**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**

**Bachelor of Technology**

# Computer Science & Engineering

# First Year

**(Effective from the Session: 2026-27)**

**NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR**

**(AN AUTONOMOUS INSTITUTE)**

**Bachelor of Technology**

**Computer Science & Engineering**

**Evaluation Scheme**

**SEMESTER-I**

| Sl. No. | Subject Code | Subject Name | Types of Subjects | Periods | | | Evaluation Schemes | | | | End Semester | | Total | Credit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | CT | TA | TOTAL | PS | TE | PE | | |
| 1 | DAS0103 | Calculus and Linear Algebra | Mandatory | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | | 150 | 4 |
| 2 | DAS0102 | Semiconductor Physics & Devices | Mandatory | 3 | 0 | 0 | 30 | 20 | 50 | | 100 | | 150 | 3 |
| 3 | DCSAI0101 | Fundamentals of Artificial Intelligence | Mandatory | 2 | 0 | 0 | 30 | 20 | 50 | | 50 | | 100 | 2 |
| 4 | DASCC0101 | Design Thinking-I | Mandatory | 2 | 0 | 0 | 60 | 40 | 100 | | | | 100 | 2 |
| 5 | DAS0152 | Semiconductor Physics & Devices Lab | Mandatory | 0 | 0 | 2 | | | | 25 | | 25 | 50 | 1 |
| 6 | DCSE0151 | C Programming | Mandatory | 0 | 0 | 4 | | | | 50 | | 50 | 100 | 2 |
| 7 | DME0151 | CAD and Digital Manufacturing Lab | Mandatory | 0 | 0 | 2 | | | | 25 | | 25 | 50 | 1 |
| 8 | DCSE0152 | Web Designing | Mandatory | 0 | 0 | 2 | | | | 25 | | 25 | 50 | 1 |
| 9 | DASL0151 | Acquiring Business Communication (ABC) Lab | Mandatory | 0 | 0 | 4 | | | | 50 | | 50 | 100 | 2 |
| 10 | DNC0103/ DNC0102 | Essence of Indian Traditional Knowledge / Constitution of India, Law and Engineering | Compulsory Audit | 2 | 0 | 0 | 30 | 20 | 50 | | | | 50 | NA |
| | | *Massive Open Online Courses (For B.Tech. Hons. Degree) | *MOOCs | | | | | | | | | | | |
| | | **TOTAL** | | **12** | **1** | **14** | | | **250** | **175** | **250** | **175** | **850** | **18** |

| *List of MOOCs Based Recommended Courses for First Year (Semester-I) | | | | | |
|---|---|---|---|---|---|
| **S. No.** | **Subject Code** | **Course Name** | **University / Industry Partner Name** | **No of Hours** | **Credits** |
| 1 | DMC0012 | Programming In C | Infosys Wingspan (Infosys Springboard) | 17h 7m | 1 |
| 2 | DMC0005 | Next Gen Technologies | Infosys Wingspan (Infosys Springboard) | 10h 14m | 0.5 |
| 3 | DMC0013 | TechA Web Development using HTML and CSS Foundation Certification | Infosys Wingspan (Infosys Springboard) | 17h 46m | 1 |

**PLEASE NOTE: -**

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

**Compulsory Audit (CA) Courses (Non-Credit - DNC0103/DNC0102)**

- All Compulsory Audit Courses (a qualifying exam) do not require any credit.
- The total and obtained marks are not added in the grand total.

**Abbreviation Used:**

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam.,
CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,
MOOCs: Massive Open Online Courses.

**NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR**

**(AN AUTONOMOUS INSTITUTE)**

**Bachelor of Technology**

**Computer Science & Engineering**

**Evaluation Scheme**

**SEMESTER-II**

| Sl. No. | Subject code | Subject Name | Types of Subjects | Periods | | | Evaluation Schemes | | | | End Semester | | Total | Credit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | CT | TA | TOTAL | PS | TE | PE | | |
| 1 | DAS0203A | Differential Equations and Linear Transformations | Mandatory | 3 | 1 | 0 | 30 | 20 | 50 | | 100 | | 150 | 4 |
| 2 | DEC0201 | Digital Electronics and IoT Systems | Mandatory | 3 | 0 | 0 | 30 | 20 | 50 | | 100 | | 150 | 3 |
| 3 | DCSE0201 | Data Structures and Algorithm-I | Mandatory | 3 | 0 | 0 | 30 | 20 | 50 | | 100 | | 150 | 3 |
| 4 | DCSE0202 | Intelligent Interaction Systems | Mandatory | 2 | 0 | 0 | 30 | 20 | 50 | | 50 | | 100 | 2 |
| 5 | | Foreign Language | Core Elective | 2 | 0 | 0 | 60 | 40 | 100 | | | | 100 | 2 |
| 6 | DEC0251 | Digital Electronics and IoT Systems Lab | Mandatory | 0 | 0 | 2 | | | | 25 | | 25 | 50 | 1 |
| 7 | DCSE0251 | Data Structures and Algorithm-I Lab | Mandatory | 0 | 0 | 4 | | | | 50 | | 50 | 100 | 2 |
| 8 | DCSE0252 | Problem Solving using Python | Mandatory | 0 | 0 | 6 | | | | 50 | | 100 | 150 | 3 |
| | DASL0251 | Communication for Career Enhancement | Mandatory | 0 | 0 | 4 | | | | 50 | | 50 | 100 | 2 |
| 10 | DMB0201 | Innovation and Entrepreneurship | Mandatory | 2 | 0 | 0 | 60 | 40 | 100 | | | | 100 | 2 |
| 11 | DNC0202/ DNC0203 | Constitution of India, Law and Engineering/ Essence of Indian Traditional Knowledge | Compulsory Audit | 2 | 0 | 0 | 30 | 20 | 50 | | | | 50 | NA |
| | | *Massive Open Online Courses (For B.Tech. Hons. Degree) | *MOOCs | | | | | | | | | | | |
| | | **TOTAL** | | **17** | **1** | **16** | | | **400** | **175** | **350** | **225** | **1150** | **24** |

# Foreign Language:

| S. No. | Subject Code | Course Name | Types of Subjects |
|---|---|---|---|
| 1. | DASL0202 | French | Core Elective |
| 2. | DASL0203 | German | Core Elective |
| 3. | DASL0204 | Japanese | Core Elective |

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

| S. No. | Subject Code | Course Name | University / Industry Partner Name | No of Hours | Credits |
|---|---|---|---|---|---|
| 1 | DMC0014 | Data Structures and Algorithms using Python - Part 1 | Infosys Wingspan (Infosys Springboard) | 29h 27m | 2 |
| 2 | DMC0001 | Digital Edge 101 | NASSCOM | 30 h | 2 |
| 3 | DMC0002 | Programming Fundamentals using Python | Infosys Wingspan (Infosys Springboard) | 66h 10m | 4 |

**PLEASE NOTE: -**

- **Compulsory Audit (CA) Courses (Non-Credit - DNC0202/DNC0203)**
  - All Compulsory Audit Courses (a qualifying exam) do not require any credit.
  - The total and obtained marks are not added in the grand total.

Abbreviation Used:

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

CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,

MOOCs: Massive Open Online Courses.

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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 to18 =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 credit

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DAS0103 | Course Name: Calculus and Linear Algebra | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/ AIML-TWIN/CYS/ECE/ECE(VLSI)/ME/M.Tech(Integrated) | | 3 | 1 | 0 | 4 |

**Pre-requisite: Knowledge of Mathematics up to 12th standard**

**Course Objectives:** 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.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Apply the concept of matrices to solve linear simultaneous equations | K3 |
| **CO2** | Apply the concept of successive differentiation and partial differentiation to solve problems of Leibnitz theorems and total derivatives. | K3 |
| **CO3** | Apply partial differentiation for evaluating maxima, minima, Taylor's series and Jacobians. | K3 |
| **CO4** | Apply the concept of multiple integral to find area, volume, centre of mass and centre of gravity. | K3 |
| **CO5** | Apply the concept of vector calculus to evaluate line, surface and volume integrals. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | 1 | 3 | 2 | - | - | - | 1 | 2 | | |
| **CO2** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | 1 | 3 | | |
| **CO3** | 3 | 2 | 3 | 3 | 3 | 2 | - | - | - | 1 | 3 | | |
| **CO4** | 3 | 2 | 3 | 3 | 2 | 2 | - | - | - | 1 | 2 | | |
| **CO5** | 3 | 2 | 3 | 2 | 3 | 1 | - | - | - | 1 | 1 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Matrices** | **9 hours** |
|---|---|---|

Types of Matrices: Symmetric, Skew-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; Diagonalization of a Matrix.

| **Unit 2** | **Differential Calculus -I** | **9 hours** |
|---|---|---|

Successive Differentiation (nth order derivatives), Leibnitz theorem and its application, Asymptotes, Curve tracing: Cartesian and Polar co-ordinates. Partial derivatives, Total derivative, Euler's Theorem for homogeneous functions.

| **Unit 3** | **Differential Calculus -II** | **9 hours** |
|---|---|---|

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.

| Unit 4 | Multivariable Calculus | 9 hours |
|---|---|---|

Multiple integration: Double integral, Triple integral, Change of order of integration, Change of variables, Application: Areas and volumes, Beta & Gama function and their properties, Dirichlet's integral and its applications.

| Unit 5 | Vector Calculus | 9 hours |
|---|---|---|

Vector differentiation: Gradient, Curl and Divergence and their Physical interpretation, Directional derivatives, Tangent and Normal planes. Vector Integration: Line integral, Surface integral, Volume integral, Gauss's Divergence Theorem, Green's theorem, Stoke's theorem (without proof) and their applications.

| | Total Lecture Hours | 45 hours |
|---|---|---|

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Higher Engineering Mathematics, Tata Mc Grew-Hill Publishing Company Ltd. | B. V. Ramana |
| 2 | Higher Engineering Mathematics, Khanna Publisher. | B. S. Grewal |
| 3 | Advance Engineering Mathematics, Narosa Publishing House. | R K. Jain & S R K. Iyenger |
| 4 | Advance Engineering Mathematics, University Science Press | N.P. Bali |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Advance Engineering Mathematics, John Wiley & Sons. | E. Kreyszig |
| 2 | Advance Engineering Mathematics, Thomson (Cengage) Learning. | Peter V. O'Neil |
| 3 | Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole. | D. Poole |
| 4 | Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi. | Veerarajan T. |
| 5 | Advanced Engineering Mathematics, Tata Mc-Grew-Hill; Sixth Edition. | Ray Wylie C and Louis C Barret |
| 6 | Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd. | P. Siva Ramakrishna Das and C. Vijayakumari |
| 7 | Advanced Engineering Mathematics. | Chandrika Prasad, Reena Garg. |
| 8 | Engineering Mathematics – I. | Reena Garg |
| 9 | Calculus, Eleventh Edition, Pearson. | Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas |
| | | |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | https://www.coursera.org/specializations/mathematics-engineers#courses<br>https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma133 | 30 Hrs<br>18 Hrs |
| Video Lectures | **Unit 1**<br>https://sl1nk.com/x4pwhm1<br>https://sl1nk.com/hp4zh3q<br>https://l1nq.com/tar0utj<br>https://sl1nk.com/qx5w2s0<br>https://l1nq.com/bsa5tsz | <br>27.32m<br>33.44m<br>34.32m<br>30.35m<br>33.49m |

| | | |
|---|---|---|
| | https://l1nq.com/krjyuz7 | 35.25m |
| | https://l1nq.com/nxmkv1j | 26.51m |
| | https://l1nq.com/d5rjml3 | 34.05m |
| | https://sl1nk.com/u7t3pus | 37.55m |
| | https://www.youtube.com/watch?v=U9LW_TWVNGw | 19.40m |
| | **Unit 2** | |
| | https://l1nq.com/osdcq89 | 27.43m |
| | https://l1nq.com/o7scg0e | 31.52m |
| | https://sl1nk.com/lin5ffj | 33.23m |
| | https://l1nq.com/zwk339w | 46.04m |
| | https://l1nq.com/yz99yyw | 36.36m |
| | https://sl1nk.com/tx5go1h | 31.04m |
| | https://l1nq.com/cf4q9j4 | 39.00m |
| | https://l1nq.com/hhv83kc | 38.01m |
| | **Unit 3** | |
| | https://sl1nk.com/kck8o3w | 32.41m |
| | https://l1nq.com/yb60xlp | 39.00m |
| | https://l1nq.com/mxg66jf | 33.56m |
| | https://sl1nk.com/842fc8v | 15.55m |
| | https://l1nq.com/sagxjsv | 19.39m |
| | https://l1nq.com/z8w15el | 28.48m |
| | https://l1nq.com/eiby96a | 26.36m |
| | https://l1nq.com/nldopta | 25.28m |
| | https://l1nq.com/t07w04e | 27.32m |
| | **Unit 4** | 28.08m |
| | https://l1nq.com/m49dsnl | 28.25m |
| | https://l1nq.com/ynv465n | 26.40m |
| | https://sl1nk.com/wy1yimg | 29.05m |
| | https://l1nq.com/y0f63oj | 27.53m |
| | https://l1nq.com/wph06ly | 29.36m |
| | https://sl1nk.com/3arnc7z | 29.59m |
| | https://l1nq.com/e54jst9 | 33.05m |
| | https://sl1nk.com/v8wtn85 | |
| | **Unit 5** | |
| | https://youtu.be/v3ZC4Mo1fS0?si=1YuVCjiJ7biZ3T2l | 14:59m |
| | https://youtu.be/SZCsFS9izfQ?si=za8c9AZts1yFt4yh | 51:01m |
| | https://youtu.be/M_Irtxhbq3E?si=_IZ8NUCpu7KtbN69 | 30:03m |
| | https://youtu.be/v5J_3o5AFoY?si=x5p4NQiIGTiUxWt5 | 28:40m |
| | https://youtu.be/hCkbBU9E_40?si=3URVgydtevlnjslR | 30:38m |
| | https://youtu.be/8h3yY0im5XU?si=1f63BZgYIk_jiUsr | 32:27m |
| | https://youtu.be/1qLb0B40YnA?si=QRQJTmVO3ZEqW8e_ | 53:56m |
| | https://youtu.be/1aS7nTIYMx0?si=jRDP8V4gsvKT7Oq2 | 52:34m |
| Web References | | |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DAS0102 | Course Name: Semiconductor Physics and Devices | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 3 | 0 | 0 | 3 |

