engineering Drawings, Scale, Coordinate System, Types of View: Orthographic, Isometric & Perspective, Type of Projection, Sections of solids and Development of surfaces, Introduction to CAD Software such as AutoCAD/PTC Creo/CATIA/Fusion 360/Solid Works etc., Exploring GUI, Workspaces, Co-ordinate systems, File Management, Display Control. | PPT/Animated Videos/ Experiment based learning/ Activity based learning | 8=2+6 | CAD Lab (AutoCAD, PTC CREO) | CO-1 |

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|---|--|---|---|-------|-------------------|------|
| 2 | Working on CAD in 2D environment | Starting with Sketching, Working with Drawing Aids, Editing Sketched Objects, Layers, Creating Text and Tables, Dimensioning and Detailing of Drawings, Editing Dimensions, Dimension Styles, Adding Constraints to Sketches, Hatching Drawings, Paper Layout, Plotting Drawings in AutoCAD, Template Drawings. | PPT/Animated Videos/ Experiment based learning/ Activity based learning/ Software based | 8=2+6 | CAD Lab (AutoCAD) | CO-2 |
| 3 | Working on CAD in 3D environment | Introduction to 3D Modeling, 3D Environment and Drawing, Modeling Workflow, Editing Models, Sectioning a Model and Creating Drawings, Visualization, Downstream, Rectangular 3D coordinates, 3D Construction techniques, Constructing wireframe objects, Constructing solid primitives, dynamically changing a 3D view, and shading a 3D model, Blueprint Drawing, Uses of Digital Prototype. | PPT/Animated Videos/ Experiment based learning/ Activity based learning/ Software based | 8=2+6 | CAD Lab (AutoCAD) | CO-3 |
| 4 | Introduction to Digital Manufacturing | Introduction to workshop layout, engineering materials, Fitting, Carpentry, Forging, Casting, Welding, Forming. Basic Machining Tools- Lathe, Milling, Drilling, Shaper, Grinding. Introduction to Digital Manufacturing: - additive manufacturing, basics of automation & robotics; Concepts of Industry 5.0 (Videos & Quizzes) | PPT/Animated Videos/ Experiment based learning/ Activity based learning/ Simulation/ Virtual Labs | 8=2+6 | Workshop, CAD Lab | CO-4 |

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| 5 | Applications of Digital Manufacturing | 3D Modelling and simulation of- various Forming, Machining in CAD Basic introduction to 3D Printing & Technologies (FDM, LDM, SLA)- Slicing software, Types of Production, Various types of Industries, Introduction to Smart Factory. | PPT/Animated Videos/ Experiment based learning/ Activity based learning/ Simulation/ Virtual Labs | 8=2+6 | CAD Lab (AutoCAD) | CO-5 |
|---|--|---|---|-------|-------------------|------|

References- NIT Patna, Amity University, SRM University, VIT Vellore, IMT Pune, Central Tool Room Training Centre Ahmadabad.

Text Books:

1. A Hand book on AUTOCAD tool practice by SSR Krishna
2. Engg. Graphics, by Agrawal B. & Agrawal CM., TMH Publication
3. Engg. Drawing by Bhatt ND.
4. CAD by CAM by M.P. Grover.
5. A course in Workshop technology by B.S. Raghuvanshi, Vol I & II, Dhanpat Rai & sons, New Delhi
6. Industrial automation and Robotics by A.K. Gupta., S K Arora, Laxmi publication
7. CNC Fundamentals and Programming by P.M Agarwal, V.J Patel, Charotar Publication

Reference Books:

1. Engg. Drawing +AUTOCAD 6th Edition by K Venugopal & V Prabhu Raja, New Age International Publishers
2. Computer Aided Engineering Drawing - S. Triyambaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006
3. Advance CAD Modelling by Nicola & Duhovnik
4. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002
5. Rapid Product Development, Kimura Fumihiko
6. CNC Machines by M.Adhitan, B.S Pabla; New age international.
7. CAD/CAM, by Groover and Zimmers, Prentice Hall India Ltd

Links:

<https://www.youtube.com/watch?v=9YxK7TuEKfE&list=PLMtzJAOD3B7Z0kAGbqdVPZuT91pNIsF-R>

<https://www.youtube.com/watch?v=pvKVy-eMDYc>

| Lab No. | UNIT | Topic | Simulator/ Software | CO Mapping |
|---------|------|---|---------------------|------------|
| 1 | 1 | To create design of a robotic Arm model on CAD | AutoCAD | CO1 |
| 2 | | To draw & design a Cell phone adapter in CAD Software. | AutoCAD | CO1 |
| 3 | | To create layout of job shop, batch shop and continuous manufacturing on CAD | AutoCAD | CO1 |
| 4 | | To draw the orthographic projection view of Hub, Arms, and Face of a Pulley | AutoCAD | CO1 |
| 5 | | To draw the isometric projection view of Pipe, 90 degree elbow and 180 degree bend of a piping system | AutoCAD | CO1 |
| 6 | | To draw the isometric projection view of motor coupling in CAD Software | AutoCAD | CO1 |
| 7 | | To draw the orthographic projection view of a Study Chair. | AutoCAD | CO1 |
| 8 | | To draw the isometric projection view of one way mobile connector | AutoCAD | CO1 |
| 9 | | Two dimensional drawings of Cam and Rocker Arm on AutoCAD. | AutoCAD | CO1 |
| 10 | | To create a design of a Soap Case on CAD software. | AutoCAD | CO1 |
| 11 | | To draw a two way cable connector on CAD software. | AutoCAD | CO1 |
| 12 | | To draw orthographic projections of hexagonal bolt in CAD Software. | AutoCAD | CO1 |
| 13 | | Two dimensional drawings of washer on AutoCAD. | AutoCAD | CO1 |
| 14 | | Two dimensional drawings of Gaskets of a vacuum pump on AutoCAD. | AutoCAD | CO1 |
| 15 | | To create 2D Drawings of Ring and Pinion Gear in CAD Software. | AutoCAD | CO1 |
| 16 | | To draw and design a phone stand/tripod in CAD software | AutoCAD | CO1 |
| 17 | | To draw an orthographic projection view of Edge Flange in CAD Software | AutoCAD | CO1 |
| 18 | | To draw the orthographic projection view of Fork End of a Knuckle Shaft | AutoCAD | CO1 |
| 19 | | To draw an orthographic projection view of Roller Stud in CAD Software | AutoCAD | CO1 |
| 20 | 2 | To design a quadcopter drone on CAD | AutoCAD | CO2 |
| 21 | | To design a digital camera on CAD | AutoCAD | CO2 |

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| 22 | To design the layout of intent device connector on CAD | AutoCAD | CO2 |
| 23 | To model & design a motor coupling in CAD Software. | AutoCAD | CO2 |
| 24 | To design a 3D Model of a one way mobile connector. | AutoCAD | CO2 |
| 25 | To create 2D drawings of Helical Gear in AutoCAD Software. | AutoCAD | CO2 |
| 26 | To draw & design a socket welded produced elbow in CAD Software. | AutoCAD | CO2 |
| 27 | To create 2D model of crane hook | AutoCAD | CO2 |
| 28 | Two dimensional drawing of seal cover on AutoCAD software. | AutoCAD | CO2 |
| 29 | Two dimensional drawings of a Friction plate on AutoCAD. | AutoCAD | CO2 |
| 30 | To create 2D drawing of a threaded rod using AutoCAD Software. | AutoCAD | CO2 |
| 31 | Create 2D drawings of Cam and camshaft bearings in AutoCAD | AutoCAD | CO2 |
| 32 | To design a socket weld cross fitting model in CAD Software. | AutoCAD | CO2 |
| 33 | To draw orthographic view of engine cylinder head in CAD software | AutoCAD | CO2 |
| 34 | To demonstrate & draw a threaded rod using AutoCAD Software. | AutoCAD | CO2 |
| 35 | To design a wrench in AutoCAD Software. | AutoCAD | CO2 |
| 36 | To design a wrist watch in AutoCAD Software. | AutoCAD | CO2 |
| 37 | To design a slip-on flange in AutoCAD Software. | AutoCAD | CO2 |
| 38 | To design a CAR Wheel in CAD Software. | AutoCAD | CO2 |
| 39 | Modelling and designing of steering wheel of a car in CAD software | AutoCAD | CO2 |
| 40 | To create drawings of a Connecting Rod and Gudgeon pin on CAD software. | AutoCAD | CO2 |
| 41 | To demonstrate a Butt-weld Straight Pipe Tee fitting and design it in CAD Software. | AutoCAD | CO2 |
| 42 | To create a 2D drawing of Cotter and Sleeve | AutoCAD | CO2 |
| 43 | To create 2D drawing of Knuckle Pin, Taper Pin and Collar in CAD Software | AutoCAD | CO2 |
| 44 | To design a digital X-ray Machine on CAD | AutoCAD | CO2 |

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| 45 | | To design & assemble a 3D pipe routing in CAD Software. | AutoCAD | CO2 |
| 46 | | To design an electric motor on CAD | AutoCAD | CO2 |
| 47 | | To create design of a CNC Lathe on CAD | AutoCAD | CO2 |
| 48 | | To create design of a Shaper Machine on CAD | AutoCAD | CO2 |
| 49 | | To create design of a Milling Machine on CAD | AutoCAD | CO2 |
| 50 | | To create design of a drilling Machine on CAD | AutoCAD | CO2 |
| 51 | | To create design of carpentry joints on CAD | AutoCAD | CO2 |
| 52 | | To create 2D drawings of Cam and followers on CAD | AutoCAD | CO2 |
| 53 | | To create design of a 3D printer machine on CAD | AutoCAD | CO2 |
| 54 | | To create layout of workshop on CAD | AutoCAD | CO2 |
| 55 | 3 | To design & assemble a 3d model of Cotter and Sleeve Joint with all dimensions and allowances | AutoCAD | CO3 |
| 56 | | To design & assemble a 3d model of knuckle joint with dimensions and allowances in CAD Software. | AutoCAD | CO3 |
| 57 | | To draw & model a spiral spring in AutoCAD Software. | AutoCAD | CO3 |
| 58 | | To design an edge flange on base flange using CAD Software. | AutoCAD | CO3 |
| 59 | | To model & design a Roller Stud in CAD Software. | AutoCAD | CO3 |
| 60 | | To model & design a Pulley used to transmit power. | AutoCAD | CO3 |
| 61 | | To model & design a 3D Model of a Study Chair in AutoCAD Software. | AutoCAD | CO3 |
| 62 | | To design the 3D assembly of Cam and Rocker Arm on AutoCAD. | AutoCAD | CO3 |
| 63 | | To create a 3D model of water bottle in CAD Software. | AutoCAD | CO3 |
| 64 | | To create the 3D drawing of Differential on AutoCAD. | AutoCAD | CO3 |
| 65 | | Modelling and designing of door lock handle in CAD software | AutoCAD | CO3 |
| 66 | | To design & model a chain ring in CAD Software. | AutoCAD | CO3 |
| 67 | | To create 3D model of crane hook | AutoCAD | CO3 |

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| 68 | Modelling and designing of a fry pan used in kitchen | AutoCAD | CO3 |
| 69 | To draw and modelling of Camshaft assembly used in multicylinder engines. | AutoCAD | CO3 |
| 70 | Modelling and designing of a rotor of turbine | AutoCAD | CO3 |
| 71 | 3D modelling of a kitchen sink in CAD Software. | AutoCAD | CO3 |
| 72 | To create 3D design of Auto headlight reflector on AutoCAD software. | AutoCAD | CO3 |
| 73 | To design a 3d design of water pump fan in CAD Software. | AutoCAD | CO3 |
| 74 | To design a wrist watch in AutoCAD Software. | AutoCAD | CO3 |
| 75 | Designing and modelling of wardrobe in CAD Software | AutoCAD | CO3 |
| 76 | Modelling and designing of English toilet seat in CAD software | AutoCAD | CO3 |
| 77 | Modelling and designing of steering wheel of a car in CAD software | AutoCAD | CO3 |
| 78 | Modelling and designing of a computer mouse by mesh modelling in CAD software | AutoCAD | CO3 |
| 79 | Modelling and designing of a chair wheel of revolving chair | AutoCAD | CO3 |
| 80 | Modelling and designing of transition duct in CAD software | AutoCAD | CO3 |
| 81 | Modelling and designing of exhaust manifold of engine | AutoCAD | CO3 |
| 82 | To design a 3D Model of a bike suspension in CAD Software. | AutoCAD | CO3 |
| 83 | To model & design of a Drone Fan in CAD Software. | AutoCAD | CO3 |
| 84 | To demonstrate & design a Motorcycle front sprocket in CAD Software. | AutoCAD | CO3 |
| 85 | To draw elevation and plan of a home on CAD. | AutoCAD | CO3 |
| 86 | To draw elevation and plan of a town on CAD. | AutoCAD | CO3 |
| 87 | To create an assembly of a Connecting Rod on CAD software. | AutoCAD | CO3 |
| 88 | To design a water tap in AutoCAD Software. | AutoCAD | CO3 |
| 89 | To design a Foot Step Power Generator in Designing Software. | AutoCAD | CO3 |
| 90 | To create an Cam Follower assembly on CAD software. | AutoCAD | CO3 |

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| 91 | 4 | Introduction and demonstration of manufacturing processes- Fitting, Carpentry | Virtual Simulator | CO4 |
| 92 | | To simulate different fitting operations through simulation | Process Simulator | CO4 |
| 93 | | To Introduce students to basic wood carving techniques using carving chisels and gouges | Process Simulator | CO4 |
| 94 | | To practice carving simple designs or patterns on wooden blocks. | | CO4 |
| 95 | | Introduction and demonstration of manufacturing Processes- Forging, Casting | Virtual Simulator | CO4 |
| 96 | | To teach students basic hammering techniques used in forging, such as drawing out, upsetting, bending. | | CO4 |
| 97 | | Demonstrate the process of punching holes or slots in a forged work piece using a punch and drift | | CO4 |
| 98 | | To simulate forging process like punching, upsetting using process simulator | Process Simulator | CO4 |
| 99 | | To perform casting experiments using materials like aluminium or bronze. | Process Simulator | CO4 |
| 100 | | To investigate the effect of mold temperature on cast parts. | Process Simulator | CO4 |
| 101 | | To investigate the effect of pouring temperature on cast parts | Process Simulator | CO4 |
| 102 | | To investigate the effect of cooling rate on cast parts | Process Simulator | CO4 |
| 103 | | Introduction and demonstration of manufacturing Processes- Welding, Forming. | Virtual Simulator | CO4 |
| 104 | | To study different welded joints using different welding techniques. | Virtual Simulator | CO4 |
| 105 | | To simulate Electric arc welding through different welding techniques | Process Simulator | CO4 |
| 106 | | To simulate MIG welding with the help of the processes simulator | Process Simulator | CO4 |
| 107 | | To simulate TIG welding with the help of the processes simulator | Process Simulator | CO4 |