**Pre-requisite:**

1. Basic knowledge of semiconductors.
2. Basics concept of electrostatics.
3. Basics of matter waves, uncertainty principle**.**
4. Properties of matter.
5. Basic laws of electricity and magnetism.

**Course Objectives:**

1. To provide the knowledge of the phenomenon of semiconductors and its uses to engineering applications.
2. To provide the knowledge of the Bipolar Junction Transistor and its engineering application.
3. To provide the knowledge of the basic concept of Field Effect Transistor.
4. To provide the knowledge of Quantum Mechanics and its application in quantum computing.
5. To provide the basic knowledge of Superconductivity and Nanotechnology which is necessary to understand the working of modern engineering tools and techniques.

| **Course Outcome:** After completion of the course, the student will be able to: | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Describe the phenomenon of semiconductor physics. | K2 |
| **CO2** | Explain the working of Bipolar Junction Transistor. | K2 |
| **CO3** | Identify the basic concept of Field Effect Transistor. | K2 |
| **CO4** | Implement the concept of quantum mechanics. | K3 |
| **CO5** | Define the basic phenomena of superconductivity and nanotechnology. | K2 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | - | 2 | 1 | - | - | - | - | 2 | - | - |
| **CO2** | 3 | 2 | 1 | - | 2 | 1 | - | - | - | - | 2 | - | - |
| **CO3** | 3 | 2 | 1 | - | 2 | 1 | - | - | - | - | 2 | - | - |
| **CO4** | 3 | 2 | 2 | - | 1 | 1 | - | - | - | - | 2 | - | - |
| **CO5** | 3 | 2 | 2 | - | 1 | 1 | - | - | - | - | 2 | - | - |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction to Semiconductor Physics** | **9 hours** |
|---|---|---|

Energy bands, Fermi Level, Direct and Indirect Band Gap Semiconductor, Diffusion and Drift Current, P-N Junction Diode and V-I Characteristics of Diode.

**Special Diodes:** Zener Diode, Photodiode, Solar Cell, Light Emitting Diode (LED), Organic-Light Emitting Diode (O-LED**)**

| Unit 2 | Bipolar Junction Transistor(BJT) | 9 hours |
|---|---|---|

Transistor (PNP & NPN), Construction & Working of Transistor, Common Base, Common Emitter and Common Collector Configurations of Transistor, V-I Characteristics of Common Emitter, Operating Point, DC load lines, Voltage Divider biasing, BJT applications: Switch and amplifier.

| Unit 3 | Field Effect Transistor(FET) | 9 hours |
|---|---|---|

Construction and Working Principle of Junction Field Effect Transistor (JFET), Comparison with BJT, V-I Characteristics of JFET, Pinch-off Voltage.

Construction & Working Principle of MOSFET, V-I Characteristics in Enhancement and Depletion modes, CMOS (Qualitative)

| Unit 4 | Quantum Mechanics and Computing | 9 hours |
|---|---|---|

Introduction to Quantum Physics, Born's Interpretation of Wave function, Operators, Schrodinger wave equation, Introduction to Quantum computing, Moore's law, Differences in classical and quantum computing, Concept of Qubits, Properties of Qubits, Bloch sphere.

| Unit 5 | Superconductivity and Nanotechnology | 9 hours |
|---|---|---|

**Superconductivity:** Temperature dependence of resistivity, Meissner effect, Penetration depth, Type-I and Type-II superconductors, Critical field and High temperature superconductors.

**Nanotechnology:** The nanoscale and nanomaterials, Surface to Volume ratio and its Importance in engineering, Bucky ball and its applications, Carbon nanotubes(CNTs) and their types, Applications of CNTs.

| | |
|---|---|
| **Total Lecture Hours** | **45 hours** |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Electronic Devices and Circuit Theory | Robert L.Boylestad and Louis Nashelsky |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Semiconductor Devices Physics and Technology 2ndEd | S. M. Sze |
| 2 | Optoelectronics an Introduction 3rd Edition | Wilson and Hawkes |
| 3 | Semiconductor Physics and Devices | Neamen |
| 4 | Solid State Electronics Devvices | Streetman and Banerjee |
| 5 | Engineering Physics | S.D. Jain and G.S. Sahasrabudhe |
| 6 | Nanotechnology | R. Booker and E. Boysen |
| 7 | Microelectronics Circuits | Adel S. Sedra and Kenneth Carless Smith |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | https://www.coursera.org/learn/semiconductor-physics<br>https://www.coursera.org/learn/semiconductor-1<br>https://www.coursera.org/learn/diode-pn-junction-metal-semiconductor-contact?specialization=semiconductor-devices<br>https://www.coursera.org/learn/transistor-field-effect-transistor-bipolar-junction-transistor?specialization=semiconductor-devices | 15hrs<br>9hrs<br>16hrs<br>13hrs |

| | | |
|---|---|---|
| Video Lectures | **Unit 1** | |
| | https://youtu.be/WiIdfUWjXog?si=plmz8LEmKZl0mvfW | 13.42m |
| | https://youtu.be/MovJj2ldIH0?si=zDsUvgwd_BGPd5nV | 7.44m |
| | https://youtu.be/aEwojo5gtn8?si=K-m4TPWnjLQp5U8v | 24.58m |
| | https://youtu.be/qgIRRi8wkmg?si=spoKbGBvdIqjj03l | 18.43m |
| | https://youtu.be/sWOSPdZHj8o?si=ujnRDilxrYQ-8t-l | 23.28m |
| | https://youtu.be/-ga2S2LOtjs?si=5l66qKsN_5r-vgY3 | 26.43m |
| | https://youtu.be/qDoUGNOMf3I?si=8B_mZz8Xdvp-LU1c | 25.01m |
| | https://youtu.be/viw9qpSDQjc?si=EImowmInReSzPZTg | 32.02m |
| | https://youtu.be/ZsOXhQemh10?si=TERBVhiNBCVDB3oh | 16.02m |
| | https://youtu.be/0SnfR13p6Mc?si=K-mfafMZXO2rDbe- | 22.12m |
| | https://youtu.be/8nyReoypSvM?si=mkMlnSOSvP5yQzY3 | 30.06m |
| | https://www.youtube.com/watch?v=BCfpLH41lAU | 56.13m |
| | https://youtu.be/rsFMSyoNKZQ?si=hTYWOy7gy1g1OEM1 | 30.24m |
| | https://www.youtube.com/watch?v=tlnCkr6B6ZY | 18.53m |
| | https://www.youtube.com/watch?v=S9jMMALKKKs | 58.03m |
| | https://youtu.be/IZs7a2L5AZI?si=0NvFzhg6x56swHO0 | 32.15m |
| | https://www.youtube.com/watch?v=MC1zGEmrELA | 54.08m |
| | https://www.youtube.com/watch?v=xhn188JafbM | 53.12m |
| | https://www.youtube.com/watch?v=JA3sCmrv11M&list=PLgMDNELGJ1CaNcuuQv9xN07ZWkXE-wCGP&index=2 | 31.45m |
| | **Unit 2** | |
| | https://www.youtube.com/watch?v=UgOM9WXp57k | 46.21m |
| | https://www.youtube.com/watch?v=0C4uxtS-tlQ | 54.22m |
| | https://www.youtube.com/watch?v=ijNBnXhiy_w&t=458s | 56.12m |
| | https://www.youtube.com/watch?v=M_Fti8OBTKo | 54.07m |
| | https://www.youtube.com/watch?v=HfKd-Y2SBFA | 56.08m |
| | https://www.youtube.com/watch?v=Ax87iYvsZ0A | 35.20m |
| | https://www.youtube.com/watch?v=oXY9zUSulkg | 53.28m |
| | https://www.youtube.com/watch?v=FP-mZF0h8vQ | 57.38m |
| | https://www.youtube.com/watch?v=gYgT_WoI9v4 | 54.34m |
| | https://www.youtube.com/watch?v=QnjZQHB1hR0&t=109s | 30.05m |
| | https://www.youtube.com/watch?v=1wJXvDGW-iQ | 29.11m |
| | https://www.youtube.com/watch?v=hOT72IdQBbw | 57.43m |
| | **Unit 3** | |
| | http://acl.digimat.in/nptel/courses/video/115102014/L22.html | 54:08 |
| | https://www.youtube.com/watch?v=MuBiC9yz2fc&t=265s | 49:00 |
| | http://acl.digimat.in/nptel/courses/video/115102014/L24.html | 57:39 |
| | http://acl.digimat.in/nptel/courses/video/115102014/L24.html | 54.14 |
| | https://www.youtube.com/watch?v=4m49vM0Ryt8 | 56:36 |
| | http://acl.digimat.in/nptel/courses/video/115102014/L28.html | 54:23 |
| | **Unit 4** | |
| | http://www.digimat.in/nptel/courses/video/115101107/L01.html | 49:12 |
| | https://www.youtube.com/watch?v=_U6YamvF7BE | 45:51 |
| | http://digimat.in/nptel/courses/video/115104096/L34.html | 21:18 |
| | https://www.youtube.com/watch?v=KQzcFBXwKdM | 30:47 |
| | http://www.digimat.in/nptel/courses/video/115102023/L02.html | 58.:12 |
| | https://www.youtube.com/watch?v=vy-qStGSy0g | 23:26 |
| | http://digimat.in/nptel/courses/video/104104082/L01.html | 35:52 |
| | http://digimat.in/nptel/courses/video/104104082/L37.html | 31:17 |
| | https://www.youtube.com/watch?v=V9cADVFxToU | 47:15 |
| | https://www.youtube.com/watch?v=rEdGqUnD8eo&t=1522s | 28:01 |
| | https://www.youtube.com/watch?v=n2RsfkrWM7U | 37:15 |
| | **Unit 5** | |
| | http://www.digimat.in/nptel/courses/video/115103108/L01.html | 56:40 |
| | http://www.digimat.in/nptel/courses/video/115103108/L02.html | 57:30 |
| | https://www.youtube.com/watch?v=VHp2Ff5N_bs | 41:12 |
| | http://digimat.in/nptel/courses/video/115105131/L39.html | 37:49 |
| | http://digimat.in/nptel/courses/video/113106093/L01.html | 57:30 |
| | https://www.youtube.com/watch?v=BLNwNkdRiTI | 48:30 |

| | | |
|---|---|---|
| | https://www.youtube.com/watch?v=9EKqNBvz4cA<br>http://digimat.in/nptel/courses/video/113106093/L24.html<br>https://youtu.be/RvtlBh_-_Rw?si=AUb2neWopHPFFxux | 54:56<br>45:23<br>43:40 |
| Web References | | |

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**GREATER NOIDA-201306**

**(An Autonomous Institute)**

| **Course Code: DCSAI0101** | **Course Name: Fundamentals of Artificial Intelligence** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| **Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated)** | | **2** | **0** | **0** | **2** |

**Pre-requisite: Basic Programming, Basic Data Interpretation Skills**

**Course Objectives:** This subject aims to introduce students to the core principles, branches, applications, tools, and ethical considerations of Artificial Intelligence, empowering them with essential theoretical knowledge and practical skills to explore intelligent systems and pursue advanced AI research and development.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Explain the foundations of Artificial Intelligence and its historical evolution | K2 |
| **CO2** | Interpret and differentiate types of data | K3 |
| **CO3** | Develop Python-based data processing workflows | K3 |
| **CO4** | Analyze the impact and real-world applications of AI | K4 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| **CO-PO Mapping** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PSO1** | **PSO2** | **PSO3** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 1 | 1 | 2 |
| **CO2** | 2 | 3 | - | - | 2 | - | - | - | - | - | - | 1 | 1 | 2 |
| **CO3** | 2 | 2 | 2 | 2 | 3 | - | - | - | - | - | - | 1 | 2 | 2 |
| **CO4** | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | - | - | - | 1 | 1 | 2 |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction to AI** | **8 hours** |
|---|---|---|

Introduction to AI – History, Approaches and Philosophy, Application of AI, Intelligent Agent, Types of Agent, Domains of AI- Machine Learning, Deep Learning, Natural Language Processing, Computer Vision, Generative AI

| **Unit 2** | **Data Literacy and Analysis** | **8 hours** |
|---|---|---|

Importance of Data, Information, Knowledge, Wisdom, Types of Data [Unstructured, Structured], Data Collection, Data Processing, Data Analysis – Descriptive and Inferential.

| **Unit 3** | **Compute, Analysis and Visualization** | **10 hours** |
|---|---|---|

Introduction to Python, Libraries (Pandas, NumPy, Matplotlib), Import and Export of Data, IDE, Google Colab, Kaggle Kernel.

| **Unit 4** | **Applications of AI** | **4 hours** |
|---|---|---|

AI in Healthcare, Finance, Agriculture, Transportation, Retail and E-commerce, Entertainment and Media, Smart Homes and IoT, Robotics and Automation.

| **Total Lecture Hours** | **30 hours** |
|---|---|

**Textbook:**

| **S.No** | **Book Title** | Author |
|---|---|---|
| 1 | Artificial Intelligence: A Modern Approach, Pearson Education, 4th Edition, 2020 | Stuart Russell & Peter Norvig |

| | | |
|---|---|---|
| 2 | Artificial Intelligence, McGraw-Hill Education, 3rd Edition, 2009 | Elaine Rich, Kevin Knight, Shivashankar B. Nair |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Artificial Intelligence and Machine Learning, Dreamtech Press, 1st Edition, 2020 | P. S. Deshpande |
| **2** | Python Data Analytics: With Pandas, Numpy, and Matplotlib, Apress; 2nd edition (1 January 2018) | Wolfgang Ertel |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | 1. https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_SMARTBRIDGE_01<br>2. https://www.udemy.com/course/artificial-intelligence-in-the-classroom/?utm_campaign=BG-Search_DSA_Beta_Prof_la.EN_cc.India&utm_source=bing&utm_medium=paid-search&portfolio=Bing-India&utm_audience=mx&utm_tactic=nb&utm_term=_._ag_1318316830212069_._ad__._kw_Teacher+Training+en&utm_content=o&funnel=&test=&utm_campaign_id=638596187&msclkid=df2935f4c5d1177d62255fb858b9eda4&couponCode=PMNVD2025<br>3.https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01333063698060902494_shared/overview | 90 Hrs<br>8 Hrs 45 Min<br>10 Hrs 45 Min |
| Video Lectures | 1. https://www.youtube.com/watch?v=D1eL1EnxXXQ<br>2. https://www.youtube.com/watch?v=qrMnoY8qBJM<br>3.https://www.youtube.com/watch?v=GHpchgLoDvI&list=PLp6ek2hDcoNB_YJCruBFjhF79f5ZHyBuz | 1 Hrs 6 Mins<br>1 Hrs 13 Min<br>32 Hrs |
| Web References | 1. https://www.ibm.com/think/topics/artificial-intelligence | 10 Hrs |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
### (An Autonomous Institute)

| Course Code: DASCC0101 | Course Name: Design Thinking-I | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 2 | 0 | 0 | 2 |

**Pre-requisite:**

**Course Objectives:** 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 the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Develop a strong understanding of the design process and apply it in a variety of business settings | K1 |
| **CO2** | Analyze self, culture, and teamwork to work in a multidisciplinary environment and exhibit empathetic behavior | K3 |
| **CO3** | Formulate specific problem statements of real time issues and generate innovative ideas using design tools | K4 |
| **CO4** | Apply critical thinking skills to arrive at the root cause from a set of likely causes | K4 |
| **CO5** | Demonstrate an enhanced ability to apply design thinking skills for evaluation of claims and arguments | K4 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | | |
| **CO2** | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | | |
| **CO3** | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | | |
| **CO4** | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| **CO5** | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction** | **6 hours** |
|---|---|---|

An overview of future skills, introduction to design thinking, traditional 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.

**Case Studies:** Mumbai Dabbawallas, Gillette, Singapore, Bengaluru, Bahubali, Google, Embrace Incubator

**Activity:** Observation, Wicked Problem

| **Unit 2** | **Ethical Values and Empathy** | **6 hours** |
|---|---|---|

Understanding humans as a combination of I (self) and body, basic physical needs up to actualization, prosperity, the gap between desires and actualization. Understanding culture in family, society, institution, startup, socialization process. Ethical behavior: effects on self, society, understanding core values and feelings, negative sentiments and how to overcome them, definite human conduct: universal human goal, developing human consciousness in values, policy, and character.

Understanding stakeholders, techniques to empathize with, identify key user problems. Empathy tools- Interviews, empathy maps, persona, emotional mapping, immersion and observations, Emotional Intelligence, customer journey maps, classifying insights after Observations, Classifying Stakeholders.

**Case Studies:** Pure-it, Royal Enfield, Big Basket, Air-bnb.

**Activity:** Moccasin Walk, Persona, Empathy map, Journey Map

| **Unit 3** | **Problem Statement and Ideation** | **6 hours** |
|---|---|---|

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, brainstorming, inclusion, sketching and presenting ideas, idea evaluation, double diamond approach, 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, Introduction to AI Tools.

**Case Studies:** The Good Kitchen, Flipkart, Uber, Redbus, Big Bazaar

**Activity:** 5 Why, HMW, Brainstorming, Six Thinking Hats, 30 Circles, paper prototype

| **Unit 4** | **Critical Thinking** | **6 hours** |
|---|---|---|

Fundamental concepts of critical thinking, the difference between critical and 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.

**Case Studies:** Byju's, Maggi noodles, Tata Nano

**Activity:** debate, role play

| **Unit 5** | **Logic and Argumentation** | **6 hours** |
|---|---|---|

The argument, claim, and statement, identifying premises and conclusion, truth and 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.

**Case Studies:** Aadhaar Card, Demonetization, Odd-Even Policy, Jio

**Activity:** Logical Fallacy Detective, Fact-Checking Challenge

| | **Total Lecture Hours** | **30 hours** |
|---|---|---|

**Textbook:**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1.** | UnMukt : Science & Art of Design Thinking | Arun Jain |
| **2.** | Solving Problems with Design Thinking – Ten Stories of What Works | Jeanne Liedta |
| **3.** | A Foundation Course in Human Values and Professional Ethics | R R Gaur, R Sangal, G P Bagaria |
| **4.** | Critical Thinking: An Introduction | Fisher |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | 101 Design Methods | Vijay Kumar |
| 2. | Change by Design | Tim Brown |
| 3. | How to improve your critical thinking & reflective kills | McMillan |
| 4. | Design of Business | Roger L. Martin |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | **1.**https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012785877065097216 1567_shared/overview **(Unit-1)**<br>**2.**https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_014273116965789696 5/overview **(Unit-2)**<br>**3.**https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013501581003620352 11528/overview **(Unit-3)**<br>**4.**https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_014583275387928576 31522/overview **(Unit-4)**<br>**5.** https://alison.com/course/problem-solving-and-critical-thinking-skills?utm_source | 3hrs 31m<br>1hr 2 m<br>23m 32s<br>1hr 1m<br>3-4Avg. hrs |
| Video Lectures | **Unit-1**<br>https://youtu.be/rUUuhnLkJ2s?si=_XCHnDbt_U1z0<br>Frx<br>https://www.youtube.com/watch?v=ldYzbV0NDp8<br>https://www.youtube.com/watch?v=0Fi83BHQsMA<br>**Unit-2**<br>https://www.youtube.com/watch?v=q654-kmF3Pc<br>http://www.uhv.org.in/ https://swayam.gov.in/nd1_noc19_mg60/preview<br>**Unit-3**<br>https://www.udemy.com/course/design-thinking-for-beginners/<br>https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them<br>**Unit-4**<br>https://www.youtube.com/watch?v=CLQd1wOS3mg&t=16s<br>https://www.criticalthinking.org/pages/defining-critical-thinking/766<br>**Unit-5**<br>https://swayam.gov.in/nd2_aic19_ma06/preview | 5m 31s<br>1m 54 s<br>14m 26s<br>4m 19s<br>2m 49s<br>(Way to Course)<br>47m<br>1d 14hrs<br>14m 10s<br>Conference Paper<br>10 hrs |
| Web References | | |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| LAB Course Code: DAS0152 | LAB Course Name: Semiconductor Physics and Devices Lab | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 0 | 0 | 2 | 1 |

**Pre-requisite: Least count, Screw gauge, Vernier calipers**

**Course Objectives:**

1. To provide the practical knowledge of the phenomenon blackbody.
2. To provide the practical knowledge of the characteristics of transistors.
3. To provide the practical knowledge of the characteristics of diodes.
4. To provide the practical knowledge of the characteristics of solar cell.
5. To provide the practical knowledge of dielectric constant.

| **Course Outcome:** After completion of the course, the student will be able to: | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Apply the practical knowledge of the phenomenon of blackbody. | K3 |
| **CO2** | Understand the characteristics of transistors. | K2 |
| **CO3** | Analyze the characteristics of diodes. | K4 |
| **CO4** | Analyze the characteristics of solar cell. | K4 |
| **CO5** | Understand the dielectric constant. | K2 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | - | - | - | 2 | - | 2 | 1 | 2 | 1 | 1 | - | - |
| **CO2** | 3 | - | - | - | 2 | - | 1 | 1 | 2 | 1 | 1 | - | - |
| **CO3** | 3 | - | - | - | 2 | - | 1 | 1 | 2 | 1 | 1 | - | - |
| **CO4** | 2 | - | - | - | 2 | - | 1 | 1 | 2 | 1 | 1 | - | - |
| **CO5** | 3 | - | - | - | 2 | - | 1 | 1 | 2 | 1 | 1 | - | - |

**List Of Practical's (Indicative & Not Limited To)**

1. To determine the energy band gap of a given semiconductor material.
2. To determine the Planck's constant using LEDs of known wavelength.
3. To study the Hall effect and determine the Hall coefficient, Carrier density and Mobility of a given semiconductor material using Hall effect setup.
4. To determine the resistivity of given material using four probe method.
5. To determine the dielectric constant of the material by charging and discharging of capacitor.
6. To determine the characteristics of photoelectric cell.
7. To verify Stefan's Law by electrical method.

| |
|---|
| 8. To Plot V-I Characteristics of PN Junction diode. |
| 9. Plot of gain in dB Vs frequency, measurement of bandwidth, input impedance, maximum signal handling capacity (MSHC) of Single stage common source FET amplifier. |
| 10. To draw the static current-voltage (I-V) characteristics of a Zener diode. |
| 11. To draw input and output characteristic of common base Bipolar Junction Transistor. |
| 12. To draw input and output characteristic of common collector Bipolar Junction Transistor. |
| 13. To draw input and output characteristic of common emitter Bipolar Junction Transistor. |
| 14. To study FET as a Voltage Variable Resistor (VVR). |
| 15. To plot the V-I Characteristics of the solar cell and hence determine the fill factor. |
| **Total Hours: 30 hrs.** |

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**GREATER NOIDA-201306**

**(An Autonomous Institute)**

| LAB Course Code: DCSE0151 | LAB Course Name: C Programming | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/M.Tech(Integrated) | | 0 | 0 | 4 | 2 |

**Pre-requisite:** Basic Mathematics and Number Systems

**Course Objectives:** 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 Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Understand the fundamentals, flowcharts, program structure, data types, operators, and the compilation process to develop error-free and logically correct programs. | K2 |
| **CO2** | Apply modular and efficient programs using conditional branching, loops, functions (including recursion), input/output operations, storage classes, and pointers. | K3 |
| **CO3** | Implement and manipulate one-dimensional and two-dimensional arrays and strings, applying them to solve problems like searching, sorting, matrix operations, structures, unions and file handling. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 3 | 1 | 2 | 3 | 2 | 1 | 2 |
| **CO2** | 3 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 2 |
| **CO3** | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 2 |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction to Algorithm and C Program** | **12 hours** |
|---|---|---|

Computer systems, Types of Software's, Linker, Loader Types of Computing Environments, Evolutional of Programming Languages Machine Language, Assembly Language, high level low level, Compilers etc,

Introduction to Algorithms: Definition, Properties of Algorithms, pseudocode and Flowchart, Algorithm vs Pseudocode. Programming Using C: C Tokens (Constants, variables, keywords), Datatypes, formatted and unformatted I/O functions, Structure of C program, Overview of compilation and execution process, Compiler vs Interpreter, Assembler, transition from algorithm to program, Syntax, logical errors, runtime errors, object and executable code, Application of C Programming.

| **Unit 2** | **Expression & Statements** | **12 hours** |
|---|---|---|

Operators and their types, Arithmetic expressions, and precedence: operators, operator precedence and associativity, type conversion. Control statements -Conditional Statements (if, else-if, nested if else, switch statements) use of break, and default with switch, Iteration and loops: Concept of loops, for, while, and do-while; while, multiple-loop variables; use of break and continue statements; nested loop, Expression statements-Null, Expression, Return, Compound statements.