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| 108 | | To study basic metal forming techniques(rolling, extrusion, wire drawing) | Virtual Simulator | CO4 |
| 109 | | To simulate rolling process using virtual simulator | Virtual Simulator | CO4 |
| 110 | | To simulate extrusion process using virtual simulator | Virtual Simulator | CO4 |
| 111 | | To simulate wire drawing process using virtual simulator | Virtual Simulator | CO4 |
| 112 | | Study of Machining Tools- Lathe, Milling | Virtual Simulator | CO4 |
| 113 | | Study of Machining Tools- Drilling, Shaper, Grinding | Virtual Simulator | CO4 |
| 114 | | To simulate lathe machine to obtain desired shape and size. | Process Simulator | CO4 |
| 115 | | To simulate drill machine to obtain holes of different diameter. | Process Simulator | CO4 |
| 116 | | To simulate lathe machine to obtain desired shape and size. | Process Simulator | CO4 |
| 117 | | Study and demonstration of automation & robotics | Construction Equipment Simulator | CO4 |
| 118 | | To study the concepts of Industry 4.0 | | CO4 |
| 119 | 5 | 3D Modelling and simulation of Machining in CAD | Construction Equipment Simulator | CO5 |
| 120 | | 3D Modelling and simulation of sheet bending in CAD | Construction Equipment Simulator | CO5 |

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| 121 | Setting up of work piece zero position and tool adjustment in CNC Turning machine | Process Simulator | CO5 |
| 122 | To write and simulate CNC Part program for turning operation as per drawing | Control System Simulator | CO5 |
| 123 | To write and simulate CNC Part program for facing operation as per drawing | Control System Simulator | CO5 |
| 124 | To write and simulate CNC Part program for drilling operation as per drawing | Control System Simulator | CO5 |
| 125 | To write and simulate CNC Part program for milling operations. | Control System Simulator | CO5 |
| 126 | Study of FDM 3D Printing Technology. | Process Simulator | CO5 |
| 127 | Study of LDM 3D Printing Technology. | Process Simulator | CO5 |
| 128 | Study of SLA 3D Printing Technology. | Process Simulator | CO5 |
| 129 | Visualization and conversion of CAD model on a slicing software. | Process Simulator | CO5 |
| 130 | Create a product using a 3D printer machine tool through different 3D printing techniques | Robotics Simulator | CO5 |
| 131 | Study of different type of production systems used in industry- Job, Batch, Mass, Continuous (Case Studies and Examples) | Process Simulator | CO5 |
| 132 | Study of different types of industries (Case Studies and Examples) | Process Simulator | CO5 |
| 133 | Design and implementation of Smart factory for Industry Revolution 4.2 | Robotics Simulator | CO5 |
| 134 | To create digital twins of given parts using smart manufacturing simulation software | Smart manufacturing | CO5 |

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| | | | simulator | |
| 135 | | Objective is to familiarize students with the operation of CNC machines, including their components, controls, and functionalities. Through hands-on experiments, students gain practical knowledge of setting up work pieces, tooling, and executing machining operations. | Robotics Simulator | CO5 |
| 136 | | Objective is to enhance students' programming skills for CNC machines. By designing and executing different machining operations, students learn to write and debug CNC programs, understand G-code instructions, and create efficient tool paths. | Robotics Simulator | CO5 |
| 137 | | Objective is to teach students how to optimize machining processes using CNC machines. Through experiments, students learn to analyse different parameters such as cutting speed, feed rate, and tool path strategies to achieve desired machining results, including surface finish, accuracy, and cycle time reduction | Robotics Simulator | CO5 |
| 138 | | Objective is to expose students to advanced CNC techniques and capabilities. Through experiments, students can explore topics such as multi-axis machining, high-speed machining, tool change management, and complex part production to expand their knowledge and skills in CNC machining. | Robotics Simulator | CO5 |
| 139 | | Objective is to help students understand the impact of machining variables on the quality of machined parts. Through experiments, students can explore variables like tool geometry, tool material, cutting parameters, and machining strategies to analyse their effects on surface finish, dimensional accuracy, and tool life. | Robotics Simulator | CO5 |
| 140 | | Objective is to teach students how to use simulation and verification tools to validate and optimize CNC programs before executing them on the machine. Through experiments, students can understand the importance of simulation in preventing collisions, verifying tool paths, and optimizing machining processes. | Robotics Simulator | CO5 |
| 141 | | Objective is to develop students' problem-solving and troubleshooting skills in CNC machining. Through experiments, students encounter and resolve issues such as tool breakage, incorrect tool paths, or machine errors, helping them develop critical thinking and decision-making abilities. | Robotics Simulator | CO5 |

B. Tech.- Second Semester

Branch- CSE/CSE-R/CS/IT/ECE/ECE(VLSI)/ME/CSE(IOT)/M.Tech.(Integrated)

Subject Code-BMIAS0203

L - T - P

| | | | | | 3 – 1 - 0 | |
|--|---|---|---------------------|---------------------------------|---|-------------------|
| Subject Name- Engineering Mathematics-II | | | | | No. of hours- 42 | |
| <p>Course Objective- The objective of this course is to familiarize the engineering students with techniques of solving Ordinary Differential Equations, Fourier series expansion, Laplace Transform and vector calculus and its application in real world. It aims to equip the students with adequate knowledge of mathematics that will enable them in formulating problems and solving problems analytically.</p> | | | | | | |
| <p>Course Outcome –</p> <p>CO1 - Apply the concept of differentiation to solve differential equations.</p> <p>CO2- Apply the concept of convergence of sequence and series to evaluate Fourier series.</p> <p>CO3- Apply the Laplace transform to solve ordinary differential equations.</p> <p>CO4- Apply the concept of vector calculus to evaluate line, surface and volume integrals.</p> <p>CO5- Solve the problems of Proportion & Partnership, Problem of ages, Allegation & Mixture, Direction, Blood relation , Simple & Compound interest, Geometry and Mensuration.</p> | | | | | | |
| Course Content | | | | | | |
| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/Lab | CO Mapping |
| Unit 1 | Ordinary Differential Equation of Higher Order | Linear differential equation of nth order with constant coefficients, | Smart Board And PPT | 10 hours | 1.1,1.2,1.3&1.4 | CO1 |

| | | | | | | |
|---------------|-----------------------------|---|---------------------|----------------|---------|-----|
| | | Cauchy-Euler equation, Simultaneous linear differential equations, Second order linear differential equations with variable coefficients, Solution by changing independent variable, Reduction of order, Normal form, Method of variation of parameters, Application of ordinary differential equation. | | | | |
| Unit 2 | Sequences and series | Definition of Sequence and series with examples, Convergence of sequence | Smart Board And PPT | 8 hours | 2.1&2.2 | CO2 |

| | | | | | | |
|---------------|--------------------------|---|---------------------|----------------|-------------|-----|
| | | and series, Tests for convergence of series, (p-test, D' Alembert's test or Ratio test, Raabe's test). Fourier series, Half range Fourier sine and cosine series. | | | | |
| Unit 3 | Laplace Transform | Laplace transform, Existence theorem, Laplace transforms of derivatives and integrals, Initial and final value theorems, Unit step function, Dirac- delta function, Laplace transform of periodic function, Inverse | Smart Board And PPT | 8 hours | 3.1,3.2&3.3 | CO3 |

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|---------------|------------------------|--|---------------------|----------------|----------|-----|
| | | Laplace transform, Convolution theorem, Application to solve simple linear and simultaneous differential equations. | | | | |
| Unit 4 | Vector Calculus | <p>Vector differentiation: Gradient, Curl and Divergence and their Physical interpretation</p> <p>Directional derivatives, Tangent and Normal planes.</p> <p>Vector Integration: Line integral, Surface integral, Volume integral,</p> | Smart Board And PPT | 8 hours | 4.1,&4.2 | CO4 |

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|---------------|--------------------|--|---------------------|----------------|-------------|-----|
| | | Gauss's Divergence Theorem, Green's theorem, Stoke's theorem (without proof) and their applications. | | | | |
| Unit 5 | Aptitude-II | Ratio, Proportion & Partnership, Problem of ages, Allegation & Mixture, Direction, Blood relation , Simple & Compound interest, Geometry and Mensuration, Puzzles. | Smart Board And PPT | 8 hours | 5.1,5.2&5.3 | CO5 |

References-

Text Books:

1. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd..

2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher.

Text Books:

1. E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons.
2. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning.
3. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
4. G.B Thomas, R L Finney, Calculus and Analytical Geometry, Ninth Edition Pearson.
5. James Ward Brown and Ruel V Churchill, Fourier Series and Boundary Value Problems, 8th Edition-Tata McGraw-Hill.
6. D. Poole, Linear Algebra : A Modern Introduction, 2nd Edition, Brooks/Cole.
7. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi.
8. Charles E Roberts Jr, Ordinary Differential Equations, Application, Model and Computing, CRC Press T&F Group.
9. Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, 6th Edition, Tata McGraw-Hill.
10. James Ward Brown and Ruel V Churchill, Complex Variable and Applications, 8th Edition, Tata McGraw-Hill.
11. P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd.
12. Advanced Engineering Mathematics By Chandrika Prasad, Reena Garg Khanna Publishing House, Delhi.
13. Quantitative Aptitude by R.S. Aggrawal.

Links:

UNIT-1

<https://www.youtube.com/watch?v=Ql42qcOLKfo&t=7s>

<https://www.youtube.com/watch?v=qlyx1kFTqT8>

https://www.youtube.com/watch?v=n_3ZmnVnrc4

<https://www.youtube.com/watch?v=19Vt7ds8Lvw>

UNIT-2

<https://www.youtube.com/watch?v=HUKR4LWrZ14&t=74s>

<https://www.youtube.com/watch?v=uei7JPnPPvg>

<https://www.youtube.com/watch?v=ummJvI0Ax2Q>

<https://www.youtube.com/watch?v=bWTmUWWZnhQ>

<https://www.youtube.com/watch?v=wpN1wn98XiA>

<https://www.youtube.com/watch?v=gK1Y11UxOhw>

<https://www.youtube.com/watch?v=Clwkvn77QrE&t=10s>

https://www.youtube.com/watch?v=LGxE_yZYigI

UNIT-3

<https://youtu.be/nmp-5tSp-UY>

<https://youtu.be/6ANT4eD6fII>

<https://youtu.be/c9NibpoQjDk>

<https://www.youtube.com/playlist?list=PLNOGIXC4kCBT8G5pWCrH71hmwaAvwsBY3>

UNIT-4

<https://youtu.be/lwggKjA6wko>

<https://youtu.be/d4OyeuRTZNA>

<https://youtu.be/j36IJKSJMqk>

<https://youtu.be/DhwMOrl6Q9g>

<https://youtu.be/DhwMOrl6Q9g>

https://youtu.be/fsMouTxce_A

<https://youtu.be/yq5oInzDCGc>

<https://youtu.be/2SB3IVCwW1w>

<https://www.khanacademy.org/math/multivariable-calculus/integrating-multivariable-functions/line-integrals-vectors/v/line-integra>

<https://www.khanacademy.org/math/multivariable-calculus/integrating-multivariable-functions/3d-flux/v/vector-representation-of-a-su>

http://nucinkis-lab.cc.ic.ac.uk/HELM/workbooks/workbook_29/29_2_surfac

<https://www.youtube.com/watch?v=Mb6Yb-SGqio>

<https://www.khanacademy.org/math/multivariable-calculus/greens-theorem-and-stokes-theorem/stokes-theorem/v/stokes-theorem-intuition>

<https://www.youtube.com/watch?v=eSqznPrtzS4>

UNIT-5

<https://www.GovernmentAdda.com>

B. Tech.- Second Semester

**Branch- CSE/CSE-R/CS/IT/M.Tech.(Int.)/ CSE(DS)/CSE(IOT)/
CSE(AMIL)/CSE(AI)/CYS/ME/BT**

Subject Code-BMIEC0201

L - T - P

3 – 1 - 0

**Subject Name- Basic Electrical & Electronics
Engineering**

No. of hours- 49

Course Objective-

1. To provide the basics of DC and AC analysis of (Single phase and Three phase) electrical circuits.
2. To study motors used in robotics, the basics of transformer and its efficiency calculation.
3. To impart elementary knowledge of layout of Power System, Earthing, and Energy Consumption.
4. To provide the knowledge of Diode, Display devices, Op-Amp, Sensors, IoT and its application.

Course Outcome –After successful completion of this course students will be able to

CO1: Apply the principle of KVL/KCL and network theorems for analysis of D.C circuit.

CO2: Analyze the steady state behavior of single phase and three phase AC electrical circuits, Earthing, and energy calculation.

CO3: Illustrate and analyze special motors, working principles of a single-phase transformer and components of Power system.

CO4: Explain the construction, working principle, and application of PN junction diode, Zener diode and Display devices.

CO5: Explain the concept of Op-Amp, Digital multimeter, Sensors, IoT and its applications.