Array notation and one-dimensional arrays, Declaration of one-dimensional arrays, initialization of one-dimensional arrays, Example programs: (searching and sorting), Two-dimensional arrays, declaration of Two-dimensional arrays, Initialization of Two-dimensional

Arrays, Example programs: Matrix multiplication, transpose of a matrix.

Strings: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String-handling Functions, Example Programs (with and without using built-in string functions).

| **Unit 3** | **Functions & Pointers** | **12 hours** |
|---|---|---|

Functions: Introduction to function, function, Built in Function, User defined functions, types of functions, passing parameters to techniques: call by value, call by reference. Recursion: Definition, Types of Recursive Functions, Attributes value, scope of variable, address, local and global variables, Nesting of scope Storage classes: Auto, Register, static, and External.

Pointers: defining and declaring pointer, & and * Operators, pointer arithmetic and scaling, Dangling Pointers, Void and Null Pointer, wild Pointer, Pointer and Array, Array of Pointer, Pointer & Structure.

| **Unit 4** | **Structure & Union** | **12 hours** |
|---|---|---|

Introduction, Initializing, defining, and declaring structure, Nesting Structures, accessing members, Operations on individual Structure within structures Array of structure, Structure Padding and Alignment

Union: Introduction, Initializing, defining, and declaring structure, Accessing members, Operations on individual members, Operations on the union, Difference between Structure and Union. Enumerations and typedef.

| **Unit 5** | **Memory Allocation and File Handling** | **12 hours** |
|---|---|---|

Dynamic Memory Allocation: Introduction, Library functions malloc, calloc, realloc, and free.

File Handling: Introductory Concepts of File Stream. File Types-text, Binary Files, File Openeing Modes, Input Output operations on File (getc() ,putc(),fprintf(),fscanf(),getw(), File Positioning functions -fseek.

| | **Total Lecture Hours** | **60 hours** |
|---|---|---|

**Textbook:**

| **S.No** | **Book Title with publication agency & year** | **Author** |
|---|---|---|
| **1** | C: The Complete Reference, McGrawHill,4thEdition,2002. | Herbert Schildt |
| **2** | Computer Concepts and Programming in C, PHI Learning Pvt. Ltd., 2nd Edition, 2004. | E Balaguruswami, |
| **3** | Let Us C, BPB Publications, 19th Edition, 2022 | Yashwant P.Kanetkar. |
| **4** | Mastering C, McGraw-Hill Education, 2nd Edition, 2010. | K.R Venugopal |
| **5** | **Working with C**, BPB Publications, 1996. | Yashwant P. Kanetkar |

**Reference Books:**

| **S.No** | **Book Title with publication agency & year** | **Author** |
|---|---|---|
| **1** | The C programming, Pearson Education | Kernighan Brain W.and Ritchie Dennis M |
| **2** | Computer Science-A Structured Programming Approach Using C,Third Edition, Cengage Learning-2007. | Behrouz A. Forouzan, RichardF. Gilberg, Thomson, |
| **3** | Computer Basics and C Programming, PHI Learning pvt. Limited,2015. | V. Rajaraman |
| **4** | Schrum's Outline of Programming with C,McGraw-Hill | Byron ,Gottfried |
| **5** | Computer Fundamentals and Programming in C,Oxford Publication | Reema Thareja |

| **Self-Study Content Links:** | **Duration (in Hrs)** |
|---|---|

| | | |
|---|---|---|
| MOOCs | 1. Programming in C<br>https://onlinecourses.nptel.ac.in/<br>2. Problem Solving Through Programming in C<br>https://swayam.gov.in/<br>3. Joy of Computing using Python (Algorithmic Thinking)<br>https://swayam.gov.in/<br>4. C Programming for Beginners<br>https://www.udemy.com/topic/c-programming/<br>5. C Programming Bootcamp<br>https://www.udemy.com/ | 8 week<br><br>8 weeks<br><br>12 weeks<br><br>26 hours<br><br>44 hours |
| Video Lectures | **Unit 1**: Introduction to C Programming<br>https://youtu.be/XM7f5x94068<br>**Unit 2**: Operators, Loops and Decision Making<br>https://youtu.be/FYdYkiIHvRQ<br>**Unit 3**: Functions and Pointers<br>https://youtu.be/lVD74GSU-3w<br>**Unit 4** : Structures and Unions<br>https://www.youtube.com/results?search_query=structures+and+unions+in+c+neso+academy<br>**Unit 5**: Dynamic Memory Allocation<br>https://www.youtube.com/results?search_query=dynamic+memory+allocation+in+c+programming | 3h 46m<br><br>31m<br><br>3hrs 47m<br><br><br><br>3hr 53m<br><br>31m |
| Web References | Wikibooks – C Programming<br>https://en.wikibooks.org/wiki/C_Programming<br>A Little C Primer<br>https://en.wikibooks.org/wiki/A_Little_C_Primer | |

| Lab No. | Unit | Title of Program | CO Mapping |
|---|---|---|---|
| 1.1 | 1 | Write a C program to print "Hello, World!" and understand the basic structure of a C program. | CO1 |
| 1.2 | 1 | Write a C program to demonstrate different data types (int, float, double, char) and use sizeof() operator. | CO1 |
| 1.3 | 1 | Write a C program to demonstrate all arithmetic operators and understand operator precedence. | CO1 |
| 1.4 | 1 | Write a C program using if, else-if, nested if-else to determine grade from marks. | CO1 |
| 1.5 | 1 | Write a C program to implement a simple calculator using switch-case statement. | CO1 |
| 1.6 | 1 | Write a C program demonstrating for, while, and do-while loops with break and continue. | CO1 |
| 1.7 | 1 | Write a C Program to implement a half pyramid of * | CO1 |
| 1.8 | 1 | Write a C Program to implement a Half pyramid of numbers | CO1 |
| 1.9 | 1 | Write a C Program to implement a half pyramid of alphabets | CO1 |
| 1.10 | 1 | Write a C Program to implement an inverted half pyramid of * | CO1 |
| 1.5 | 1 | Write a C Program to implement an inverted half pyramid of numbers | CO1 |
| 1.6 | 1 | Write a C Program to implement a full pyramid of * | CO1 |
| 1.7 | 1 | Write a C Program to implement a full pyramid of numbers | CO1 |
| 1.8 | 1 | Write a C Program to implement an inverted full pyramid of * | CO1 |
| 1.9 | 1 | Write a C Program to implement Pascal's triangle | CO1 |
| 1.10 | 1 | Write a C Program to implement Floyd's triangle | CO1 |
| 1.11 | 1 | C Program to Print Diamond Pattern | CO1 |
| 1.12 | 1 | C Program to Print Binary Triangle Pattern | CO1 |
| 1.13 | 1 | C Program to Print Character Triangle | CO1 |
| 1.14 | 1 | Star Pattern Programs in C | CO1 |
| 1.15 | 1 | Pyramid Patterns in C | CO1 |

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|---|---|---|---|
| 1.16 | 1 | 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:<br>There are 21 matchsticks.<br>The computer asks the player to pick 1, 2, 3 or 4 matchsticks.<br>After the person picks, the computer does its picking. – Whoever is forced to pick up the last matchstick loses the game. | CO1 |
| 1.17 | 1 | 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. | CO1 |
| 1.18 | 1 | Design a calculator that performs Number system conversion | CO1 |
| 1.19 | 1 | C Program to Simulate a Simple arithmetic Calculator | CO1 |
| 1.20 | 1 | C Program to Evaluate the Given Polynomial Equation | CO1 |
| 1.21 | 1 | C Program to Find Mean, Variance and Standard Deviation | CO1 |
| 1.22 | 1 | C Program to Add Two Complex Numbers | CO1 |
| 1.23 | 1 | C Program to Find Power of a Number | CO1 |
| 1.24 | 1 | C Program to Calculate Pow (x,n) | CO1 |
| 1.25 | 1 | C program to Find the Sum of Arithmetic Progression Series | CO1 |
| 1.26 | 1 | C program to Find the Sum of Geometric Progression Series | CO1 |
| 1.27 | 1 | C program to Find the Sum of Harmonic Progression Series | CO1 |
| 1.28 | 1 | C Program to Find Sum of Series 1 + 1/2 + 1/3 + 1/4 + ……. + 1/N | CO1 |
| 1.29 | 1 | C Program to Find Sum of Series 1^2 + 2^2 + …. + n^2 | CO1 |
| 1.30 | 1 | C Program to Find Sum of Series 1^3 + 2^3 + 3^3 + … + n^3 | CO1 |
| 1.31 | 1 | C Program to Find Sum of the Series 1/1! + 2/2! + 3/3! + ……1/N! | CO1 |
| 1.32 | 1 | Design a program which displays following options on screen<br><br>Figure<br>Exit<br>Enter Choice<br>Once valid choice is entered it executes further.<br><br>If choice one is entered, then it should display<br><br>TRAINGLE<br>SQUARE<br>RHOMBUS<br>TRAPEZIUM<br>RETURN TO PREVIOUS MENU<br><br>ENTER CHOICE<br><br>Once valid choice is entered it executes further.<br><br>After that it ask for specific data and prints the area and volume and perimeter/circumference of the respective figure.<br><br>After that a choice is to be asked for | CO1 |
| 1.33 | 1 | Do you wish to continue (Y/N)? And should work accordingly. Before every menu, the screen should be cleared. | CO1 |

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|---|---|---|---|
| 1.34 | 1 | C Program to Find the Largest Number Among Three Numbers | CO1 |
| 1.35 | 1 | C Program to Find the Roots of a Quadratic Equation | CO1 |
| 1.36 | 1 | C Program to Check Leap Year. Evaluate all the cases. | CO1 |
| 1.37 | 1 | C Program to Check Whether a Number is Positive or Negative | CO1 |
| 1.38 | 1 | C Program to Check Whether a Character is an Alphabet or not | CO1 |
| 1.39 | 1 | C Program to Calculate the Sum of Natural Numbers | CO1 |
| 1.40 | 1 | C Program to Find Factorial of a Number | CO1 |
| 1.41 | 1 | C Program to Generate Multiplication Table | CO1 |
| 1.42 | 1 | C Program to Display Fibonacci Sequence | CO1 |
| 1.43 | 1 | C Program to Find GCD of two Numbers | CO1 |
| 1.44 | 1 | C Program to Find LCM of two Numbers | CO1 |
| 1.45 | 1 | C Program to Display Characters from A to Z Using Loop | CO1 |
| 1.46 | 1 | C Program to Reverse a Number using looping concepts | CO1 |
| 1.47 | 1 | C Program to Check Whether a Number is Palindrome or Not | CO1 |
| 1.48 | 1 | C Program to Check Whether a Number is Prime or Not | CO1 |
| 1.49 | 1 | C Program to Check Armstrong Number | CO1 |
| 1.50 | 1 | C Program to Display Armstrong Number Between Two Intervals | CO1 |
| 1.51 | 1 | C Program to Display Factors of a Number | CO1 |
| 1.52 | 1 | C Program to Reverse a Number using looping concepts | CO1 |
| 1.53 | 1 | C Program to Check Whether a Number is Palindrome or Not | CO1 |
| 1.54 | 1 | C Program to Check Whether a Number is Prime or Not | CO1 |
| 1.55 | 1 | C Program to Check Armstrong Number | CO1 |
| 1.56 | 1 | C Program to Display Armstrong Number Between Two Intervals | CO1 |
| 1.57 | 1 | C Program to Display Factors of a Number | CO1 |
| 1.58 | 1 | C Program to Make a Simple Calculator Using switch...case | CO1 |
| 1.59 | 1 | C Program to Check Whether a Number is Even or Odd | CO1 |
| 1.60 | 1 | C Program to Check Whether a Character is a Vowel or Consonant | CO1 |
| 1.61 | 1 | C Program to Find the Largest Number Among Three Numbers | CO1 |
| 1.62 | 1 | C Program to Check Whether a Number is Positive or Negative | CO1 |
| 1.63 | 1 | C Program to Calculate the Sum of Natural Numbers | CO1 |
| 1.64 | 1 | C Program to Find Factorial of a Number | CO1 |
| 1.65 | 1 | C Program to Generate Multiplication Table | CO1 |
| 1.66 | 1 | C Program to Display Fibonacci Sequence | CO1 |
| 1.67 | 1 | C Program to Display Prime Numbers Between Intervals Using Function | CO1 |
| 1.68 | 1 | C Program to Check Prime or Armstrong Number Using User-defined Function | CO1 |
| 1.69 | 1 | C Program to Check Whether a Number can be Expressed as Sum of Two Prime Numbers | CO1 |
| 1.70 | 1 | C Program to Find the Sum of Natural Numbers using Recursion | CO1 |
| 2.1 | 2 | Write a C program demonstrating formatted input and output using scanf() and printf() with various format specifiers and field widths. | CO2 |
| 2.2 | 2 | Write a C program to find the roots of the equation $ax^2 + bx + c = 0$ using the discriminant. | CO2 |
| 2.3 | 2 | Write C programs to (a) print Fibonacci series, (b) check prime number, (c) check Armstrong number. | CO2 |

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|---|---|---|---|
| 2.4 | 2 | Write a C program demonstrating function definition, call by value, and different types of functions (no-arg, with-arg, return value). | CO2 |
| 2.5 | 2 | Write a C program to implement recursive functions for finding the reverse of a number and checking palindrome. | CO2 |
| 2.6 | 2 | C Program to Find Factorial of a Number Using Recursion | CO2 |
| 2.7 | 2 | C Program to Find G.C.D Using Recursion | CO2 |
| 2.8 | 2 | C Program to Convert Binary Number to Decimal and vice-versa | CO2 |
| 2.9 | 2 | C program to calculate the power using recursion | CO2 |
| 2.10 | 2 | C Program to Check Prime or Armstrong Number Using User-defined Function | CO2 |
| 2.11 | 2 | C Program to Find the Sum of Natural Numbers using Recursion | CO2 |
| 2.12 | 2 | Design a calculator | CO2 |
| 2.13 | 2 | Design a Menu Driven program which performs the functions as per the menu<br>Add Details of students<br>Search the student data<br>Display the records Name must not be blank, and first letter should be alphabet<br>Student details should contain Name. Age, Class, Roll-No<br>Exit<br>Enter the Choice:<br>Note: Choice must be between 1-4 Only. Other than that, an error message must be displayed and entry should be done again | CO2 |
| 2.14 | 2 | C Program to Add Two Numbers Using Recursion. | CO2 |
| 2.15 | 2 | C Program to find the sum of digits of a number using recursion. | CO2 |
| 2.16 | 2 | Write a method in C that will remove any given character from a string. | CO2 |
| 3.1 | 3 | Write a C program demonstrating function definition, call by value, and different types of functions (no-arg, with-arg, return value). | CO3 |
| 3.2 | 3 | C Program to Calculate Average Using Arrays | CO3 |
| 3.3 | 3 | C Program to Find Largest Element in an Array | CO3 |
| 3.4 | 3 | C Program to search an element | CO3 |
| 3.5 | 3 | C Program to Add Two Matrices Using Multi-dimensional Arrays | CO3 |
| 3.6 | 3 | C Program to Multiply Two Matrices Using Multi- dimensional Arrays | CO3 |
| 3.7 | 3 | C Program to Find Transpose of a Matrix | CO3 |
| 3.8 | 3 | Write a C program to declare a pointer, store the address of a variable in it, and display the value and address of the variable using the pointer. | CO3 |
| 3.9 | 3 | C Program to Access Array Elements Using Pointer | CO3 |
| 3.10 | 3 | Write a C program to swap two numbers using pointers and a user-defined function. | CO3 |
| 3.11 | 3 | C Program to Calculate Average Using Arrays | CO3 |
| 3.12 | 3 | C Program to Find Largest Number Using Dynamic Memory Allocation | CO3 |
| 3.13 | 3 | C Program to Calculate Standard Deviation | CO3 |
| 3.14 | 3 | C Program to Find the Frequency of Characters in a String | CO3 |
| 3.15 | 3 | C Program to Count the Number of Vowels, Consonants and so on | CO3 |
| 3.16 | 3 | C Program to Remove all Characters in a String Except Alphabets | CO3 |
| 3.17 | 3 | C Program to Find the Length of a String | CO3 |
| 3.18 | 3 | C Program to Concatenate Two Strings | CO3 |
| 3.19 | 3 | C Program to Copy String Without Using strcpy() | CO3 |

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|---|---|---|---|
| 3.20 | 3 | C Program to Sort Elements in Lexicographical Order (Dictionary Order) | CO3 |
| 3.21 | 3 | C Program to Find the Frequency of Characters in a String | CO3 |
| 3.22 | 3 | Write a method in C which will remove any given character from a String. | CO3 |
| 3.23 | 3 | Write a program in C to count occurrence of a given character in a String. | CO3 |
| 3.24 | 3 | Write a program in C to check if two Strings are Anagram. | CO3 |
| 3.25 | 3 | Write a program in C to check a String is palindrome or not. | CO3 |
| 3.26 | 3 | C program to check given character is vowel or consonant. | CO3 |
| 3.27 | 3 | C program to check given character is digit or not. | CO3 |
| 3.28 | 3 | C program to replace the string space with a given character. | CO3 |
| 3.29 | 3 | C program to convert lowercase char to uppercase of string. | CO3 |
| 3.30 | 3 | C program to convert lowercase vowel to uppercase in string. | CO3 |
| 3.31 | 3 | C program to delete vowels in a given string. | CO3 |
| 3.32 | 3 | C program to count Occurrence Of Vowels & Consonants in a String. | CO3 |
| 3.33 | 3 | C program to print the highest frequency character in a String. | CO3 |
| 3.34 | 3 | C program to Replace First Occurrence Of Vowel With '-' in String. | CO3 |
| 3.35 | 3 | C program to count alphabets, digits and special characters. | CO3 |
| 3.36 | 3 | C program to separate characters in a given string. | CO3 |
| 3.37 | 3 | C program to remove blank space from string. | CO3 |
| 3.38 | 3 | C program to count blank space from string. | CO3 |
| 3.39 | 3 | C program to concatenate two strings. | CO3 |
| 3.40 | 3 | C program to remove repeated character from string. | CO3 |
| 3.41 | 3 | C program to calculate sum of integers in string. | CO3 |
| 3.42 | 3 | C program to print all non-repeating character in string. | CO3 |
| 3.43 | 3 | C program to copy one string to another string. | CO3 |
| 3.44 | 3 | C Program to sort characters of string. | CO3 |
| 3.45 | 3 | C Program to sort character of string in descending order. | CO3 |
| 3.46 | 3 | Write a program in C for, In array 1-100 numbers are stored, one number is missing how do you find it. | CO3 |
| 3.47 | 3 | Write a program in C for, In a array 1-100 multiple numbers are duplicates, how do you find it. | CO3 |
| 3.48 | 3 | Write a program in C to find first duplicate number in a given array. | CO3 |
| 3.49 | 3 | Write a program in C to remove duplicate elements form array in C. | CO3 |
| 3.50 | 3 | 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 |
| 3.51 | 3 | Write a program in C for, How to compare two array is equal in size or not. | CO3 |
| 3.52 | 3 | Write a program in C to find largest and smallest number in array. | CO3 |
| 3.53 | 3 | Write a program in C to find second highest number in an integer array. | CO3 |
| 3.54 | 3 | Write a program in C to find top two maximum number in array? | CO3 |
| 3.55 | 3 | C program to print array in reverse Order. | CO3 |
| 3.56 | 3 | C program to reverse an Array in two ways. | CO3 |
| 3.57 | 3 | C Program to calculate length of an array. | CO3 |
| 3.58 | 3 | C program to insert an element at end of an Array. | CO3 |
| 3.59 | 3 | C program to insert element at a given location in Array. | CO3 |
| 3.60 | 3 | C Program to delete element at end of Array. | CO3 |
| 3.61 | 3 | C Program to delete given element from Array. | CO3 |

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|---|---|---|---|
| 3.62 | 3 | C Program to delete element from array at given index. | CO3 |
| 3.63 | 3 | C Program to find sum of array elements. | CO3 |
| 3.64 | 3 | C Program to print all even numbers in array. | CO3 |
| 3.65 | 3 | C Program to print all odd numbers in array. | CO3 |
| 3.66 | 3 | C program to perform left rotation of array elements by two positions. | CO3 |
| 3.67 | 3 | C program to perform right rotation in array by 2 positions. | CO3 |
| 3.68 | 3 | C Program to merge two arrays. | CO3 |
| 3.69 | 3 | C Program to find highest frequency element in array. | CO3 |
| 3.70 | 3 | Write a C program to compute factorial and Fibonacci using recursion, and solve the Tower of Hanoi problem. | CO3 |
| 4.1 | 4 | Write a C program to implement (a) linear search and (b) bubble sort on a 1D array. | CO3 |
| 4.2 | 4 | Write a C program to perform matrix multiplication and find the transpose of a matrix using 2D arrays. | CO3 |
| 4.3 | 4 | Write a C program to perform string operations: length, copy, concatenate, compare, reverse – both using and without using built-in functions. | CO3 |
| 4.4 | 4 | C Program to Store Information of a Student Using Structure | CO3 |
| 4.5 | 4 | C Program to Store Information of Students Using Structure | CO3 |
| 4.6 | 4 | C Program to Store Data in Structures Dynamically | CO3 |
| 4.7 | 4 | C Program to Store Information of a Student Using Structure | CO3 |
| 4.8 | 4 | C Program to Add Two Distances (in inch-feet system) using Structures | CO3 |
| 4.9 | 4 | 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.<br>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. | CO3 |
| 5.1 | 5 | Write a C program to demonstrate dynamic memory allocation using malloc(), calloc(), realloc(), and free(). | CO3 |
| 5.2 | 5 | C Program to Write a Sentence to a File | CO3 |
| 5.3 | 5 | C Program to Read the First Line From a File | CO3 |
| 5.4 | 5 | C Program to showcase use of DMA | CO3 |
| 5.5 | 5 | C Program to Write a record to a File | CO3 |
| 5.6 | 5 | C Program to Read the last Line From a File | CO3 |
| 5.7 | 5 | Program to create a file using command line argument | CO3 |
| 5.8 | 5 | Program to copy one file into another | CO3 |
| 5.9 | 5 | Implement macro handling | CO3 |
| 5.10 | 5 | Program to write a structure into a file and display its content | CO3 |
| 5.11 | 5 | Program to search a record in a file | CO3 |
| 5.12 | 5 | Program to implement multi line macro and Conditional Macros | CO3 |
| 5.13 | 5 | Program to draw Circle/Rectangle/Triangle/ A Hut/with colors in it | CO3 |
| 5.14 | 5 | Program to shut down/ sleep a system if not component is being touched | CO3 |
| 5.15 | 5 | Write a program in C to create and store information in a text file. | CO3 |
| 5.16 | 5 | Write a program in C to read an existing file.: | CO3 |
| 5.17 | 5 | Write a program in C to write multiple lines to a text file.: | CO3 |
| 5.18 | 5 | Write a program in C to read the file and store the lines in an array. | CO3 |
| 5.19 | 5 | Write a program in C to find the number of lines in a text file. | CO3 |