Course Content

| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/Lab | CO Mapping |
|-------------|--|---|-----------------------------------|---------------------------------|---|-------------------|
| Unit 1 | D.C CIRCUIT ANALYSIS AND NETWORK THEOREMS | Concept of network, Active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, source transformation , Kirchhoff's Law: loop and | Digital Smart Board, PPT, m-Tutor | 10 | Assignment 1.1, Assignment 1.2 | CO1 |

| | | | | | | |
|--------|--|---|-----------------------------------|----|--------------------------------|-----|
| | | nodal methods of analysis, star delta transformation, network theorems: Superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem. | | | | |
| Unit 2 | STEADY STATE ANALYSIS OF AC CIRCUIT | Single phase AC circuit: AC fundamentals, concept of phasors, phasor representation of sinusoidally varying voltage and current, analysis of series and parallel RLC circuits, j-notation, Different types of | Digital Smart Board, PPT, m-Tutor | 10 | Assignment 2.1, Assignment 2.2 | CO2 |

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| | | <p>power, power factor, resonance in series and parallel circuits.</p> <p>Importance of Earthing, Elementary calculations for energy consumption,</p> | | | | |
| Unit 3 | <p>SINGLE PHASE TRANSFORMER AND ELEMENTS OF POWER SYSTEM</p> | <p>Single Phase Transformer: Principle of operation, construction, EMF equation, equivalent circuit, losses and efficiency.</p> <p>Introduction to Elements of Power System: General layout of Power system, Conventional and renewable</p> | <p>Digital Smart Board, PPT, m-Tutor</p> | 10 | <p>Assignment 3.1, Assignment 3.2</p> | CO3 |

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| | | <p>energy sources.</p> <p>Special motors used in robotics: Brushless motor, stepper motor, servomotor</p> | | | | |
| Unit 4 | <p>SEMICONDUCTOR DIODE AND THEIR APPLICATIONS</p> | <p>Introduction of Semiconductors: Intrinsic and Extrinsic, P-N Junction Diode: Depletion layer, V-I characteristics, Half and Full Wave rectification, DC charger architecture for EV.</p> <p>Breakdown Mechanism: Zener and Avalanche, Zener Diode as Shunt Regulator.</p> | <p>Digital Smart Board, PPT, m-Tutor</p> | 10 | <p>Assignment 4.1, Assignment 4.2</p> | CO4 |

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|--------|-------------------------------|--|-----------------------------------|---|--------------------------------|-----|
| | | <p>Display Devices</p> <p>Liquid Crystal Display (LCD), Light Emitting Diode (LED), Organic-Light Emitting Diode (O-LED), 7-segment display.</p> | | | | |
| Unit 5 | OPERATIONAL AMPLIFIERS | <p>Introduction, Op-Amp Basic, Practical Op-Amp Circuits (Inverting Amplifier, Noninverting Amplifier, Summing Amplifier, Integrator, Differentiator)</p> <p>Electronic Instrumentation</p> <p>Digital Multimeter</p> | Digital Smart Board, PPT, m-Tutor | 9 | Assignment 5.1, Assignment 5.2 | CO5 |

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| | | (DMM), Types of sensor, Introduction to IoT and its application in smart Grid. | | | | |
|--|--|--|--|--|--|--|

References-

Text Books:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill.
3. C.L. Wadhwa, Basic Electrical Engineering, Pearson Education
4. J.B. Gupta, Basic Electrical Engineering, Kataria& Sons
5. Robert L. Boylestad / Louis Nashelsky "Electronic Devices and Circuit Theory", Latest Edition, Pearson Education.
6. H S Kalsi, "Electronic Instrumentation", Latest Edition, TMH Publication.

Reference Books:

1. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
2. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press.
3. V. D. Toro, "Electrical Engineering Fundamentals", Pearson India.
4. David A. Bell, "Electronic Devices and Circuits", Latest Edition, Oxford University Press.
5. Jacob Millman, C.C. Halkias, Stayabratajit, "Electronic Devices and Circuits", Latest Edition, TMH.

Links:

UNIT-1

1. <https://youtu.be/FjaJEo7knF4>
2. <https://youtu.be/UsLbB5k9iuY>
3. <https://youtu.be/1QfNg965OyE>
4. <https://youtu.be/wWihXHCOMUc>

UNIT-2

1. <https://youtu.be/ulGKCeOoR88>
2. <https://youtu.be/YLGrugmDvc0>
3. <https://youtu.be/0f7YkVOrOmY>
4. <https://youtu.be/LM2G3cunKp4>
5. <https://youtu.be/S5464NnKOq4>

UNIT-3

1. <https://youtu.be/GgckE4H5AJE>
2. <https://youtu.be/OKkOif2JYRE>
3. <https://youtu.be/qSyUFp3Qk2I>
4. <https://youtu.be/GROtUE6ILc4>
5. https://youtu.be/k_FqhE0uNEU

UNIT-4

1. https://youtu.be/EdUAecpYVWQ?list=PLwjK_ikyK4LLBj2yTYPYKFKdF6kIg0ccP2
2. <https://youtu.be/MZPeRlst8rQ>
3. <https://youtu.be/qQucInufX-s>
4. https://youtu.be/tPFI2_PdCYA
5. <https://youtu.be/zA-UtZ-s9GA>

UNIT-5

1. https://youtu.be/AuZ00cQ0UrE?list=PLwjK_ikyK4LLDBB1E9MFbxGCEnmMMOAXOH
 2. https://youtu.be/aU24RWIgJVs?list=PLwjK_ikyK4LLDBB1E
 3. https://youtu.be/c5NeTnp_poA
 4. <https://youtu.be/KLGbPgl18k>
- <https://youtu.be/UFJzQH3G1Ko?list=PLVrieKUj5RceFRq5MKy-f-EHdumStFPLt>

B. Tech.- Second Semester

Branch- Branch – CS/ CSE/CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AIML)/CSE(AI)/CYS/ ECE/ECE(VLSI)/ ME/M. Tech (Integrated)/ BT

Subject Code- BMIASL0202

L - T - P

2 - 0 - 0

Subject Name- French Language

No. of hours- 24

Course Objectives:

1. To help the students learn to articulate in French language in day-to-day real-life situations.
2. To enable the students acquire the four basic skills LSRW (Listening, Speaking, Reading, and Writing) of language learning.

Course Outcomes:

After the completion of the course, the students will be able to

CO1 - Recognize the basic sounds, letters, numbers, words, and phrases of French.

CO2 - Develop basic French vocabulary.

CO3 - Use simple vocabulary and sentences in day-to-day life.

CO4 - Introduce a third person

CO5 - Develop basic skills in writing and speaking

Course Content

| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment /Lab | CO Mapping |
|--------|-------------------------------|---|---|--------------------------|--|------------|
| Unit 1 | Introduction to French | <ul style="list-style-type: none">• Basic greetings• French letters, sounds and accents• Numbers• The subject pronouns• Verbs- être, avoir• Basic adjectives (How to change into feminine form)• Introductory questions and Self introduction | Audio-lingual method & reference of the learning aids | 5 hours | Assignment on- Greetings, numbers, verb conjugation, adjective and basic questions | CO1 |

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| | | | | | | |
| Unit 2 | Vocabulary Building | <ul style="list-style-type: none"> • Days of the week, months of the year and date • Colors • Basic vocabulary • Articles (indefinite and definite) • How to make nouns plural • Use of C'est and Ce sont • Vocabulary of nationality and professions • Introduction of a friend | Learning through attractive pictures, word-picture association & question-answer patterns. | 6 hours | Assignment on- days, months, colors, articles, nationality, professions and making sentences plural | CO2 |
| Unit 3 | Everyday Common Simple Sentences | <ul style="list-style-type: none"> • Contracted articles with à • Vocabulary of transports • Use of prepositions | Communicative method and learning through videos, Total Physical Response Methodology (TPR), activities | 7 hours | Assignment on- contracted articles, transports, prepositions (à and en), time, negative sentences, and questions | CO3 |

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|--------|------------------------------|---|--|---------|---|-----|
| | | <p>ons à and en</p> <ul style="list-style-type: none"> • Time • Negation • 3 ways to frame question and how to reply accordingly | <p>might include: dialogue framing, question making.</p> | | | |
| Unit 4 | Reading & Writing | <ul style="list-style-type: none"> • Vocabulary of family members • Introduction of a family member • “ER” verbs with exceptions | <p>Tasked-Based Learning, Grammar-Translation Method, Reading Aids, Reference Books</p> | 3 hours | Assignment on- family members and verb conjugation | CO4 |
| Unit 5 | Skilled writing | <ul style="list-style-type: none"> • How to fill a basic form • How to write a brief post card in French. | <p>Communicative and Tasked-Based Learning method, activities might include: developing writing skills through various forms of exercises.</p> | 3 hours | Assignment on- writing post card in French and filling form | CO5 |

Reference Books: 1. Edito 1 (Méthode de français/Cahiers d'exercices)
 2. Echo A1 (Méthode de français/Cahier d'exercices)
 3. Saison A1 (Méthode de français/Cahier d'exercices)

B. Tech.- Second Semester

Branch- CS/ CSE/CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AIML)/CSE(AI)/CYS/ ECE/ECE(VLSI)/ ME/M. Tech (Integrated)/ BT

Subject Code – BMIASL0203

L - T - P

2 - 0 - 0

Subject Name – German Language

No. of hours- 24

Course Objectives:

1. To help the students learn to articulate in German language in day-to-day real-life situations.
2. To enable the students acquire the four basic skills LSRW (Listening, Speaking, Reading, and Writing) of language learning.

Course Outcomes:

After the completion of the course, the students will be able to

CO1 - Understand and be familiar with basic German Language concepts and the culture

CO2- Recognise the fundamental vocabulary

CO3- Use simple vocabulary and sentences in everyday conversations

CO4- Read and write simple sentences

CO5- Use complex sentences and develop basic writing skills

Course Content

| Unit | Module | Topics Covered | Pedagogy | Lecture | Aligned Practical/Assignment/Lab | CO Mapping |
|-------------|---------------|-----------------------|-----------------|----------------|---|-------------------|
|-------------|---------------|-----------------------|-----------------|----------------|---|-------------------|

| | | | | Required (T=L+P) | | |
|--------|-------------------------------|---|---|-----------------------------|---|-----|
| Unit 1 | Introduction to German | <ul style="list-style-type: none"> • Letters and Numbers • German Greetings and Self Introduction • Personal Pronouns and Verb Conjugations (Regular and Irregular Verbs) • W- Question ➤ Simple Sentences | Audio-lingual method & reference books | 4 Hours | Assignment on – Verb Exercises, Question Making | CO1 |
| Unit 2 | Vocabulary building | <ul style="list-style-type: none"> • The concept of German Articles (Definite and Indefinite) • Nouns and Articles • Days, Months, & Seasons • Adjectives • Negation | <p>Learning through attractive pictures, audio-lingual method</p> <p><u>Activities</u> will include pantomiming, word-picture association & question-answer patterns.</p> | 4 Hours | Assignment on – Articles ,Vocabulary, Negative Sentences | CO2 |
| Unit 3 | Everyday common | <ul style="list-style-type: none"> • Basic directions • Imperativ | Communicative method and learning through videos, Total | 4 Hours | Assignment on – Sentence Making and Dialogue | CO3 |

| | | | | | | |
|--------|----------------------------|--|--|----------------|---|-----|
| | simple sentences | <ul style="list-style-type: none"> • Date and Time • Modal Verben ➤ (Basic everyday life conversations and making appointments) | Physical Respond Methodology (TPR), | | | |
| Unit 4 | Reading and Writing | <ul style="list-style-type: none"> • Separable Verbs • Possessive Pronouns • Sentences - Nomminativ, Akkusativ, Dativ ➤ Translations (English to German, German to English) ➤ Short Text and Form Filling | Tasked-Based Learning, Grammar-Translation Method, Reading Aids, Reference Books | 6 Hours | Assignment on – Translations and Sentence Making, Form Filling exercises | CO4 |
| Unit 5 | Skilled Writing | <ul style="list-style-type: none"> • Changeable Prepositions • Present Perfect Tense • Past Tense of – To have and To Be | Communicative and Tasked-Based Learning method, Grammar-Translation, activities will include developing writing skills through various | 6 Hours | Assignment on - Vocabulary Exercises, Usage of Prepositions, Changing a sentence/Text from Present tense to past tense, E-mail writing | CO5 |

| | | | | | | |
|--|--|--|---------------------|--|--|--|
| | | <ul style="list-style-type: none"> • Health and Body, Vacations • Leisure Activities, Celebrations ➤ E-mail Writing | forms of exercises. | | | |
|--|--|--|---------------------|--|--|--|

Reference Books:

- **Netzwerk A1 (Goyal Saab Publications)**
- **Studio D A1 (Goyal Saab Publications)**
- **Langenscheidt Dictionary**

B. Tech.- Second Semester

Branch -CS/ CSE/CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AIML)/CSE(AI)/CYS/ ECE/ECE(VLSI)/ ME/M. Tech (Integrated)/ BT

Subject Code – BMIASL0204

L - T - P

2 - 0 - 0

Subject Name – Japanese Language

No. of hours- 24

Course Objectives:

- 1. To help the students learn to articulate in Japanese language in day-to-day real-life situations.**
- 2. To enable the students acquire the four basic skills LSRW (Listening, Speaking, Reading, and Writing) of language learning.**

Course Outcomes:

After the completion of the course, the students will be able to

CO1 - Understand and be familiar with basic Japanese Language concepts and the culture.

CO2- Recognise the fundamental vocabulary.

CO3- Use simple vocabulary and sentences in everyday conversations.

CO4- Read and write simple sentences.

CO5- Use complex sentences and develop basic writing skills.