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| 5.20 | 5 | Write a program in C to find the content of a file and the number of lines in a text file. | CO3 |
| 5.21 | 5 | Write a program in C to count the number of words and characters in a file. | CO3 |
| 5.22 | 5 | C Program to list all files and sub-directories in a directory | CO3 |
| 5.23 | 5 | C Program to count number of lines in a file | CO3 |
| 5.24 | 5 | C Program to print contents of file | CO3 |
| 5.25 | 5 | C Program to copy contents of one file to another file | CO3 |
| 5.26 | 5 | C Program to merge contents of two files into a third file | CO3 |
| 5.27 | 5 | C Program to read records from a data file | CO3 |
| 5.28 | 5 | C Program to count number of lines, words, characters, blank space in a file | CO3 |
| 5.29 | 5 | C Program to Illustrate how User Authentication is Done | CO3 |
| 5.30 | 5 | C Program to Shutdown Computer in Linux | CO3 |
| 5.31 | 5 | C Program to Compute First N Fibonacci Numbers using Command Line Arguments | CO3 |
| 5.32 | 5 | C Program to Generate Fibonacci Series using Command Line Argument | CO3 |
| 5.33 | 5 | Design an ATM Simulation using C 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.<br>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. | CO3 |
| 5.34 | 5 | The following modules are included in this project. Add Employee Details<br>Edit Employee details<br>Modify Employee<br>Delete Employee<br>Create a Database using C file structure | CO3 |
| 5.35 | 5 | A Library in charge is facing problems in handling books and customers. Design a solution using C regarding his problem | CO3 |
| 5.36 | 5 | 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 system is written entirely in the C programming language. | CO3 |
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# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| LAB Code: DME0151 | LAB Course Name: CAD & Digital Manufacturing | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 0 | 0 | 2 | 1 |

**Pre-requisite: NIL**

**Course Objectives:** The objective of this lab is to enable students to understand and apply the fundamentals of CAD and digital manufacturing, including 2D drafting, 3D modeling, and 3D printing processes. Students will gain hands-on experience with design tools, slicing software, and post-processing techniques to develop functional digital-to-physical prototypes.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Understand the principles of 2D geometry and orthographic projection and apply them to manual and computer-aided drafting. | K3 |
| **CO2** | Develop 3D models of components using CAD tools and apply appropriate dimensioning and modeling techniques. | K3 |
| **CO3** | Identify the components of a 3D printer and understand the workflow from CAD file preparation to STL conversion for 3D printing. | K2 |
| **CO4** | Use slicing software to generate G-code from 3D models and analyze the slicing parameters, support structures, and print previews. | K3 |
| **CO5** | Perform 3D printing of parts and assemblies and demonstrate post-processing techniques to enhance surface finish, fit, and function. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 1 | - | - | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 |
| **CO2** | 3 | 1 | - | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 |
| **CO3** | 3 | 2 | 2 | 1 | 3 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 2 |
| **CO4** | 3 | 1 | - | - | 2 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 |
| **CO5** | 3 | 2 | 2 | 1 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | 3 | 3 |

**List Of Practical's (Indicative & Not Limited To)**

1. To introduce the user interface of CAD software and its elements/tools/commands.
2. To draw the sheet layout and title block using aligned system of dimensioning.
3. To apply the Aligned Dimensioning System to precisely reproduce the given 2D drawings using CAD software.
4. To accurately create and represent the given 2D drawing in CAD, utilizing the Aligned System of dimensioning.
5. To design the given 3D Component in CAD software, utilizing the Aligned System of dimensioning.
6. To design the given 3D Component in CAD software, utilizing the Unidirectional System of dimensioning and Layer Properties.

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|---|
| 7. Introduction to 3D printer and explore features and specifications like Machine setting (e.g., Nozzle, Print Bed, etc.) for FDM 3D printer. |
| 8. To upload the part and set up the position and orientation of the model (use of various commands like Move, Scale, Rotate, Mirror etc.) in slicing software. |
| 9. To use slicing software for converting a 3D CAD model into a G code on cloud based slicing software and adding the reinforcing of layers of composites within slicing software. |
| 10. To create the G-code file for 3D printing purpose using raft, brim and skirt in the slicing software to fulfill the adaptive need of 3d printer. |
| 11. A case study on different types of 3D printers. |
| |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | CAD/CAM: Computer Aided Design And Manufacturing | Azhar Wahab and SSR Krishna |
| 2 | CAD/CAM: Computer Aided Design And Manufacturing | Pearson Publication |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Engineering Drawing | N. D. Bhatt |
| 2 | 3D Printing: A practical and hands-on textbook for mastering 3D printing technology | BPB Publications |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | https://nptel.ac.in/courses/112104031 | 15 hrs |
| Video Lectures | https://nptel.ac.in/courses/113108632<br>https://www.youtube.com/watch?v=VtLXKU1PpRU | 15 hrs |
| Web References | https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_IITMPR_03<br>https://www.youtube.com/ | |

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**GREATER NOIDA-201306**

**(An Autonomous Institute)**

| LAB Course Code: DCSE0152 | LAB Course Name: Web Designing | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 0 | 0 | 2 | 1 |

**Pre-requisite:** Basic Knowledge about web pages

**Course Objectives:** The objective is to understand the principles of web page design and types of websites, visualize and recognize the basic concepts of HTML and its application, recognize and apply the elements of Creating Style Sheet (CSS) with help of Java Script.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Understand the principles of web page design, types of websites, and basic concepts of HTML and CSS. | K2 |
| **CO2** | Apply the basic concepts of Java Script and its application to the web page. | K3 |
| **CO3** | Implement the fundamental ideas of registering domains and web hosting for website. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 1 | - | 2 | 2 | 3 | 2 | 1 |
| **CO2** | 3 | 2 | 3 | 2 | 3 | 1 | 2 | 1 | - | - | 2 | 2 | 2 | 2 | 2 |
| **CO3** | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 1 | 3 | 3 |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction to Websites and HTML** | **7 hours** |
|---|---|---|

**Introduction:** Basic principles involved in developing a web site, Planning process, Responsive Web Designing, Types of Websites (Static and Dynamic Websites), Web Standards and W3C recommendations.

**Introduction to HTML**: HTML Documents, Basic structure of an HTML document, creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks.

| **Unit 2** | **Elements of HTML** | **5 hours** |
|---|---|---|

**Elements of HTML:** HTML Tags, Working with Text, working with Lists, Tables and Frames, working with Hyperlinks, Images, Working with Forms and controls.

| | | |
|---|---|---|
| **Unit 3** | **Concept of CSS** | **6 hours** |
| **Concept of CSS:** Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, working with Lists and Tables, CSS Id and Class, Box Model:- Introduction, Border properties, Padding Properties, Margin properties. | | |
| **Unit 4** | **Introduction to JavaScript** | **6 hours** |
| **Introduction to JavaScript:** Introduction to Client Side Scripting, Introduction to Java Script, JavaScript Types, Variables in JS, Operators in JS, Conditional Statements, Java Script Loops, JS Popup Boxes, JS Functions and Events. | | |
| **Unit 5** | **Web Hosting** | **6 hours** |
| **Web Hosting:** Web Hosting Basics, Registering Domains, Defining Name Servers, Using Control Panel, Creating Emails in Cpanel, Deployment and Management of websites using FTP client, Maintaining a Website. | | |
| | **Total Lecture Hours** | **30 hours** |

**Textbook:**

| S.No | Book Title with publication agency & year | Author |
|---|---|---|
| 1 | "HTML, XHTML, and CSS Bible, 5ed", Wiley India (2010). | Steven M. Schafer |
| 2 | Beginning CSS: Cascading Style Sheets for Web Design 3rd Edition, Wiley India(2011) | Ian Pouncey and Richard York |

**Reference Books:**

| S.No | Book Title with publication agency & year | Author |
|---|---|---|
| 1 | The Principles of Beautiful Web Design, SitePoint 4th edition(2020) | Jason Beaird & James George |
| 2 | Responsive Web Design, A Book Apart 2nd Edition(2014) | Ethan Marcotte |
| 3 | HTML and CSS: Design and Build Websites, Wiley India Ist Edition(2011) | Jon Duckett |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | 1.https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013841749346 0582402881_shared/overview<br>2.https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013094432869 5070722286_shared/overview<br>3.https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013501573460 27110410381/overview | 2hr 56m<br>4hr 55m<br>1hr 44m |
| Video Lectures | 1. https://www.youtube.com/watch?v=HcOc7P5BMi4 | 2hr 6m |

| | | |
|---|---|---|
| | 2. https://www.youtube.com/watch?v=ESnrn1kAD4E<br>3. https://www.youtube.com/watch?v=ajdRvxDWH4w<br>4. https://www.youtube.com/watch?v=LVZOzKs1z6o | 7hr 18m<br>1hr 21m<br>20m |
| Web References | 1. https://www.w3schools.com/whatis/<br>2. https://www.geeksforgeeks.org/web-tech/web-technology/ | |

| **List Of Practical's (Indicative & Not Limited To)** |
|---|
| 1. Create mypage.html with your name as an <h1> heading, a short paragraph introducing yourself, and an <hr> tag for separation. |
| 2. Create an HTML file (practice.html) ensuring all essential tags are present (<!DOCTYPE html>, <html>, <head>, <title>, <body>). |
| 3. Create city.html. Use <h1> for the city name, <h2> for its famous landmarks, and paragraphs (<p>) to describe them, using <br> for line breaks where appropriate. |
| 4. Create a html page to insert horizontal rules. |
| 5. Create a new HTML file and add comments (``) explaining the purpose of each main tag (head, body, title). |
| 6. Create a mobile-responsive layout using basic HTML. |
| 7. In your index.html file, explicitly set the language of the document using the lang attribute in the <html> tag (e.g., <html lang="en">). |
| 8. Create coming-soon.html with an <h1> "Website Under Construction" and a simple paragraph with a "Coming Soon!" message. |
| 9. Create homepage.html with a clear <h1> "Welcome to Our Site" and a paragraph about the site's purpose. |
| 10. Create a page explaining W3C and its purpose. |
| 11. Create an ordered and unordered list. |
| 12. Create a list inside another list. |
| 13. Create a definition list for at least five web development terms (e.g., HTML, CSS, JavaScript, Server, Browser). |
| 14. Create a table with 3 rows and 3 columns. |
| 15. Create a table name Student Gared with <thead> for headers (Name, Subject, Grade) and <tbody> for at least three student records. |
| 16. Design a table for a simple product catalog with columns like Product Name, Price, and Stock, using <th> and <td> tags. |
| 17. Create a table with rowspan and colspan property. |
| 18. Create a web page that provide a basic frame layout. |
| 19. Design a webpage that add an image. |
| 20. Create an image with clickable hyperlink. |
| 21. Create an HTML page with three distinct sections (<section id="section1">, <section id="section2">, etc.) |
| 22. Design a complete registration form including fields for: Username (text), Password (password), Email (email), Age (number), and a Submit button. Include appropriate label tags. |
| 23. Create a feedback form asking: "How would you rate our service?" (radio buttons: Excellent, Good, Fair, Poor) and "What services are you interested in?" (checkboxes: Web Design, SEO, Hosting). |
| 24. Create a form with text input, radio button, checkbox, and submit button. |

25. Design a webpage using CSS that change background color of the body.
26. Design a webpage that should be add margin and padding to elements in CSS.
27. Create one HTML page that uses inline CSS on an <h1>, internal CSS on a <p>, and links to an external style.css for the <body> background color.
28. Create a style lists using CSS.
29. Create two CSS classes:.highlight (yellow background) and .important (red text). Apply these classes to different paragraphs and observe their effects.
30. Create three  elements. Give each a different border-width, border-style, and border-color. Apply padding and margin values to visually differentiate them.
31. Create a div and a p element. Use CSS to set their width and height, and observe how they behave as block elements.
32. Write a script that implement variables and data types
33. Create an alert box using JavaScript.
34. Create a webpage to show a prompt asking for user's name.
35. Write a script to add two numbers.
36. Create an HTML button. When clicked, a JavaScript function should change the text content of a <p> element from "Hello" to "Goodbye!".
37. Create a script that display the current date and time.
38. Create a script to make a form field required using JavaScript validation
39. Create a JavaScript function to validate a form.
40. Create a form with a single text input and a submit button. Use JavaScript to prevent submission if the input field is empty, displaying an alert() message.
41. Write a script to check if a number is even or odd.
42. Create a script to use confirm box before submitting a form.
43. Create a button that, when clicked, uses confirm() to ask "Are you sure you want to delete?". Display an alert() based on the user's Yes/No choice.
44. Write a JavaScript function calculateArea(length, width) that takes two parameters, calculates the area, and returns the result. Display the result in the browser.
45. Create an <img> tag and two buttons ("Next Image", "Previous Image"). Use JavaScript to change the src attribute of the image when buttons are clicked, cycling through an array of image paths.
46. Create an HTML page and upload it using an FTP client.
47. Register a free domain and map it to hosting (use demo platform like InfinityFree).
48. Create email using cPanel.
49. Create a monthly website maintenance checklist that includes tasks like checking for broken links, updating content, checking contact forms, and reviewing analytics.
50. Create a static HTML/CSS website and upload to GitHub Pages.