Course Content

| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment /Lab | CO Mapping |
|--------|---------------------------------|---|--|--------------------------|--|------------|
| Unit 1 | Introduction to Japanese | <ul style="list-style-type: none">• General features of Japanese• Japanese scripts• Pronunciation of Japanese words• Classroom instructions• Daily greetings and expressions• Numerals, Months name Days of the week, Time & Calendar• Family members• Vocabulary lessons 1&2• Sentence pattern & Example sentences• Self-introduction | Audio-lingual method & reference books | 5 Hours | Assignment on – Verb Exercises, Question Making | CO1 |

| | | | | | | |
|--------|---|---|--|----------------|---|-----|
| | | (jikoshokai) | | | | |
| Unit 2 | Vocabulary building | <ul style="list-style-type: none"> Country, language, and people Basic conversations Vocabulary lessons 3&4 Use of patterns (KO, SO, AA, and DO) Conversations between guests and hosts Conversations between customers and shopkeepers | <p>Learning through attractive pictures, audio-lingual method.</p> <p>Activities might include pantomiming, word-picture association & question-answer patterns.</p> | 5 Hours | Assignment on – Articles, Vocabulary, and Negative Sentences | CO2 |
| Unit 3 | Everyday common simple sentences | <ul style="list-style-type: none"> Vocabulary lessons 5&6 Grammar explanation Colour & taste Conversations in post office Conversations with friends Making a request Making an enquiry – Railway Station | <p>Communicative method and learning through videos, Total Physical Response Methodology (TPR), activities might include dialogue framing,</p> | 5 Hours | Assignment on – Sentence Making and Dialogue | CO3 |

| | | | | | | |
|--------|----------------------------|--|--|----------------|---|-----|
| | | <ul style="list-style-type: none"> • Buying Fruits & Vegetables • Names of the Animals • Question formation | question making. | | | |
| Unit 4 | Reading and Writing | <ul style="list-style-type: none"> • Scanning based Newspaper reading • Transportation • KANJI Form of Writing – 40 Characters • Shopping Counters • Basic Japanese grammar rules – particles: か (ka), は (wa), の (no), と (to), を (o), に (ni), も (mo), が (ga), や (ya). • Kara, Soshite • Grammar - Present, Past, Future • Adjectives • Vocabulary Lessons 7&8 | Tasked-Based Learning, Grammar-Translation Method, Reading Aids, Reference Books | 4 Hours | Assignment on – Translations and Sentence Making | CO4 |

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|--------|------------------------|--|---|----------------|--|-----|
| Unit 5 | Skilled Writing | <ul style="list-style-type: none"> • Write short text on oneself. • Grammar: Pronouns – subject, object, possessive, Modal verbs | Communicative and Tasked-Based Learning method, Grammar-Translation, activities might include - developing writing skills through various forms of exercises. | 5 Hours | Assignment on - Vocabulary Exercises, Usage of Prepositions, Changing a sentence/Text from Present tense to past tense. | CO5 |
|--------|------------------------|--|---|----------------|--|-----|

Reference Book(s):

- *Minna no nihongo – N5*

Link(s):

- <https://www.youtube.com/@NihonGoal/community>

B. Tech.-Second Semester

Branch- CS/ CSE/CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AIML)/CSE(AI)/CYS/ ECE/ECE(VLSI)/ ME/M.
Tech (Integrated)/ BT

Subject Code-BMICSE0252**L - T - P****0 - 0 - 6****Subject Name- Advanced Python****No. of hours- 78 hours**

Course Objective- To become familiar with Python's Object-Oriented Concepts, functional programming And create GUI application and to gain the knowledge of Python libraries.

Course Outcome –

CO1 - Implement classes and create instances in python

CO2- Implement GUI based Python application

CO3- Use Python libraries for data handling.

CO4- Analyze data using visualization libraries.

CO5- Analyze web scraping application for real world data

Course Content

| Unit | Module | Topics Covered | Pedagogy | Lecture Required | Aligned Practical/Assignment/Lab | CO Mapping |
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| | | | | (T=L+P) | | |
| Unit 1 | Classes and Objects | Introduction: Python Classes and objects, User-Defined Classes, Class Variables and Instance Variables | Lecture , Hands-on exercise, Demonstration, practical lab | 4(3+1) | Learn to create python classes and objects. | 1 |
| | | Instance methods, Class method, static methods, | | 4(2+2) | Perform different types of class methods. | 1 |
| | | constructor in python, parametrized constructor, Magic Methods in python, | | 3(3+2) | Create a constructor to initialize an object in Python, Different types of constructors, Constructor overloading and chaining | 1 |
| | | Object as an argument, Instances as Return Values, namespaces, | | 2(1+1) | Implementation of Object as an argument, Instances and namespace | 1 |

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| | | Introduction to inheritance and polymorphism, Abstract Class, Introduction to Abstraction and Encapsulation | | 8(3+5) | Implementing inheritance and types of polymorphism. | 1 |
| Unit 2 | Functional and GUI Programming | Functional Programming: Immutability, Closures and Decorators, generators | Hands-on exercise, Demonstration, lectures, practical lab | 6(2+4) | Implementation of Decorators and generators | 2 |
| | | Co-routines, iterators, Declarative programming | | 3(2+1) | Implement the functions of iterators and co routines | 2 |
| | | GUI Programming: Intro to GUI Programming, Settling widgets in the window's interior, | | 3(0+3) | Demonstration of GUI interface. | 2 |

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| | | Numeric Widgets, | | | | |
| | | Boolean Widgets, Selection Widgets, String Widgets, Date Picker, Color Picker, Container Widgets, | | 2(0+2) | Implement different types of GUI widgets. | 2 |
| | | Creating a GUI Application, Tkinter, button, canvas | | 2(0+2) | Create GUI application using Tkinter and components. | 2 |
| Unit 3 | Libraries for Data Handling | NumPy: Basic Operation, Indexing, slicing and Iterating | Lecture , Hands-on exercise, Demonstration, practical lab | 3(1+2) | Demonstration on numpy, and mathematical operations on numpy. | 3 |
| | | Multidimensional arrays, NumPy Data types, Reading and writing data on Files | | 3(1+2) | Implementation of Multi-dimensional array. | |
| | | SciPy: Introduction to SciPy, Create | | 3(1+2) | Learn to demonstrate the SciPy libraries. | |

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| | | function, modules of SciPy. | | | | |
| | | Pandas : Series and Data Frames, Grouping, aggregation, Merge Data Frames, | | 3(1+2) | Learn to demonstrate the use of pandas, data frames.. | |
| | | Generate summary tables, Group data into logical pieces, Manipulation of data | | 3(1+2) | Creating tables and groups. | |
| Unit 4 | Libraries in Data Visualization | Matplotlib: Scatter plot, Bar charts, histogram, Stack charts | Lecture , Hands-on exercise, Demonstration, practical lab | 3(1+2) | Learn to demonstrate the different visualization methods. | 4 |
| | | Legend title Style, Figures and subplots, | | 1(0.5+0.5) | Implementation on charts and figures. | 4 |
| | | Plotting function in pandas, Labelling and | | 3(1+2) | Implementation on plots and figures. | 4 |

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| | | arranging figures, Save plots. | | | | |
| | | Seaborn: style function, color palettes, heatmaps ,distribution plots, category plot, regression plot | | 3(1+2) | Implementation of seaborn library | 4 |
| | | Plotly : Lineplots , Areaplots, Scatterplots, Bubbleplots , Stacked bar charts, | | 2(1+1) | Implementation of different types of plots. | 4 |
| | | Grouped bar charts, Pie charts, Tables, Dashboards | | 2(1+1) | Implementation of charts. | 4 |
| Unit 5 | V e b S c r a p i n g | Web Scraping: Introduction, Web Crawling v/s Web Scraping, Uses of Web Scraping, Components of a Web Scraper, | Lecture , Hands-on exercise, Demonstration, practical lab | 3(1+2) | Learn to scrap the data. | 5 |

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| | working of a Web Scraper, Crawl, Parse and Transform Store the Data | | | | |
| | Beautiful Soup: Introduction to Beautiful Soup library, Accessing Tags, Navigable Strings, Navigating and searching with Beautiful Soup, Web Scraping | | 3(1+2) | Demonstration of web scrapping using Beautiful Soup. | 5 |
| | Example: Scraping Flipkart Website | | 4(1+3) | Learn to scrapping of Flipkart website. | 5 |
| | <i>Introduction to Github</i> | | 2(1+1) | Implementation of Projects on Github. | 5 |

References-

Text Books:

1. Magnus Lie Hetland, "Beginning Python-From Novice to Professional" —Third Edition, Apress
2. Peter Morgan, Data Analysis from Scratch with Python, AI Sciences
3. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016
4. Miguel Grinberg, Developing Web applications with python, OREILLY

Reference Books:

1. Dusty Phillips, Python 3 Object-oriented Programming - Second Edition, O'Reilly
2. Burkhard Meier, Python GUI Programming Cookbook - Third ,Packt
3. DOUG HELLMANN, THE PYTHON 3 STANDARD LIBRARY BY EXAMPLE, :Pyth 3 Stan Libr Exam _2 (Developer's Library) 1st Edition, Kindle Edition
4. Kenneth A. Lambert, —Fundamentals of Python: First Programs, CENGAGE Learning, 2012.

Links:

Unit 1 <https://nptel.ac.in/courses/106/106/106106145/>

Unit 2 https://www.python-course.eu/python3_inheritance.php

Unit 3 <https://realpython.com/courses/functional-programming-python/>

Unit 4 <https://realpython.com/python-gui-tkinter/>

Unit 5 <https://nptel.ac.in/courses/106/107/106107220/>
<https://nptel.ac.in/courses/106/106/106106212/>

LAB:

| Total No. of Practicals: 176 | | | | |
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| List of Practicals | | | | |
| Lab No. | Unit | Topic | Program Logic Building | CO Mapping |
| 1.1 | 1 | Class and object | Write a program illustrating class definition and accessing class members. | CO 1 |
| 1.2 | | Class and object | Write a program to implement default constructor, parameterized constructor, and destructor. | CO 1 |
| 1.3 | 1 | Class and object | Create a Python class named Rectangle constructed by a length and width. a. Create a method called area which will compute the area of a rectangle. | CO 1 |
| 1.4 | 1 | Class and object | Create a class called Numbers, which has a single class attribute called MULTIPLIER, and a constructor which takes the parameters x and y (these should all be numbers). a. Write an instance method called add which returns the sum of the attributes x and y. b. Write a class method called multiply, which takes a single number parameter a and returns the product of a and MULTIPLIER. | CO 1 |

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| 1.5 | 1 | Class and object | <p>Create a class named as Student to store the name and marks in three subjects. Use List to store the marks.</p> <p>a. Write an instance method called compute to compute total marks and average marks of a student.</p> <p>b. Write a method called display to display student information.</p> | CO 1 |
| 1.6 | 1 | Class and object | <p>Write a program that has a class called Fraction with attributes numerator and denominator.</p> <p>a. Write a method called getdata to enter the values of the attributes.</p> <p>b. Write a method show to print the fraction in simplified form.</p> | CO 1 |
| 1.7 | 1 | Class and object | <p>Write a program that has a class Numbers with a list as an instance variable.</p> <p>a. Write a method called insert_element that takes values from user.</p> <p>b. Write a class method called find_max to find and print largest value in the list.</p> | CO 1 |
| 1.8 | 1 | Class and object | <p>Create a class called Complex. Write a menu driven program to read, display, add and</p> | CO 1 |

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| | | | subtract two complex numbers by creating corresponding instance methods. | |
| 1.9 | 1 | Class and object | <p>Write a program that has a class Point with attributes x and y.</p> <p>a. Write a method called midpoint that returns a midpoint of a line joining two points.</p> <p>b. Write a method called length that returns the length of a line joining two points.</p> | CO 1 |
| 1.10 | 1 | Class and object | <p>Write a Python program to create a class called "Rectangle" with attributes length and width. Include methods to calculate the perimeter and area of the rectangle.</p> | CO 1 |
| 1.11 | 1 | Class and object | <p>Implement a Python class called "BankAccount" with attributes account number, account holder name, and balance. Include methods to deposit and withdraw money from the account.</p> | CO 1 |
| 1.12 | 1 | Class and object | <p>Write a Python program to create a class called "Student" with attributes roll number, name, and marks in three subjects. Include a method to calculate the average marks of the student.</p> | CO 1 |
| 1.13 | 1 | Class and object | <p>Implement a Python class called "Car" with attributes make, model, and year. Include methods to start the car, stop the car, and display its details.</p> | CO 1 |

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| 1.14 | 1 | Magic Method | Write a program to illustrate the use of following built-in methods: a. hasattr(obj,attr) b. getattr(object, attribute_name [, default]) c. setattr(object, name, value) d. delattr(class_name, name) | CO 1 |
| 1.15 | 1 | Inheritance | Write a program to create class Employee. Display the personal information and salary details of 5 employees using single inheritance. | CO 1 |
| 1.16 | 1 | Inheritance | WAP that extends the class Employee. Derive two classes Manager and Team Leader from Employee class. Display all the details of the employee working under a particular Manager and Team Leader. | CO 1 |
| 1.17 | 1 | Inheritance | Write a program that has a class Point. Define another class Location which has two objects (Location and destination) of class Point. Also, define a function in Location that prints the reflection on the y-axis. | CO 1 |
| 1.18 | 1 | Polymorphism | Write a program to overload + operator to multiply to fraction object of fraction class which contain two instance variable numerator and denominator. Also, define the instance | CO 1 |

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| | | | method simplify() to simplify the fraction objects. | |
| 1.19 | 1 | Polymorphism | 26. Write a program to compare two-person object based on their age by overloading > operator. . | CO 1 |
| 1.20 | 1 | Polymorphism | Write a program to overload in operator. | CO 1 |
| 2.1 | 2 | Functional Programming | WAP to Show the concept of inner function. | CO2 |
| 2.2 | 2 | Functional Programming | WAP to create closure. | CO2 |
| 2.3 | 2 | Functional Programming | WAP to create a decorator which will convert a string into upper case string. | CO2 |
| 2.4 | 2 | Functional Programming | WAP to show the concept of nested decorator. | CO2 |
| 2.5 | 2 | Functional Programming | WAP to calculate sum of 1,2,3,4,5 using reduce function. | CO2 |
| 2.6 | 2 | Functional Programming | WAP to generate numbers from 1 to 10 using generator. | CO2 |

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| 2.7 | 2 | Functional Programming | WAP to decide number is even or odd using generator. | CO2 |
| 2.8 | 2 | Functional Programming | WAP to generate square of 1,2,3,4,5,6,7,8,9,10 using generator. | CO2 |
| 2.9 | 2 | Functional Programming | WAP to generate square of even number upto 10 using generator and save in list. | CO2 |
| 2.10 | 2 | Functional Programming | WAP to make a co-routine which will print all name with prefix Dear. | CO2 |
| 2.11 | 2 | Functional Programming | WAP to close a co-routine. | CO2 |
| 2.12 | 2 | Functional Programming | WAP to iterate tuple using iter() and next() method. | CO2 |
| 2.13 | 2 | Functional Programming | WAP to iterate a string using iter and next method. | CO2 |
| 2.14 | 2 | GUI Programming | Hello World: Display a simple "Hello, World!" message box. | CO 2 |

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| 2.15 | 2 | GUI Programming | Button: Create a button that displays a message when clicked. | CO 2 |
| 2.16 | 2 | GUI Programming | Entry: Create a text entry field and display the entered text. | CO 2 |
| 2.17 | 2 | GUI Programming | Check button: Create a checkbox and display the selected options | CO 2 |
| 2.18 | 2 | GUI Programming | Radio button: Create radio buttons and display the selected option. | CO 2 |
| 2.19 | 2 | GUI Programming | List box: Create a list box and display the selected items. | CO 2 |
| 2.20 | 2 | GUI Programming | Text: Create a text area and display the entered text. | CO 2 |
| 2.21 | 2 | GUI Programming | Menu: Create a menu with different options. | CO 2 |
| 2.21 | 2 | GUI Programming | Message: Display a message in a dialog box. | CO 2 |

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| 2.23 | 2 | GUI Programming | Progress bar: Create a progress bar that updates over time python | CO 2 |
| 2.24 | 2 | GUI Programming | Scale: Create a scale widget and display the selected value. | CO 2 |
| 2.25 | 2 | GUI Programming | Spin box: Create a spin box and display the selected value. | CO 2 |
| 2.26 | 2 | GUI Programming | Canvas: Create a canvas and draw shapes on it. | CO 2 |
| 2.27 | 2 | GUI Programming | Label Frame: Create a labeled frame with widgets inside. | CO 2 |
| 2.28 | 2 | GUI Programming | Scrollbar: Add a scrollbar to a widget like a text area or list box | CO 2 |
| 2.29 | 2 | GUI Programming | Frame: Create a frame and place widgets inside it. | CO 2 |
| 2.30 | 2 | GUI Programming | Tree view: Create a tree view widget to display hierarchical data | CO 2 |
| 2.31 | 2 | GUI Programming | Notebook: Create a notebook widget with tabs. | CO 2 |
| 2.32 | 2 | GUI Programming | File Dialog: Open a file dialog to select a file. | CO 2 |
| 2.33 | 2 | GUI Programming | Color Dialog: Open a color dialog to select a color. | CO 2 |

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| 2.34 | 2 | GUI Programming | Button Counter: Create a button that increments a counter when clicked. | CO 2 |
| 2.35 | 2 | GUI Programming | Checkbox List: Display a list of checkboxes and show selected options. | CO 2 |
| 2.36 | 2 | GUI Programming | Dropdown Menu: Create a dropdown menu with multiple options. | CO 2 |
| 2.37 | 2 | GUI Programming | Slider Value Display: Display the current value of a slider widget. | CO 2 |
| 2.38 | 2 | GUI Programming | Text Input and Button: Take user input in a text box and display it when a button is clicked. | CO 2 |
| 2.39 | 2 | GUI Programming | Radio Buttons: Present a set of options as radio buttons and display the selected option. | CO 2 |
| 2.40 | 2 | GUI Programming | Progress Bar: Show the progress of a task using a progress bar widget. | CO 2 |
| 2.41 | 2 | GUI Programming | Password Input: Create a password input field that hides the entered characters. | CO 2 |
| 2.42 | 2 | GUI Programming | File Uploader: Enable users to upload files and display the selected file name. | CO 2 |
| 3.1 | 3 | NumPy | Creating Arrays: Create NumPy arrays using various methods like np.array(), np.zeros(), np.ones(), np.arange(), etc. | CO 3 |
| 3.2 | 3 | NumPy | Array Shape and Size: Get the shape and size of a NumPy array using the shape and size attributes. | CO 3 |
| 3.3 | 3 | NumPy | Array Indexing: Access and modify individual elements of a NumPy array using indexing | CO 3 |

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| 3.4 | 3 | NumPy | Array Slicing: Extract a subset of elements from a NumPy array using slicing. | CO 3 |
| 3.5 | 3 | NumPy | Array Reshaping: Change the shape of a NumPy array using the reshape() function. | CO 3 |
| 3.6 | 3 | NumPy | Array Arithmetic: Perform basic arithmetic operations (addition, subtraction, multiplication, division) on NumPy arrays. | CO 3 |
| 3.7 | 3 | NumPy | Array Broadcasting: Perform element-wise operations on arrays with different shapes using broadcasting rules. | CO 3 |
| 3.8 | 3 | NumPy | Array Aggregation: Calculate aggregate values on arrays, such as sum(), min(), max(), mean(), etc. using NumPy | CO 3 |
| 3.9 | 3 | NumPy | Array Transposition: Transpose a NumPy array using the transpose() function. | CO 3 |
| 3.10 | 3 | NumPy | Write a program that demonstrates advanced array indexing techniques, such as indexing with boolean arrays or using fancy indexing to select specific elements or subsets of an array. | CO3 |
| 3.11 | 3 | NumPy | Write a program using NumPy to perform data manipulation tasks, such as sorting arrays, removing duplicates, or finding unique elements in an array. | CO3 |
| 3.12 | 3 | NumPy | Array Sorting: Sort the elements of a NumPy array using the sort() function. | CO 3 |

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| 3.13 | 3 | NumPy | Array Filtering: Filter elements in a NumPy array based on a condition using boolean indexing. | CO 3 |
| 3.14 | 3 | NumPy | Array Statistics: Calculate statistical measures like mean, median, standard deviation using functions like np.mean(), np.median(), np.std(). | CO 3 |
| 3.15 | 3 | NumPy | Array Randomization: Generate random numbers or arrays using functions from the np.random module. | CO 3 |
| 3.16 | 3 | NumPy | Array Dot Product: Compute the dot product of two NumPy arrays using the dot() function. | CO 3 |
| 3.17 | 3 | NumPy | Array Matrix Operations: Perform matrix operations like matrix multiplication, matrix inverse using functions from the np.linalg module. | CO 3 |
| 3.18 | 3 | NumPy | Array File I/O: Save and load NumPy arrays from files using functions like np.save() and np.load(). | CO 3 |
| 3.19 | 3 | NumPy | Array Masking: Create a mask array to select or manipulate specific elements of a NumPy array based on a condition. | CO 3 |
| 3.20 | 3 | NumPy | Array Broadcasting: Understand and utilize broadcasting rules in NumPy for efficient computations. | CO 3 |
| 3.21 | 3 | Scipy | Write a program to finds the cube root of values using scipy library. | CO 3 |
| 3.22 | 3 | Scipy | Write a program to computes the 10^{**x} element-wise using scipy library. | CO 3 |

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| 3.23 | 3 | Scipy | Write a SciPy program to calculate Permutations and Combinations. | CO 3 |
| 3.24 | 3 | Scipy | Write a SciPy program to calculates the inverse of any square matrix. | CO 3 |
| 3.25 | 3 | Scipy | Write a SciPy program to calculates the Eigenvalues and Eigenvector. | CO 3 |
| 3.26 | 3 | Panda | Read and Load a CSV File into a Pandas DataFrame using pandas.read_csv. | CO 3 |
| 3.27 | 3 | Panda | Access and Display the First N Rows of a DataFrame using DataFrame.head(N). | CO 3 |
| 3.28 | 3 | Panda | Access and Display the Last N Rows of a DataFrame using DataFrame.tail(N). | CO 3 |
| 3.29 | 3 | Panda | Retrieve Basic Information about a DataFrame using DataFrame.info. | CO 3 |
| 3.30 | 3 | Panda | Perform Descriptive Statistics on a DataFrame using DataFrame.describe. | CO 3 |
| 3.31 | 3 | Panda | Filter Rows of a DataFrame based on a Condition using Boolean Indexing. | CO 3 |
| 3.32 | 3 | Panda | Rename Columns in a DataFrame using DataFrame.rename. | CO 3 |
| 3.33 | 3 | Panda | Group Data in a DataFrame using DataFrame.groupby. | CO 3 |
| 3.34 | 3 | Panda | Perform Aggregation on Grouped Data using GroupBy.agg. | CO 3 |
| 3.35 | 3 | Panda | Sort a DataFrame by One or Multiple Columns using DataFrame.sort_values. | CO 3 |

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| 3.36 | 3 | Panda | Perform Basic Arithmetic Operations on Columns of a DataFrame. | CO 3 |
| 3.37 | 3 | Panda | Apply a Function to Each Element or Column of a DataFrame using DataFrame.apply or DataFrame.applymap. | CO 3 |
| 3.38 | 3 | Panda | Reshape Data using Pivot Tables using DataFrame.pivot_table. | CO 3 |
| 3.39 | 3 | Panda | Perform Data Visualization using pandas.plotting or matplotlib.pyplot. | CO 3 |
| 3.40 | 3 | Panda | Save a DataFrame to a CSV File using DataFrame.to_csv. | CO 3 |
| 3.41 | 3 | Panda | Perform Data Sampling or Random Selection using DataFrame.sample. | CO 3 |
| 3.42 | 3 | SciPy | Find the roots of a mathematical equation using SciPy's root-finding functions, such as scipy.optimize.root. | CO 3 |
| 3.43 | 3 | SciPy | Fit a polynomial function to a set of data points using SciPy's curve fitting functions, such as scipy.optimize.curve_fit | CO 3 |
| 3.44 | 3 | SciPy | Perform linear regression on a dataset using SciPy's linear regression functions, such as scipy.stats.linregress. | CO 3 |
| 3.45 | 3 | SciPy | Calculate the Fast Fourier Transform (FFT) of a signal using SciPy's FFT functions, such as scipy.fft.fft. | CO 3 |

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| 3.46 | 3 | SciPy | Solve a system of linear equations using SciPy's linear algebra functions, such as <code>scipy.linalg.solve</code> . | CO 3 |
| 3.47 | 3 | SciPy | Perform numerical integration using SciPy's integration functions such as <code>scipy.integrate.quad</code> . | CO 3 |
| 3.48 | 3 | SciPy | Calculate the eigenvalues and eigenvectors of a square matrix using SciPy's linear algebra functions, such as <code>scipy.linalg.eig</code> . | CO 3 |
| 4.1 | 4 | matplotlib | Create a Simple Line Plot using <code>matplotlib.pyplot.plot</code> . | CO 4 |
| 4.2 | 4 | matplotlib | Create a Scatter Plot using <code>matplotlib.pyplot.scatter</code> . | CO 4 |
| 4.3 | 4 | matplotlib | Create a Bar Chart using <code>matplotlib.pyplot.bar</code> . | CO 4 |
| 4.4 | 4 | matplotlib | Create a Histogram using <code>matplotlib.pyplot.hist</code> . | CO 4 |
| 4.5 | 4 | matplotlib | Create a Pie Chart using <code>matplotlib.pyplot.pie</code> . | CO 4 |
| 4.6 | 4 | matplotlib | Create a Box Plot using <code>matplotlib.pyplot.boxplot</code> . | CO 4 |
| 4.7 | 4 | matplotlib | Create a Heatmap using <code>matplotlib.pyplot.imshow</code> . | CO 4 |
| 4.8 | 4 | matplotlib | Customize Plot Labels and Titles using <code>matplotlib.pyplot.xlabel</code> , <code>matplotlib.pyplot.ylabel</code> , and <code>matplotlib.pyplot.title</code> . | CO 4 |

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| 4.9 | 4 | matplotlib | Customize Plot Colors, Line Styles, and Marker Styles using matplotlib.pyplot.plot parameters. | CO 4 |
| 4.10 | 4 | matplotlib | Add Gridlines to a Plot using matplotlib.pyplot.grid. | CO 4 |
| 4.11 | 4 | matplotlib | Add Legends to a Plot using matplotlib.pyplot.legend. | CO 4 |
| 4.12 | 4 | matplotlib | Create Subplots using matplotlib.pyplot.subplots. | CO 4 |
| 4.13 | 4 | matplotlib | Save a Plot as an Image File using matplotlib.pyplot.savefig. | CO 4 |
| 4.14 | 4 | matplotlib | Create 3D Plots using mpl_toolkits.mplot3d module. | CO 4 |
| 4.15 | 4 | matplotlib | Create Error Bars on a Plot using matplotlib.pyplot.errorbar. | CO 4 |
| 4.16 | 4 | matplotlib | Customize Axis Ticks and Tick Labels using matplotlib.pyplot.xticks and matplotlib.pyplot.yticks. | CO 4 |
| 4.17 | 4 | matplotlib | Create a Bar Plot with Stacked Bars using matplotlib.pyplot.bar and the bottom parameter. | CO 4 |
| 4.18 | 4 | seaborn | Create a Scatter Plot using seaborn.scatterplot. | CO 4 |
| 4.19 | 4 | seaborn | Create a Line Plot using seaborn.lineplot. | CO 4 |
| 4.20 | 4 | seaborn | Create a Bar Plot using seaborn.barplot. | CO 4 |

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| 4.21 | 4 | seaborn | Create a Histogram using <code>seaborn.histplot</code> . | CO 4 |
| 4.22 | 4 | seaborn | Create a Box Plot using <code>seaborn.boxplot</code> . | CO 4 |
| 4.23 | 4 | seaborn | Create a Violin Plot using <code>seaborn.violinplot</code> . | CO 4 |
| 4.24 | 4 | seaborn | Create a Heatmap using <code>seaborn.heatmap</code> . | CO 4 |
| 4.25 | 4 | seaborn | Create a Pair Plot using <code>seaborn.pairplot</code> . | CO 4 |
| 4.26 | 4 | seaborn | Create a Joint Distribution Plot using <code>seaborn.jointplot</code> . | CO 4 |
| 4.27 | 4 | seaborn | Create a KDE (Kernel Density Estimate) Plot using <code>seaborn.kdeplot</code> . | CO 4 |
| 4.28 | 4 | seaborn | Create a Categorical Scatter Plot using <code>seaborn.stripplot</code> . | CO 4 |
| 4.29 | 4 | seaborn | Create a Categorical Bar Plot using <code>seaborn.countplot</code> . | CO 4 |
| 4.30 | 4 | seaborn | Create a Facet Grid using <code>seaborn.FacetGrid</code> . | CO 4 |
| 4.31 | 4 | seaborn | Customize Plot Colors and Styles using <code>seaborn.set_palette</code> and <code>seaborn.set_style</code> . | CO 4 |
| 4.32 | 4 | seaborn | Add Error Bars to a Plot using <code>seaborn.barplot</code> or <code>seaborn.pointplot</code> with the <code>ci</code> parameter. | CO 4 |