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**GREATER NOIDA-201306**

**(An Autonomous Institute)**

| LAB Course Code: DASL0151 | LAB Course Name: Acquiring Business Communication (ABC) Lab | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated) | | 0 | 0 | 4 | 2 |

**Pre-requisite: Comprehension of basic English language**

**Course Objectives:**

1. To improve proficiency in the English language to the Intermediate level of CEFR (Common European Framework of Languages).
2. To motivate students to look within and create a better version of 'self.'
3. To introduce the key concepts of etiquette and soft skills.

**Course Outcome:** After completion of the course, the student will be able to

| S. No | Course Outcome | Bloom's Knowledge Level (KL) |
|---|---|---|
| CO1 | Identify essential soft skills for the workplace | K1 |
| CO2 | Apply effective listening skills | K3 |
| CO3 | Acquire fluency and clarity of speech | K3 |
| CO4 | Understand and analyse written texts | K4 |
| CO5 | Create clear, correct, and concise written content | K6 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| CO2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| CO3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| CO4 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 1 |
| CO5 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 3 | 1 |

**List Of Practical**

1. **Orientation**

a. Introduction to the course

b. Introduction to the evaluation scheme & the British Council EnglishScore Tests

**Developing Communication Skills**

- Confidence building activities
- Overcoming initial hesitations

2. ***Anubhav*** **Activity**

- The Students will share their own reservations and expectations from the course.

**Showcasing talents**

- Participants will gain confidence in expressing themselves through song/dance, overcome inhibitions, and develop a sense of freedom and creativity.

3. **Developing active listening and accurate communication skills**

- The students will enhance their listening skills, practice conveying information accurately, and understand the importance of clear communication and active listening.

4. **Language Toolbox 1: Vocabulary enrichment**

- The students will be exposed to General Service List (GSL) by West and Academic Word List (AWL); the students will be asked to keep a journal of new words learnt every day.

5. **Think-Pair-Share for Reading Comprehension**

- The students will actively interact with the reading material by engaging in this activity, collaborating with their peers, and refining their comprehension skills.

6. **Essentials of Writing – Requisites of a good sentence**The students will learn to construct sentences which showcase clarity, consistency and correctness in structure, word usage and punctuation through activities like picture prompts and verbal clues.

7**. Professional Introductions (Video recorded)**

- The students will practice professional introductions with emphasis on clarity, correctness, voice modulation, and engaging content.

8**. Listen and write**

- The students will practice writing exactly what they hear.

**Listen and Repeat**

- The students will practice speaking, with correct pronunciation and intonation, what they hear.

9. **Pronunciation**

- Vowel & Consonant sounds which are difficult for Indian speakers
- Syllable division & accent

10. **Reading Techniques for Time Management**

- The students will be able to identify keywords, headings, and topic sentences. Further, they will be able to analyze and synthesize information from the selected texts.

11. **Paragraph Writing (Unity, Cohesion, Emphasis)**

- The students will learn to write with emphasis on correctness of grammatical structure, concord, voice, and tenses.

12. **Language Toolbox 3: Vocabulary Building – Homophones, homonyms, synonyms, antonyms, phrases & idioms**

- The students will be able to bring in variety in the usage of words.

13. **Building formal attitude through language, dress, and behavior**

- The students will understand the importance of formal dressing and professional behavior in academic and workplace settings.

14. **Clarity in articulation**

- The students will practice accent, rhythm, and intonation in connected speech (Ref. English Score – Speaking/ SVAR/ Versant/etc.)

15. **Listening to follow directions and instructions precisely**

- The students will improve their listening comprehension and enhance their ability to follow instructions & directions.

16. **Speaking in front of an audience**

**JAM, Extempore**

- The students will develop the ability to speak confidently and fluently in front of an audience by organizing their thoughts quickly, expressing ideas clearly, managing time effectively, and using appropriate body language, voice modulation, and eye contact to overcome stage fear and hesitation.

17. **Analysing Caselets**

- The students will improve their analytical and speaking skills by analysing & providing solutions to the issues in the caselets.

18. **Basics of Email Writing**

- The students will be able to write letters/applications on topics from real life scenarios.

19. ***Anubhav* Activity**

- The students will talk about their key takeaways from the sessions/test scores this far.

20. **Analysing Speech/ Ted Talks**

- The students will be able to improve their listening by analysing speeches by famous personalities/Ted Talks.

21. **Sharing views in a group discussion**

- The students will enhance their ability to express their opinions, actively listen to others, and engage in constructive discussions to develop well-rounded perspectives.

22. **Decoding infographics**

- The students will improve their ability to interpret and analyse information presented in diagrams, graphs, and pie charts.

23. **Writing Essay**

- The students will practice writing coherently, logically, precisely, and correctly on a wide variety of topics.

24. ***Anubhav* Activity**

The students will reflect on the semester and the road map ahead.

**Total Hours: 60 hrs.**

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | NPTEL – "Soft Skills" by Prof. Binod Mishra, IIT Roorkee (covers effective communication, group discussion, interviews & presentations) – onlinecourses.nptel.ac.in | 15 |
| | Coursera – "Improve Your English Communication Skills" Specialization, Georgia Institute of Technology – coursera.org | 25 |
| Video Lectures | NPTEL/YouTube – "Communication Skills" by Prof. T. Ravichandran, IIT Kanpur (reading, writing, listening & speaking modules) | 14 |
| | English Speaking & Grammar" series, Learn English with Let's Talk (pronunciation, vocabulary & fluency practice) | 10 |
| Web References | Purdue Online Writing Lab (OWL) – Business Writing & Professional Correspondence – owl.purdue.edu | 5 |
| | BBC Learning English – Business English & Pronunciation modules – bbc.co.uk/learningenglish | 8 |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DNC0103 | Course Name: Essence of Indian Traditional Knowledge | L | T | P | C |
|---|---|---|---|---|---|
| **Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated)** | | **2** | **0** | **0** | **NC** |

**Pre-requisite:** Philosophical Systems, Spiritual Practices, Cultural Heritage, Ayurveda and Traditional Medicine, Architecture

**Course Objectives:** To enable the students to understand the importance of our surroundings and encourage them to contribute towards sustainable development.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Understand the basics of past Indian politics and state polity. | K2 |
| **CO2** | Understand the Vedas, Upanishads, languages & literature of Indian society. | K2 |
| **CO3** | Know the different religions and religious movements in India. | K4 |
| **CO4** | Identify and explore the basic knowledge about the ancient history of Indian agriculture, science & technology, and ayurveda. | K4 |
| **CO5** | Identify Indian dances, fairs & festivals, and cinema. | K1 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | | |
| **CO2** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | | |
| **CO3** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 3 | 3 | 2 | 2 | | |
| **CO4** | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 2 | | |
| **CO5** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 3 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Society State and Polity in India** | **6 hours** |
|---|---|---|

State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women.

| **Unit 2** | **Indian Literature, Culture, Tradition, and Practice** | **6 hours** |
|---|---|---|

Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali,Prakrit And Sanskrit, **Sikh Literature**, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature,Malayalam Literature ,Sangama Literature Northern Indian Languages & Literature, Persian And Urdu ,Hindi Literature.

| Unit 3 | Indian Religion, Philosophy, and Practices | 6 hours |
|---|---|---|
| Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines , Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices. | | |
| **Unit 4** | **Science, Management and Indian Knowledge System** | **6 hours** |
| Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India , Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India ,Writing Technology in India Pyrotechnics in India Trade in Ancient India/,India's Dominance up to Pre-colonial Times. | | |
| **Unit 5** | **Cultural Heritage and Performing Arts** | **6 hours** |
| Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Pottery, Painting, Indian Handicraft, UNESCO'S List of World Heritage sites in India, Seals, coins, Puppetry, Dance, Music, Theatre, drama, Martial Arts Traditions, Fairs and Festivals, UNESCO'S List of Intangible Cultural Heritage, Calenders, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema | | |
| | **Total Lecture Hours** | **30 hours** |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | Indian Art and Culture: for civil services and other competitive Examinations | Nitin Singhania |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | The Wonder that was India (34th impression) | A. L. Basham |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | https://www.classcentral.com/course/swayam-indian-popular-culture-292678<br>https://www.udemy.com/course/indian-history-chronology/ | 24.00<br>1.50 |
| Video Lectures | https://youtu.be/xUphsn5b1w8?si=P8PqTnYUrNP3aWU7<br>https://youtu.be/SeTjQHzLci0?si=E-DEaKnWJEPN8yHj<br>https://youtu.be/32XmLQxwhlQ?si=Ew7hFEL12E_3rPkh<br>https://youtu.be/iof_dTG4cnQ?si=QWhHFeacVcYZ7mmR<br>https://youtu.be/xmtM0ilhBIU?si=w9MQv8HSdzBXD321<br>https://youtu.be/7dT2eg3ekk0?si=YIDa9kfxJfTAyK1l<br>https://youtu.be/xhqP7rPGNu4?si=WxdcjHKqmD3HGWge<br>https://youtu.be/qE23vA4dHkk?si=6D9q-hKN57UVjUUV | 1.00<br>0.09<br>0.23<br>1.05<br>1.09<br>1.26<br>0.26<br>0.33 |
| Web References | https://en.wikipedia.org/wiki/Indian_religions | |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DNC0102 | Course Name: Constitution of India, Law And Engineering | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- First Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated) | | 2 | 0 | 0 | NC |

**Pre-requisite:** Basic understanding of political science

**Course Objectives:** Acquaint the students with legacies of constitutional development in India and help those to understand the most diversified legal document of India and philosophy behind it.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Identify and explore the basic features and modalities about Indian constitution. | K1 |
| **CO2** | Differentiate and relate the functioning of Indian parliamentary system at the center and state level | K2 |
| **CO3** | Differentiate different aspects of Indian Legal System and its related bodies. | K4 |
| **CO4** | Discover and apply different laws and regulations related to engineering practices. | K4 |
| **CO5** | Correlate role of engineers with different organizations and governance models. | K4 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 1 | | |
| **CO2** | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 1 | | |
| **CO3** | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 2 | 1 | | |
| **CO4** | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | | |
| **CO5** | 2 | 2 | 3 | 2 | 1 | 3 | 2 | 3 | 2 | 3 | 2 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction and Basic Information about Indian Constitution** | **6 hours** |
|---|---|---|

Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947,Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.

| **Unit 2** | **Union Executive and State Executive** | **6 hours** |
|---|---|---|

Powers of Indian Parliament Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of Vice-President, Powers and Functions of the Prime Minister, Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013, State Executives – Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.

| Unit 3 | Introduction and Basic Information about Legal System | 6 hours |
|---|---|---|
| The Legal System: Sources of Law and the Court Structure: Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court). Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace. | | |
| **Unit 4** | **Intellectual Property Laws and Regulation to Information** | **6 hours** |
| Intellectual Property Laws: Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information, Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act. | | |
| **Unit 5** | **Business Organizations and E-Governance** | **6 hours** |
| Sole Traders, Partnerships: Companies: The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development. | | |
| | **Total Lecture Hours** | **30 hours** |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | Introduction to the Indian Constitution | Brij Kishore Sharma |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | The Indian Constitution | Madhav Khosla |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | https://www.google.com/url?sa=i&source=web&rct=j&url=https://onlinecourses.nptel.ac.in/noc25_lw02/preview&ved=2ahUKEwjL_K6Lt8KVAxUo3TgGHdmhN3oQy_kOegoIAggACAAIDxAJ&opi=89978449&cd&psig=AOvVaw3iygHhUeKYg3egnz62E-ST&ust=1783577767518000 | 10 |
| Video Lectures | https://nptel.ac.in/courses/129106411? | 10 |
| Web References | https://www.legislative.gov.in/documents/constitution-of-india? | 10 |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DAS0203A | Course Name: Differential Equations and Linear Transformations | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated) | | 3 | 1 | 0 | 4 |

**Pre-requisite: Knowledge of Mathematics I of B. Tech or equivalent.**

**Course Objectives:** The objective of this course is to familiarize the engineering students with techniques of solving Ordinary Differential Equations, Fourier series expansion, Partial Differential Equation, Laplace Transform, Vector space and Linear transformation 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.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Apply the concept of differentiation to solve differential equations. | K3 |
| **CO2** | Illustrate the solution of partial differential equation and expansion of function as Fourier series. | K3 |
| **CO3** | Apply the Laplace transform to solve ordinary differential equations. | K3 |
| **CO4** | Explain the concept of vector space. | K2 |
| **CO5** | Understand the concept of linear transformation and orthogonalization. | K2 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 3 | 3 | 3 | - | - | - | - | 1 | 2 | | |
| **CO2** | 3 | 3 | 3 | 2 | 2 | - | - | - | - | 1 | 2 | | |
| **CO3** | 3 | 2 | 3 | 2 | 3 | - | - | - | - | 1 | 2 | | |
| **CO4** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | 1 | 3 | | |
| **CO5** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | 1 | 3 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Ordinary Differential Equation of Higher Order** | **10 hours** |
|---|---|---|

Linear differential equation of nth order with constant coefficients, 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.

| **Unit 2** | **Fourier Series and Partial Differential Equation** | **10 hours** |
|---|---|---|

Fourier series, Half range Fourier sine and cosine series. Applications in Engineering.