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| 4.33 | 4 | seaborn | Create a Clustered Heatmap using seaborn.clustermap. | CO 4 |
| 4.34 | 4 | seaborn | Create a Regression Plot using seaborn.regplot. | CO 4 |
| 4.35 | 4 | seaborn | Create a Stacked Bar Plot using seaborn.barplot with the hue parameter. | CO 4 |
| 4.36 | 4 | Plotly | Write a program to draw a line chart using Plotly | CO 4 |
| 4.37 | 4 | Plotly | Write a program to draw a Bar chart using Plotly | CO 4 |
| 4.38 | 4 | Plotly | Write a program to draw a scatter plot using Plotly | CO 4 |
| 4.39 | 4 | Plotly | Write a program to draw a Bubble chart using Plotly | CO 4 |
| 4.40 | 4 | Plotly | Write a program to draw a Violin Plots using Plotly | CO 4 |
| 4.41 | 4 | Plotly | Write a program to draw a Gant chart using Plotly | CO 4 |
| 5.1 | 5 | Web scrapping | Write a Python program to find the title tags from a given html document. | CO 5 |
| 5.2 | 5 | Web scrapping | Write a Python program to retrieve all the paragraph tags from a given html document. | CO 5 |
| 5.3 | 5 | Web scrapping | Write a Python program to get the number of paragraph tags of a given html document. | CO 5 |

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| 5.4 | 5 | Web scrapping | Write a Python program to extract the text in the first paragraph tag of a given html document. | CO 5 |
| 5.5 | 5 | Web scrapping | Write a Python program to find the length of the text of the first <h2> tag of a given html document. | CO 5 |
| 5.6 | 5 | Web scrapping | Write a Python program to find the text of the first <a> tag of a given html text. | CO 5 |
| 5.7 | 5 | Web scrapping | Write a Python program to find the href of the first <a> tag of a given html document. | CO 5 |
| 5.8 | 5 | Web scrapping | Write a Python program to a list of all the h1, h2, h3 tags from the webpage python.org. | CO 5 |
| 5.9 | 5 | Web scrapping | Write a Python program to extract all the text from a given web page. | CO 5 |
| 5.10 | 5 | Web scrapping | Write a Python program to print the names of all HTML tags of a given web page going through the document tree. | CO 5 |
| 5.11 | 5 | Web scrapping | Write a Python program to retrieve children of the html tag from a given web page. | CO 5 |
| 5.12 | 5 | Web scrapping | Write a Python program to retrieve all descendants of the body tag from a given web page. | CO 5 |
| 5.13 | 5 | Web scrapping | Write a Python program to create a Beautiful Soup parse tree into a nicely formatted | CO 5 |

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| | | | Unicode string, with a separate line for each HTML/XML tag and string. | |
| 5.14 | 5 | Web scrapping | Write a Python program to find the first tag with a given attribute value in an html document. | CO 5 |
| 5.15 | 5 | Web scrapping | Write a Python program to find tag(s) beneath other tag(s) in a given html document. | CO 5 |
| 5.16 | 5 | Web scrapping | Write a Python program to find tag(s) directly beneath other tag(s) in a given html document. | CO 5 |
| 5.17 | 5 | Web scrapping | Write a Python program to find the siblings of tags in a given html document. | CO 5 |
| 5.18 | 5 | Web scrapping | Write a Python program to find tags by CSS class in a given html document. | CO 5 |
| 5.19 | 5 | Web scrapping | Write a Python program to change the tag's contents and replace with the given string. | CO 5 |
| 5.20 | 5 | Web scrapping | Write a Python program to add to a tag's contents in a given html document. | CO 5 |
| 5.21 | 5 | Web scrapping | Write a Python program to insert a new text within a url in a specified position. | CO 5 |
| 5.22 | 5 | Web scrapping | Write a Python program to insert tags or strings immediately before specified tags or strings. | CO 5 |

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| 5.23 | 5 | Web scrapping | Write a Python program to insert tags or strings immediately after specified tags or strings. | CO 5 |
| 5.24 | 5 | Web scrapping | Write a Python program to extract a tag or string from a given tree of html document. | CO 5 |
| 5.25 | 5 | Web scrapping | Write a Python program to remove a tag from a given tree of html document and destroy it and its contents. | CO 5 |

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| B. Tech. – Second Semester | |
| Branch – CS/ CSE/CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AI ML)/CSE(AI)/CYS/ ECE/ECE(VLSI)/ ME/M. Tech (Integrated)/ BT | |
| Subject Code-BMIASL0251 | L - T - P 0- 0 - 4 |
| Subject Name- Communication for Career Enhancement | No. of hours- 48 |

Course Objectives:

- To improve proficiency in the English language to at least the Intermediate level (B1/B2) of CEFR (Common European Framework of Reference).
- To impart business communication skills.
- To improve verbal communication skills for the workplace.
- To help acquire collaborative and critical evaluation skills.
- To train for career enhancement.

Course Outcome:

After the completion of the course, the students will be able to

CO1 – Improve proficiency in English to the next level of CEFR.

CO2 - Develop business communication skills.

CO3 - Demonstrate improved verbal communication skills for the workplace.

CO4 – Acquire collaboration and critical evaluation skills.

CO5 – Participate in the placement process with confidence.

Course Content

| Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/Lab | CO Mapping |
|------------------------------|--|---|---------------------------------|--|-------------------|
| Interactions Level 1: | <ul style="list-style-type: none"> • Greet and take leave of people. • Introducing oneself and others • Conversations in different situations • Telephone conversation | Includes audio-visual learning of situational interactions. | 4 | Incorporate video – audio. Role – play (record) | CO1 |

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| | <p>s</p> <p>Outcome: Students will know how to meet, greet, and strike a conversation.</p> | | | | |
| | <p>Networking and Icebreaker Activities</p> <p>Objective: To foster networking skills and create a comfortable environment through interactive icebreaker activities</p> <p>Outcome: Participants will engage in meaningful conversations, build connections, and create a positive networking atmosphere</p> | <p>Collaborative exercises and challenges to facilitate learning.</p> | 4 | Gamification | CO2 |
| | <p>Play Acting</p> <p>Objective: To develop communication skills by engaging in spontaneous conversations and role-playing in different situations</p> <p>Outcome: Participants will demonstrate effective communication, active listening, and</p> | <p>Includes performative use of communication skills through role playing.</p> | 6 | Stage performance (record) | CO4 |

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| | adaptability in various scenarios | | | | |
| Interactions Level 2: Introducing the vocabulary and sentence structures of polite conversations | Vocabulary Building Objective: To emphasize the importance of courteous words and tone while communicating. Outcome: Students will use better vocabulary and manners in conversations | Audio-visual aid for vocabulary building and understanding of sentence structure. | 4 | Through audio-video clips | CO1 |
| | Presentations (Individual/Group) on topics of choice Objective: To deliver a clear and engaging presentation. Outcome: Improved presentation skills and effective communication. | Podcast-based learning covering varied storytelling and informative narratives. | 4 | Group activity utilizing podcast type recording | CO5 |
| | Group Discussion Objective: To develop effective communication, listening, and critical thinking skills through engaging in group discussions Outcome: Participants will actively contribute to discussions, express their thoughts coherently, and | Group activity to foster skills of persuasion, and discussion. | 6 | Group activity | CO5 |

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| | consider different perspectives | | | | |
| | <p>Debates</p> <p>Objective: To improve persuasive speaking, critical thinking, and argumentation skills through engaging in formal debates</p> <p>Outcome: Participants will articulate their viewpoints, construct logical arguments, and engage in respectful debate</p> | Video-clip-based learning followed by practice. | 6 | Video clips of great debates to be shared first. | CO3 |
| | <p>Communication and Cinema</p> <p>Objective: To observe various aspects of speaking – pronunciation, tone, intonation, pitch and pauses in various movie clips</p> <p>Outcome: Participants will analyse to understand the articulation of various sounds and demonstrate full range of expression in communication.</p> | Includes movies and shows to be observed and discussed. | 4 | Display movie clip from montage of movies like My Fair Lady, English Vinglish. | CO1 |
| | <p>Impromptu Speaking</p> <p>Objective: To enhance spontaneous thinking, quick decision-making, and effective communication skills</p> | Situation-based speaking challenge | 4 | Trainer to share tips on how to think on one's feet. JAM sessions (to be recorded) | CO5 |

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| | <p>through impromptu speaking exercises</p> <p>Outcome: Participants will deliver coherent and engaging speeches on given topics within a limited time frame</p> | | | | |
| | <p>Mock Job Interviews</p> <p>Objectives: To improve interview skills, communication, and self-presentation in a simulated job interview setting</p> <p>Outcome: Participants will demonstrate confidence, effective communication, and interview techniques necessary for successful job interviews</p> | <p>Mock interview simulated sessions</p> | <p>6</p> | <p>Simulated exercise</p> | <p>CO5</p> |

Suggested Readings:

1. Rizvi, M. Ashraf. *Resumes and Interviews: The Art of Winning*. Tata McGraw Hill. New Delhi. 2008
2. Lesikar and Flatley. *Basic Business Communication: Skills for Empowering the Internet Generation*. 10th Edition. Tata McGraw-Hill.2005.
3. McGrath, E. H. and S. J. *Basic Managerial Skills for All*. Ninth Edition. PHI Learning Pvt. Ltd. New Delhi. 2012.
4. Thill, J. V. & Bovee, G. L. (1993). *Excellence in Business Communication*. McGraw Hill, New York.
5. Bowman, J.P. & Branchaw, P.P. (1987). *Business Communications: From Process to Product*. Dryden Press, Chicago.

Free Apps to Practice English:

11. Memrise - <https://www.memrise.com>
12. Open Language - <https://open-language.en.uptodown.com>
13. Duolingo - <https://englishtest.duolingo.com/applicants>
14. Rosetta Stone - <https://www.rosettastone.com/product/mobile-apps/>
15. FluentU - <https://www.rosettastone.com/product/mobile-apps/>

| Subject Code-BMIEC0251 | | | L | T | P |
|---|-------------|--|-------------------------------|-------------------|----------|
| | | | 0 | 0 | 2 |
| Subject Name- Basic Electrical & Electronics Engineering Lab | | | No. of Hours: 32 | | |
| Course Objective- | | | | | |
| <ol style="list-style-type: none"> 1. The student will learn laws and theorems used for analysis of electrical circuits along with steady state behavior of single phase, transformer and different types of safety devices. 2. The student will learn about semiconductors diodes applications, Op-Amp circuits. | | | | | |
| Course Outcome- | | | | | |
| CO1- Apply the principle of KVL/KCL and theorem to analysis DC Electric circuits. | | | | | |
| CO2- Demonstrate the behavior of AC circuits connected to single-phase AC supply and measure power in single phase as well as three phase electrical circuits. | | | | | |
| CO3- Calculate efficiency of a single-phase transformer and energy consumption. | | | | | |
| CO4- Understand the concept and applications of diode, Op-Amp, sensors and IoT. | | | | | |
| Total No. of Practicals | | | | | |
| List of Practicals | | | | | |
| Lab No. | Unit | Topic | Program Logic Building | CO Mapping | |
| | I | <ol style="list-style-type: none"> 1. To Verify Kirchhoff's laws of a circuit 2. To Verify Superposition Theorem of a circuit. 3. To Verify Thevenin's Theorem of a circuit. 4. To Verify Norton's Theorem of a circuit. | | CO1 | |

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| | | 5. To Verify Maximum Power Transfer Theorem of a circuit. | | |
| | II | 6. Measurement of power and power factor in a single-phase ac series inductive circuit and improvement of power factor using capacitor. 7. Study of phenomenon of resonance in RLC series circuit and obtain resonant Frequency. 8. Study and Calibration of single-phase energy meter. | | CO2 |
| | III | 9. To study wiring of distribution board including power plug using MCB, ELCB. 10. Visit your college substation and familiarize the supply system, Transformer, HT Panel, solar panel and Distribution etc. Perform Energy audit of labs and rooms of different blocks. | | CO3 |
| | IV | 11. Study of Cathode Ray Oscilloscope and perform: a) Calibration of CRO b) Component testing using CRO c) Draw the VI- characteristics of Diode. 12. To design half wave and full wave rectifier circuits using diode. 13. To generate random numbers using 7-Segment display using decoder IC | | CO4 |
| | V | 14. Design Op-Amp circuit for the following operations. a) inverting, b) non-inverting, c) adder, d) differentiator e) integrator circuit 15. To study wheat stone bridge by using load cell sensor. 16. To understand the concept of Wireless Home Automation System based on IoT for controlling lights and fans. | | CO4 |

B. Tech.-Second Semester

**Branch- CS/ CSE/CSE (R)/ IT/CSE(DS)/CSE(IOT)/CSE(AI ML)/CSE(AI)/CYS/ ECE/ECE(VLSI)/ ME/M.
Tech (Integrated)/ BT**

| Subject Code-BMICSE0251 | | | | L - T - P 0 - 0 - 6 | | |
|--|---|--|--|--------------------------------------|---|-------------------|
| Subject Name-C Programming | | | | No. of hours-60 | | |
| Course Objective- The objective of a C programming course is to provide students with a solid foundation in the C programming language. The course aims to familiarize students with the syntax, concepts, and principles of C programming, as well as develop their ability to write efficient and effective C code. They will be able to develop complex real-world applications. | | | | | | |
| Course outcomes: | | | | | | |
| CO 1: Implement and trace the execution of conditional and iteration programs. | | | | K1 | | |
| CO 2: Implement and trace the execution of conditional and iteration programs. | | | | K3 | | |
| CO 3: Acquire the knowledge of memory allocation and binding, array, structure to solve complex problems | | | | K3 | | |
| CO 4: Compare and contrast between Structure and union along with their applications | | | | K3 | | |
| CO5: Develop Complex real-world applications | | | | K4 | | |
| Course Content | | | | | | |
| Unit | Module | Topics Covered | Pedagogy | Lecture Required (T=L+P) | Aligned Practical/Assignment/Lab | CO Mapping |
| 1 | Introduction to Algorithm and C Program | Programming using C: Concepts of Algorithm and Flowchart, Translator | T3, R1, Chalk & Duster/PPT/Online Programs | 2+2 | Basic Program in C | CO1 |

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| | | and its types, Applications of C programming , Structure of C program, Overview of compilation and execution process in an IDE, transition from algorithm to program, Syntax, logical errors and Run time errors, object and executable code, | | | | |
| | Tokens & Operators | Keywords, identifiers, constant, data types. Operators and their types, Arithmetic expressions and precedence: Operators, operator precedence and | T3, R1, Chalk & Duster/PPT/Online Programs | 3+3 | Basic Program in C | CO1 |

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| | | associativity, type conversion, mixed operands | | | | |
| | Conditional Branching | if, else-if, nested if - else, switch statements, use of break, and default with switch | T3, R1, Chalk & Duster/PPT/Onli ne Programs | 1+2 | Programs using Conditional Statement | CO1 |
| | Iteration and loops: | Concept of loops, for, while and do- while, multiple loop variables, use of break and continue statements, nested loop. | T3, R1, Chalk & Duster/PPT/Onli ne Programs | 1+2 | Programs using Looping Statement | CO1 |
| II | Functions: | Concept of Sub- programming , function, types of functions, passing parameters to functions: call by value Definition, | T3, R1, Chalk & Duster/PPT/Onli ne Programs | 3+3 | Function Programs | CO2 |
| | Recursion | Definition, Types of recursive | T3, R1, Chalk & Duster/PPT/Onli ne Programs | 1+2 | Recursion Programs | CO2 |

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| | | functions, Tower of Hanoi problem, | | | | |
| | Storage: | scope of variable, local and global variables, Nesting of Scope, Storage classes: Auto, Register, Static and Extern | T3, R1, Chalk & Duster/PPT/Onli ne Programs | 1+1 | Programs showing use of Storage | CO2 |
| | Pointers: | defining and declaring pointer, pointer arithmetic and scaling, Pointer Aliasing. call by reference | R1, R3, R4 Chalk & Duster/PPT/ Labs | 2+2 | Programs illustrating use of Pointers Arithmetic/Addressing/ Call by Reference | CO2 |
| III | Arraya: | Array notation and representatio n (one and two dimensional), array using pointers, manipulating array elements,2-D array s used | R1, R3, R4 Chalk & Duster/PPT/ Labs | 2+2 | Programs illustrating use of Pointers Arithmetic/Addressing/ Call by Reference | CO3 |

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| | | in matrix computation. | | | | |
| | Strings: | Introduction, initializing strings, accessing string elements, Array of strings, Passing strings to functions, String functions like Strcat, strcmp, strcpy and any other functions | R1, R3, R4 Chalk & Duster/PPT/ Labs | 2+3 | Use of Arrays both Single and Multi-Dimensional. | CO3 |
| IV | Structure: | Introduction, Initializing, defining and declaring structure, accessing members, Operations on individual members, Operations on structures, Structure within structure, Array of structure | T1, T2, R1, R2 Chalk & Duster/PPT/ Labs | 2+2 | Program Based on structure implementation | CO4 |

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| | Union: | Introduction , Initializing, defining and declaring structure, Accessing members, Operations on individual members, Operations on Union, Difference between Structure and Union | T1, T2, R1, R2 Chalk & Duster/PPT/ Labs | 1+1 | | CO4 |
| | Dynamic Memory Allocation | Introduction, Library functions– malloc, calloc, realloc and free. | T1, T2, R1, R2 Chalk & Duster/PPT/ Labs | 1+1 | Programs allocating memory during run time and manipulations | CO4 |
| V | File Handling | Basics, File Types, File operations, File pointer, File opening modes, File handling functions, Command Line Arguments, File handling through command line argument, Record I/O in files | T1, T2, R1, R2 Chalk & Duster/PPT/ Labs | 2+4 | Implementation of Data Files and Command Line Arguments | CO5 |

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| | Introduction to Embedded Programming | Introduction to Embedded System, Factors for Selecting the Embedded Programming Language, Difference Between C and Embedded C, Keyword, Datatypes, Components of Embedded Program, Program Structure, Basic concepts of Embedded Programming , Defining Macros, Types & File Inclusion, Pre-processor directives implementation | T1, T2, R1, R2 Chalk & Duster/PPT/ Labs | 2+4 | Example on Embedded Programs | CO5 |
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References-

Textbooks:

(T1) Herbert Schildt, "C: The Complete Reference", Osbourne McGrawHill, 4th Edition, 2002.

(T2) Computer Concepts and Programming in C, E Balaguruswami, McGrawHill

(T3) Let Us C by Yashwant P.Kanetkar. BPB publication

(T4) K.R Venugopal, "Mastering C", TMH

(T5) Yashwant P. Kanetkar, "Working with C", BPB publication

Reference Books:

(R1) The C programming by Kernighan Brain W.and Ritchie Dennis M.,Pearson Education.

(R2) Computer Science-A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition, Cengage Learning-2007.

(R3) Computer Basics and C Programming by V.Rajaraman, PHI Learning pvt. Limited,2015.

(R4) Schrum's Outline of Programming with C by Byron Gottfried, McGraw-Hill

(R5) Computer Fundamentals and Programming in C.Reema Thareja, Oxford Publication

Links:

E-Book Links:

(E1)https://en.wikibooks.org/wiki/C_Programming

(E2)https://en.wikibooks.org/wiki/A_Little_C_Primer

(E3) <https://www.goodreads.com/book/show/6968572-ansi-c-programming>

LAB:

| List of Practical | | | | |
|-------------------|------|-------|------------------------|------------|
| Lab No. | Unit | Topic | Program Logic Building | CO Mapping |

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|------|---|---|---|-----|
| 1.1 | 1 | Pattern Printing | Half pyramid of * | CO1 |
| 1.2 | 1 | Pattern Printing | Half pyramid of numbers | CO1 |
| 1.3 | 1 | Pattern Printing | Half pyramid of alphabets | CO1 |
| 1.4 | 1 | Pattern Printing | Inverted half pyramid of * | CO1 |
| 1.5 | 1 | Pattern Printing | Inverted half pyramid of numbers | CO1 |
| 1.6 | 1 | Pattern Printing | Full pyramid of * | CO1 |
| 1.7 | 1 | Pattern Printing | Full pyramid of numbers | CO1 |
| 1.8 | 1 | Pattern Printing | Inverted full pyramid of * | CO1 |
| 1.9 | 1 | Pattern Printing | Pascal's triangle | CO1 |
| 1.10 | 1 | Pattern Printing | Floyd's triangle | CO1 |
| 1.11 | 1 | Pattern Printing | Half pyramid of * | CO1 |
| 1.12 | 1 | Pattern Printing | Half pyramid of numbers | CO1 |
| 1.13 | 1 | Pattern Printing | Half pyramid of alphabets | CO1 |
| 1.14 | 1 | Pattern Printing | <u>C Program to Print Diamond Pattern</u> | CO1 |
| 1.15 | 1 | Pattern Printing | <u>C Program to Print Floyd's Triangle</u> | CO1 |
| 1.16 | 1 | Pattern Printing | <u>C Program to Print Pascal Triangle</u> | CO1 |
| 1.17 | 1 | Pattern Printing | <u>Star Pattern Programs in C</u> | CO1 |
| 1.18 | 1 | Pattern Printing | <u>Pyramid Patterns in C</u> | CO1 |
| 1.19 | 1 | Decision Making and Iterative programming using screen design | <p><u>Write a C program for a matchstick game being played between the computer and a user. Your program should ensure that the computer always wins. Rules for the game are as follows:</u></p> <ul style="list-style-type: none"> <u>– There are 21 matchsticks.</u> <u>– The computer asks the player to pick 1, 2, 3 or 4 matchsticks.</u> <u>– After the person picks, the computer does its picking.</u> | CO1 |

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| | | | <u>– Whoever is forced to pick up the last matchstick loses the game.</u> | |
| 1.20 | 1 | Decision Making and Iterative programming using screen design | <u>Write a program that plays tic-tac-toe. The tic-tac-toe game is played on a 3x3 grid the game is played by two players, who take turns. The first player marks move with a circle, the second with a cross. The player who has formed a horizontal, vertical, or diagonal sequence of three marks wins. Your program should draw the game board, ask the user for the coordinates of the next mark, change the players after every successful move, and pronounce the winner.</u> | CO1 |
| 1.21 | 1 | Decision Making and Iterative programming | <u>Design a Calculator which performs Number system conversion</u> | CO1 |
| 1.22 | 1 | Decision Making and Iterative programming | <u>C Program to Simulate a Simple arithmetic Calculator</u> | CO1 |
| 1.23 | 1 | Decision Making and Iterative programming | <u>C Program to Evaluate the Given Polynomial Equation</u> | CO1 |
| 1.24 | 1 | Decision Making and Iterative programming | <u>C Program to Find Mean, Variance and Standard Deviation</u> | CO1 |
| 1.25 | 1 | Decision Making and Iterative programming | <u>C Program to Add Two Complex Numbers</u> | CO1 |
| 1.26 | 1 | Decision Making and Iterative programming | <u>C Program to Find Power of a Number</u> | CO1 |
| 1.27 | 1 | Decision Making and Iterative programming | <u>C Program to Calculate Pow (x,n)</u> | CO1 |

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| 1.28 | 1 | Decision Making and Iterative programming | <u>C program to Find the Sum of Arithmetic Progression Series</u> | CO1 |
| 1.29 | 1 | Decision Making and Iterative programming | <u>C program to Find the Sum of Geometric Progression Series</u> | CO1 |
| 1.30 | 1 | Decision Making and Iterative programming | <u>C program to Find the Sum of Harmonic Progression Series</u> | CO1 |
| 1.31 | 1 | Decision Making and Iterative programming | <u>C Program to Find Sum of Series $1 + 1/2 + 1/3 + 1/4 + \dots + 1/N$</u> | CO1 |
| 1.32 | 1 | Decision Making and Iterative programming | <u>C Program to Find Sum of Series $1^2 + 2^2 + \dots + n^2$</u> | CO1 |
| 1.33 | 1 | Decision Making and Iterative programming | <u>C Program to Find Sum of Series $1^3 + 2^3 + 3^3 + \dots + n^3$</u> | CO1 |
| 1.34 | 1 | Decision Making and Iterative programming | <u>C Program to Find Sum of the Series $1/1! + 2/2! + 3/3! + \dots + 1/N!$</u> | CO1 |
| 1.35 | 1 | Decision Making and Iterative programming | <p><u>Accept five subject marks of the student. Calculate his percentage. If his percentage is below 35 mark him "fail". If between 35to 45 "Third Div", 45-60 Second and above 60 then first.</u></p> <p><u>Do this process till the user wishes. No field should be left blank.</u></p> | CO1 |

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| 1.36 | 1 | | <p>Design a program which displays following options on screen</p> <ol style="list-style-type: none">1. Figure2. Exit3. Enter Choice <p>Once valid choice is entered it executes further.</p> <p>If choice one is entered, then it should display</p> <ol style="list-style-type: none">1. TRAIANGLE2. SQUARE3. RHOMBUS4. TRAPEZIUM5. RETURN TO PREVIOUS MENU <p>ENTER CHOICE</p> <p>Once valid choice is entered it executes further.</p> <p>After that it ask for specific data and prints the area and volume and perimeter/circumference of the respective figure.</p> <p>After that a choice is to be asked for</p> <p>Do you wish to continue (Y/N)? And should work accordingly.</p> | CO1 |
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| | | | Before Every Menu the screen should be cleared, | |
| 1.37 | 1 | Decision Making and Iterative programming | <u>C Program to Find the Largest Number Among Three Numbers</u> | CO1 |
| 1.38 | 1 | Decision Making and Iterative programming | <u>C Program to Find the Roots of a Quadratic Equation</u> | CO1 |
| 1.39 | 1 | Decision Making and Iterative programming | <u>C Program to Check Leap Year. Evaluate all the cases.</u> | CO1 |
| 1.40 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Number is Positive or Negative</u> | CO1 |
| 1.41 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Character is an Alphabet or not</u> | CO1 |
| 1.42 | 1 | Decision Making and Iterative programming | <u>C Program to Calculate the Sum of Natural Numbers</u> | CO1 |
| 1.43 | 1 | Decision Making and Iterative programming | <u>C Program to Find Factorial of a Number</u> | CO1 |

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| 1.44 | 1 | Decision Making and Iterative programming | <u>C Program to Generate Multiplication Table</u> | CO1 |
| 1.45 | 1 | Decision Making and Iterative programming | <u>C Program to Display Fibonacci Sequence</u> | CO1 |
| 1.46 | 1 | Decision Making and Iterative programming | <u>C Program to Find GCD of two Numbers</u> | CO1 |
| 1.47 | 1 | Decision Making and Iterative programming | <u>C Program to Find LCM of two Numbers</u> | CO1 |
| 1.48 | 1 | Decision Making and Iterative programming | <u>C Program to Display Characters from A to Z Using Loop</u> | CO1 |
| 1.49 | 1 | Decision Making and Iterative programming | <u>C Program to Reverse a Number using looping concepts</u> | CO1 |
| 1.50 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Number is Palindrome or Not</u> | CO1 |
| 1.51 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Number is Prime or Not</u> | CO1 |
| 1.52 | 1 | Decision Making and Iterative programming | <u>C Program to Check Armstrong Number</u> | CO1 |
| 1.53 | 1 | Decision Making and Iterative programming | <u>C Program to Display Armstrong Number Between Two Intervals</u> | CO1 |
| 1.54 | 1 | Decision Making and Iterative programming | <u>C Program to Display Factors of a Number</u> | CO1 |

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|------|---|---|---|-----|
| 1.55 | 1 | Decision Making and Iterative programming | <u>C Program to Make a Simple Calculator Using switch...case</u> | CO1 |
| 1.56 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Number is Even or Odd</u> | CO1 |
| 1.57 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Character is a Vowel or Consonant</u> | CO1 |
| 1.58 | 1 | Decision Making and Iterative programming | <u>C Program to Find the Largest Number Among Three Numbers</u> | CO1 |
| 1.59 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Number is Positive or Negative</u> | CO1 |
| 1.60 | 1 | Decision Making and Iterative programming | <u>C Program to Calculate the Sum of Natural Numbers</u> | CO1 |
| 1.61 | 1 | Decision Making and Iterative programming | <u>C Program to Find Factorial of a Number</u> | CO1 |
| 1.62 | 1 | Decision Making and Iterative programming | <u>C Program to Generate Multiplication Table</u> | CO1 |
| 1.63 | 1 | Decision Making and Iterative programming | <u>C Program to Display Fibonacci Sequence</u> | CO1 |
| 1.64 | 1 | Decision Making and Iterative programming | <u>C Program to Display Prime Numbers Between Intervals Using Function</u> | CO1 |
| 1.65 | 1 | Decision Making and Iterative programming | <u>C Program to Check Prime or Armstrong Number Using User-defined Function</u> | CO1 |

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| 1.66 | 1 | Decision Making and Iterative programming | <u>C Program to Check Whether a Number can be Expressed as Sum of Two Prime Numbers</u> | CO1 |
| 1.67 | 1 | Decision Making and Iterative programming | <u>C Program to Find the Sum of Natural Numbers using Recursion</u> | CO1 |
| 2.1 | 2 | Recursion | <u>C Program to Find Factorial of a Number Using Recursion</u> | CO2 |
| 2.2 | 2 | Recursion | <u>C Program to Find G.C.D Using Recursion</u> | CO2 |
| 2.3 | 2 | Function | <u>C Program to Convert Binary Number to Decimal and vice-versa</u> | CO2 |
| 2.4 | 2 | Recursion | <u>C program to calculate the power using recursion</u> | CO2 |
| 2.5 | 2 | Function | <u>C Program to Check Prime or Armstrong Number Using User-defined Function</u> | CO2 |
| 2.6 | 2 | Recursion | <u>C Program to Find the Sum of Natural Numbers using Recursion</u> | CO2 |
| 2.7 | 2 | Case Study | Design a calculator | CO2 |
| 2.8 | 2 | Case Study | <p>Design a Menu Driven program which performs the functions as per the menu</p> <ol style="list-style-type: none"> 1. Add Details of students 2. Search the student data 3. Display the records 4. Exit <p>Enter the Choice:</p> <p>Note: Choice must be between 1-4 Only. Other than that, an error message</p> <p>must be displayed and entry should be done again</p> | |

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| | | | <p>Name must not be blank, and first letter should be alphabet</p> <p>Student details should contain</p> <p>Name. Age, Class, Roll-No</p> | |
| 2.9 | 2 | Recursion | C Program to add two number using recursion. | CO2 |
| 2.10 | 2 | Recursion | C Program to find sum of digit of number using recursion. | CO2 |
| 2.11 | 2 | Recursion | Write a method in C which will remove any given character from a String. | CO2 |
| 3.1 | 3 | Array | <u>C Program to Calculate Average Using Arrays</u> | CO3 |
| 3.2 | 3 | Array | <u>C Program to Find Largest Element in an Array</u> | CO3 |
| 3.3 | 3 | Array | C Program to search an element | CO3 |
| 3.4 | 3 | Array | <u>C Program to Add Two Matrices Using Multi-dimensional Arrays</u> | CO3 |
| 3.5 | 3 | Array | <u>C Program to Multiply Two Matrices Using Multi-dimensional Arrays</u> | CO3 |
| 3.6 | 3 | Array | <u>C Program to Find Transpose of a Matrix</u> | CO3 |
| 3.7 | 3 | Array | <u>C program to illustrate Point Arithmetic</u> | CO3 |
| 3.8 | 3 | Array | <u>C Program to Access Array Elements Using Pointer</u> | CO3 |
| 3.9 | 3 | Array | <u>C Program to Find Largest Number Using Dynamic Memory Allocation</u> | CO3 |
| 3.10 | 3 | Array | <u>C Program to Calculate Average Using Arrays</u> | CO3 |
| 3.11 | 3 | Array | <u>C Program to Find Largest Element in an Array</u> | CO3 |
| 3.12 | 3 | Array | <u>C Program to Calculate Standard Deviation</u> | CO3 |
| 3.13 | 3 | String Handling | <u>C Program to Find the Frequency of Characters in a String</u> | CO3 |
| 3.14 | 3 | String Handling | <u>C Program to Count the Number of Vowels, Consonants and so on</u> | CO3 |

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| 3.15 | 3 | String Handling | <u>C Program to Remove all Characters in a String Except Alphabets</u> | CO3 |
| 3.16 | 3 | String Handling | <u>C Program to Find the Length of a String</u> | CO3 |
| 3.17 | 3 | String Handling | <u>C Program to Concatenate Two Strings</u> | CO3 |
| 3.18 | 3 | String Handling | <u>C Program to Copy String Without Using strcpy()</u> | CO3 |
| 3.19 | 3 | String Handling | <u>C Program to Sort Elements in Lexicographical Order (Dictionary Order)</u> | CO3 |
| 3.20 | 3 | String Handling | <u>C Program to Find the Frequency of Characters in a String</u> | CO3 |
| 3.21 | 3 | String Handling | Write a method in C which will remove any given character from a String. | CO3 |
| 3.22 | 3 | String Handling | Write a program in C to count occurrence of a given character in a String. | CO3 |
| 3.23 | 3 | String Handling | Write a program in C to check if two Strings are Anagram. | CO3 |
| 3.24 | 3 | String Handling | Write a program in C to check a String is palindrome or not. | CO3 |
| 3.25 | 3 | String Handling | C program to check given character is vowel or consonant. | CO3 |
| 3.26 | 3 | String Handling | C program to check given character is digit or not. | CO3 |
| 3.27 | 3 | String Handling | C program to replace the string space with a given character. | CO3 |
| 3.28 | 3 | String Handling | C program to convert lowercase char to uppercase of string. | CO3 |
| 3.29 | 3 | String Handling | C program to convert lowercase vowel to uppercase in string. | CO3 |
| 3.30 | 3 | String Handling | C program to delete vowels in a given string. | CO3 |
| 3.31 | 3 | String Handling | C program to count Occurrence Of Vowels & Consonants in a String. | CO3 |
| 3.32 | 3 | String Handling | C program to print the highest frequency character in a String. | CO3 |

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| 3.33 | 3 | String Handling | C program to Replace First Occurrence Of Vowel With '-' in String. | CO3 |
| 3.34 | 3 | String Handling | C program to count alphabets, digits and special characters. | CO3 |
| 3.35 | 3 | String Handling | C program to separate characters in a given string. | CO3 |
| 3.36 | 3 | String Handling | C program to remove blank space from string. | CO3 |
| 3.37 | 3 | String Handling | C program to count blank space from string. | CO3 |
| 3.38 | 3 | String Handling | C program to concatenate two strings. | CO3 |
| 3.39 | 3 | String Handling | C program to remove repeated character from string. | CO3 |
| 3.40 | 3 | String Handling | C program to calculate sum of integers in string. | CO3 |
| 3.41 | 3 | String Handling | C program to print all non-repeating character in string. | CO3 |
| 3.42 | 3 | String Handling | C program to copy one string to another string. | CO3 |
| 3.43 | 3 | String Handling | C Program to sort characters of string. | CO3 |
| 3.44 | 3 | String Handling | C Program to sort character of string in descending order. | CO3 |
| 3.45 | 3 | Arrays | Write a program in C for, In array 1-100 numbers are stored, one number is missing how do you find it. | CO3 |
| 3.46 | 3 | Arrays | Write a program in C for, In a array 1-100 multiple numbers are duplicates, how do you find it. | CO3 |
| 3.47 | 3 | Arrays | Write a program in C to find first duplicate number in a given array. | CO3 |
| 3.48 | 3 | Arrays | Write a program in C to remove duplicate elements form array in C. | CO3 |
| 3.49 | 3 | Arrays | Write a program in C for, Given two arrays 1,2,3,4,5 and 2,3,1,0,5 find which number is not present in the second array. | CO3 |
| 3.50 | 3 | Arrays | Write a program in C for, How to compare two array is equal in size or not. | CO3 |

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| 3.51 | 3 | Arrays | Write a program in C to find largest and smallest number in array. | CO3 |
| 3.52 | 3 | Arrays | Write a program in C to find second highest number in an integer array. | CO3 |
| 3.53 | 3 | Arrays | Write a program in C to find top two maximum number in array? | CO3 |
| 3.54 | 3 | Arrays | C program to print array in reverse Order. | CO3 |
| 3.55 | 3 | Arrays | C program to reverse an Array in two ways. | CO3 |
| 3.56 | 3 | Arrays | C Program to calculate length of an array. | CO3 |
| 3.57 | 3 | Arrays | C program to insert an element at end of an Array. | CO3 |
| 3.58 | 3 | Arrays | C program to insert element at a given location in Array. | CO3 |
| 3.59 | 3 | Arrays | C Program to delete element at end of Array. | CO3 |
| 3.60 | 3 | Arrays | C Program to delete given element from Array. | CO3 |
| 3.61 | 3 | Arrays | C Program to delete element from array at given index. | CO3 |
| 3.62 | 3 | Arrays | C Program to find sum of array elements. | CO3 |
| 3.63 | 3 | Arrays | C Program to print all even numbers in array. | CO3 |
| 3.64 | 3 | Arrays | C Program to print all odd numbers in array. | CO3 |
| 3.65 | 3 | Arrays | C program to perform left rotation of array elements by two positions. | CO3 |
| 3.66 | 3 | Arrays | C program to perform right rotation in array by 2 positions. | CO3 |
| 3.67 | 3 | Arrays | C Program to merge two arrays. | CO3 |
| 3.68 | 3 | Arrays | C Program to find highest frequency element in array. | CO3 |
| 4.1 | 4 | Structure | <u>C Program to Store Information of a Student Using Structure</u> | CO4 |

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| 4.2 | 4 | Structure | <u>C Program to Store Information of Students Using Structure</u> | CO4 |
| 4.3 | 4 | Structure | <u>C Program to Store Data in Structures Dynamically</u> | CO4 |
| 4.4 | 4 | Structure | <u>C Program to Store Information of a Student Using Structure</u> | CO4 |
| 4.5 | 4 | Structure | <u>C Program to Add Two Distances (in inch-feet system) using Structures</u> | CO4 |
| 4.6 | 4 | Mini Project | <p><u>Snake Game Mini Project in C is a basic console program with no graphics. You may play the famous "Snake Game" in this project exactly as you would anywhere else. To move the snake, use the up, down, right, and left arrows.</u></p> <p><u>Food is placed at various co-ordinates on the screen for the snake to consume. The snake's length and score will both rise by one element each time it consumes the food.</u></p> | CO4 |
| 5.1 | 5 | File Handling | <u>C Program to Write a Sentence to a File</u> | CO5 |
| 5.2 | 5 | File Handling | <u>C Program to Read the First Line From a File</u> | CO5 |
| 5.3 | 5 | File Handling | <u>C Program to showcase use of DMA</u> | CO5 |
| 5.4 | 5 | File Handling | <u>C Program to Write a record to a File</u> | CO5 |
| 5.5 | 5 | File Handling | <u>C Program to Read the last Line From a File</u> | CO5 |
| 5.6 | 5 | Command Line Argument | Program to create a file using command line argument | CO5 |
| 5.7 | 5 | File Handling | Program to copy one file into another | CO5 |
| 5.8 | 5 | Macros | Implement macro handling | CO5 |
| 5.9 | 5 | File Handling | Program to write a structure into a file and display its content | CO5 |
| 5.10 | 5 | File Handling | Program to search a record in a file | CO5 |
| 5.11 | 5 | Macro | Program to implement multi line macro and Conditional Macros | CO5 |

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| 5.12 | 5 | Graphics | Program to draw Circle/Rectangle/Triangle/ A Hut/with colors in it | CO5 |
| 5.13 | 5 | Hardware | Program to shut down/ sleep a system if not component is being touched | CO5 |
| 5.14 | 5 | File Handling | Write a program in C to create and store information in a text file. | CO5 |
| 5.15 | 5 | File Handling | Write a program in C to read an existing file.: | CO5 |
| 5.16 | 5 | File Handling | Write a program in C to write multiple lines to a text file.: | CO5 |
| 5.17 | 5 | File Handling | Write a program in C to read the file and store the lines in an array. | CO5 |
| 5.18 | 5 | File Handling | Write a program in C to find the number of lines in a text file. | CO5 |
| 5.19 | 5 | File Handling | Write a program in C to find the content of a file and the number of lines in a text file. | CO5 |
| 5.20 | 5 | File Handling | Write a program in C to count the number of words and characters in a file. | CO5 |
| 5.21 | 5 | File Handling | C Program to list all files and sub-directories in a directory | CO5 |
| 5.22 | 5 | File Handling | C Program to count number of lines in a file | CO5 |
| 5.23 | 5 | File Handling | C Program to print contents of file | CO5 |
| 5.24 | 5 | File Handling | C Program to copy contents of one file to another file | CO5 |
| 5.25 | 5 | File Handling | C Program to merge contents of two files into a third file | CO5 |
| 5.26 | 5 | File Handling | C Program to read records from a data file | CO5 |

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| 5.27 | 5 | File Handling | C Program to count number of lines, words, characters, blank space in a file | CO5 |
| 5.28 | 5 | File Handling | <u>C Program to Illustrate how User Authentication is Done</u> | CO5 |
| 5.29 | 5 | File Handling | <u>C Program to Shutdown Computer in Linux</u> | CO5 |
| 5.30 | 5 | File Handling | <u>C Program to Compute First N Fibonacci Numbers using Command Line Arguments</u> | CO5 |
| 5.31 | 5 | File Handling | <u>C Program to Generate Fibonacci Series using Command Line Argument</u> | CO5 |
| 5.32 | 5 | Case Study | Design an ATM Simulation using C | CO5 |
| 5.33 | 5 | Case Study | <p><u>manage the information of workers working in a firm or organization using this Employee Management System. The file handling technique is used here to save the data in a particular file, and you get the notion of this project as soon as you hear the name.</u></p> <p><u>This project uses the Insert, Edit, and Delete file actions, but the sole constraint is that you can only display the data, not search for any data item in particular. If you have more experience with C, you may alter this program by using the searching strategies.</u></p> <p><u>The following modules are included in this project.</u></p> <p><u>Add Employee Details</u></p> <ul style="list-style-type: none"> • <u>Edit Employee details</u> • <u>Modify Employee</u> • <u>Delete Employee</u> <p><u>Create a Database using C file structure</u></p> | |
| 5.34 | 5 | | A Library in charge is facing problems in handling books and customers. Design a solution using C regarding his problem | CO5 |
| 5.35 | 5 | | <ul style="list-style-type: none"> • <u>Design a Simple Result System in the C programming language. You can keep track of the pupils' grades and update them at any time. Students might be given marks based on their performance in each subject. The project is straightforward and straightforward to use. The</u> | CO5 |

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| | | | <p><u>system is written entirely in the C programming language.</u></p> <ul style="list-style-type: none">• <u>You will be greeted with a "Welcome Screen" when you build and execute the project. Following that, many choices will appear on your computer screen. Select the required project modification function from the drop-down menu. The admin is in charge of the majority of the system. He has the ability to add and remove teachers. He can also add students. Following the addition of instructors, the administrator may finally assign grades to the pupils. All of the data has been preserved.</u> | |
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