Solution of first order Lagrange's linear partial differential equations, Linear partial differential equations with constant coefficients (homogeneous and non-homogeneous), classification of second order partial differential equations. Solution of one-dimensional wave and heat equations.

| **Unit 3** | **Laplace Transform** | **9 hours** |
|---|---|---|

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 Laplace transform, Convolution theorem, Application to solve simple linear differential equations.

| **Unit 4** | **Vector Space** | **8 hours** |
|---|---|---|
| Vector spaces over R and C, subspace, linear independence and linear dependence of vectors, basis, dimension. | | |
| **Unit 5** | **Linear Transformations** | **8 hours** |
| linear transformations, rank and nullity theorem, inner product spaces and Orthogonalization. Gram–Schmidt Orthogonalization process. | | |
| | **Total Lecture Hours** | **45 hours** |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Higher Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd. | B. V. Ramana, |
| 2 | Higher Engineering Mathematics, Khanna Publisher | **B.**S. Grewal |
| 3 | Advance Engineering Mathematics, Narosa Publishing House. | R K. Jain & S R K. Iyenger |
| 4 | Advance Engineering Mathematics, University Science Press | N.P. Bali |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1 | Advance Engineering Mathematics, John Wiley & Sons. | E. Kreyszig |
| 2 | Advance Engineering Mathematics, Thomson (Cengage) Learning. | Peter V. O'Neil |
| 3 | Calculus, Eleventh Edition, Pearson. | Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas |
| 4 | Calculus and Analytical Geometry, Ninth Edition Pearson. | G.B Thomas, R L Finney |
| 5 | Fourier Series and Boundary Value Problems, 8th Edition-Tata McGraw-Hill. | James Ward Brown and Ruel V Churchill |
| 6 | Linear Algebra : A Modern Introduction, 2nd Edition, Brooks/Cole. | D. Poole |
| 7 | Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi. | Veerarajan T. |
| 8 | Ordinary Differential Equations, Application, Model and Computing, CRC Press T&F Group. | Charles E Roberts Jr |
| 9 | Advanced Engineering Mathematics, 6th Edition, Tata McGraw-Hill. | Ray Wylie C and Louis C Barret |
| 10 | Complex Variable and Applications, 8th Edition, Tata McGraw-Hill. | James Ward Brown and Ruel V Churchill |
| 11 | Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd. | P. Sivaramakrishna Das and C. Vijayakumari |
| 12 | Advanced Engineering Mathematics By Khanna Publishing House, Delhi. | Chandrika Prasad, Reena Garg |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | https://www.coursera.org/learn/differential-equations-engineers#modules | 17 Hrs |
| Video Lectures | **Unit 1** | 27:27m |

| | | |
|---|---|---|
| | https://www.youtube.com/watch?v=1HKn9IvYiEM&list=PLU6SqdYcYsfI5CvOHMVOxxMWdAKWG67Xq&index=1<br>https://www.youtube.com/watch?v=1HKn9IvYiEM&list=PLU6SqdYcYsfI5CvOHMVOxxMWdAKWG67Xq<br>https://www.youtube.com/watch?v=n_3ZmnVnrc4<br>https://www.youtube.com/watch?v=19Vt7ds8Lvw<br><br>**Unit 2**<br>https://www.youtube.com/watch?v=HUKR4LWrZ14&t=74s<br>https://www.youtube.com/watch?v=uei7JPnPpVg<br>https://www.youtube.com/watch?v=ummJvI0Ax2Q<br>https://www.youtube.com/watch?v=bWTmUWWZnhQ<br>https://www.youtube.com/watch?v=wpN1wn98XiA<br>https://www.youtube.com/watch?v=gK1Y11UxOhw<br>https://www.youtube.com/watch?v=Clwkvn77QrE&t=10s<br><br>**Unit 3**<br>https://www.youtube.com/watch?v=OA1OJrfpP20<br>https://www.youtube.com/watch?v=OA1OJrfpP20&list=PLU6SqdYcYsfIWugLkTq1nMoU3rDDx7xpG<br><br>**Unit 4**<br>https://youtu.be/0gHg5X6ng_4<br>https://www.youtube.com/watch?v=_h76n-jR0WA<br><br>**Unit 5**<br>https://youtu.be/zvRdbPMEMUI<br>https://youtu.be/ERfbtPBEYVA<br>https://youtu.be/ZFQteSfxMss | 27:27m<br><br>34:28m<br>19:14m<br><br><br>13:44m<br>8:40m<br>11:44m<br>51:33m<br>12:49m<br>9:31m<br>9:05m<br><br>17:57m<br>17:23m<br><br>7:12m<br>13:16m<br><br>50:09m<br>44:43m<br>59:21m |
| Web References | | |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DEC0201 | Course Name: Digital Electronics and IoT Systems | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 3 | 0 | 0 | 3 |

**Pre-requisite:** Number system

**Course Objective:** The objective of the course is to equip students with the necessary theoretical knowledge, practical skills, and critical thinking abilities to understand, the design and implementation of digital logic circuits and IoT systems effectively.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Understand the fundamentals of Number systems and Boolean algebra. | K2 |
| **CO2** | Design and analyze combinational logic circuits. | K3 |
| **CO3** | Explain the fundamental of sequential logic circuits | K2 |
| **CO4** | Design and analyse the sequential logic circuits | K3 |
| **CO5** | Understand the fundamental concepts, principles, and architecture of the Internet of Things (IoT) | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | 1 |
| **CO2** | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | 2 | 2 |
| **CO3** | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 2 |
| **CO4** | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | 3 | 3 |

**Course Contents / Syllabus**

| **Unit 1** | **Number System and Boolean Algebra** | **9 hours** |
|---|---|---|

Number System and its arithmetic, signed binary numbers, compliments, Binary codes, Cyclic codes, Hamming Code. Boolean Algebra, De Morgan's Theorem, Logic Gates, Canonical SOP & POS Forms representation of Boolean function.

| **Unit 2** | **Combinational Logic Circuits** | **9 hours** |
|---|---|---|

Simplification of Boolean Expression using K-map method in SOP and POS forms, Code Converters, Comparators, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Multiplexers, Demultiplexers, Encoders, and Decoders.

| **Unit 3** | **Fundamental of Sequential Logic Circuits** | **9 hours** |
|---|---|---|

Basic Building Blocks of Sequential circuits like SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops, Excitation and characteristics Table of all Flip Flops, Conversion of Flip-Flops.

| **Unit 4** | **Synchronous & Asynchronous Sequential Circuits** | **9 hours** |
|---|---|---|

Design of clocked sequential circuits, mealy and moore model, Synchronous and Asynchronous counters, MOD counters, Shift Registers, Shift register counters, RAM and ROM.

| **Unit 5** | **Introduction to IOT** | **9 hours** |
|---|---|---|

Introduction to IoT and its Characteristics, Components of the IoT, Conceptual & Architectural Framework of IOT, Microcontroller for IoT. Overview of IoT programming Boards such as Arduino UNO, Arduino NANO, Arduino IDE coding, and Libraries. Interfacing of IO Sensors and Actuators using Arduino board.

| | **Total Lecture Hours** | **45 hours** |
|---|---|---|

**Textbook:**

| S.No. | Book Title | Author |
|---|---|---|
| 1. | "Digital Design", Pearson Education, Global Edition, 2018 | M. Morris R. Mano and Michael D. Ciletti |
| 2. | "The Internet of Things" Pearson, 1st Edition March 2015 | Michael Miller |

**Reference Books:**

| S.No. | Book Title | Author |
|---|---|---|
| 1. | "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009 | R.P. Jain |
| 2. | "Internet of Things: A Hands-On Approach", Orient Blackswan Private Limited, 1st New Delhi, 2015. | Arshdeep Bahga and Vijay Madisetti |
| | | |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | https://www.coursera.org/learn/digital-systems | 29 |
| | https://www.coursera.org/learn/packt-arduino-for-beginners-2023-complete-course-n0axt | 21.5 |
| Video Lectures | **Unit-1** | |
| | https://www.youtube.com/watch?v=juJR_JDJRa | 60 |
| | https://www.youtube.com/watch?v=2cpl_HjcI3A | 23 |
| | https://www.youtube.com/watch?v=hCmbZ0bWPfE&list=PL8aIjWXnCcnReye61TfoB02x81Be6Mh3D | 100 |
| | https://www.youtube.com/watch?v=KergVtV3SxU | 30 |
| | https://www.youtube.com/watch?v=xDARFvArIpc | 16 |
| | https://www.youtube.com/watch?v=iogRGu7nbJw | 14 |
| | **Unit-2** | |
| | https://www.youtube.com/watch?v=EznCqZ1eh5Q | 52 |
| | https://www.youtube.com/watch?v=kgL5UaSVuro | 54 |
| | https://www.youtube.com/watch?v=sUutDs7FFeA | 49 |
| | https://www.youtube.com/watch?v=XCiLHOZsQl8 | 53 |
| | https://www.youtube.com/watch?v=wgje9eH3TT0 | 21 |
| | https://www.youtube.com/watch?v=aLUY-s7LSns&list=PL4h2nw12GXryviGVh9-QzkNW6AW23MPto | 97 |
| | https://www.youtube.com/watch?v=FKvnmxte98A | 12 |
| | https://www.youtube.com/watch?v=g1Lfz1XgrH8&list=PLw4vax4iD7VCB-bJiDL6dCWex6a4E-0Ih&index=2 | 5 |
| | https://www.youtube.com/watch?v=b0z7YKKCCyY&list=PLw4vax4iD7VCB-bJiDL6dCWex6a4E-0Ih&index=3 | 5 |
| | https://www.youtube.com/watch?v=uoBZZ53Okvo&list=PLw4vax4iD7VCB-bJiDL6dCWex6a4E-0Ih&index=7 | 5 |
| | https://www.youtube.com/watch?v=t3Ed13z9uz8 | 9 |
| | https://www.youtube.com/watch?v=4kgPMT9k3bg | 6 |
| | https://www.youtube.com/watch?v=feBvhLFQEDk&list=PLw4vax4iD7VC0ztyX0MIQwkhDtHs81L-y | 32 |
| | **Unit-3** | |
| | https://www.youtube.com/watch?v=ibQBb5yEDlQ | 50 |
| | https://www.youtube.com/watch?v=kt8d3CYWGH4&t=876s | 16 |
| | https://www.youtube.com/watch?v=HZg7fNu-l24 | 8 |
| | https://www.youtube.com/watch?v=uiKKRPZbuXA | 8 |
| | https://www.youtube.com/watch?v=dnfXXpW7tIw&t=1s | 4 |
| | https://www.youtube.com/watch?v=4c6z9RKrC8Q | 4 |
| | https://www.youtube.com/watch?v=j6krFp511HA | 7 |
| | https://www.youtube.com/watch?v=lnQD2_M9uDI | 9 |
| | https://www.youtube.com/watch?v=trPGhO7MPnw | 8 |
| | https://www.youtube.com/watch?v=wcfnEla_Y78 | 3 |
| | https://www.youtube.com/watch?v=9mh-2QwxmF4 | 5 |

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|---|---|---|
| | https://www.youtube.com/watch?v=NytpDrESCV8<br>https://www.youtube.com/watch?v=k-jzR07dY1s<br><br>**Unit-4**<br>https://www.youtube.com/watch?v=0_OZKWdCixw<br>https://www.youtube.com/watch?v=vdZKehWMJSM<br>https://www.youtube.com/watch?v=LHAbLXfRYXk<br>https://www.youtube.com/watch?v=Gc3DL-tmr-g<br>https://www.youtube.com/watch?v=-paFaxtTCkI&list=PLBlnK6fEyqRjed9IBEAAOrchYy4zgIMJ<br>https://www.youtube.com/watch?v=Cd19ohX0770<br>https://www.youtube.com/watch?v=p4R0Ej6FCn0&list=PLgwJf8NK-2e517yYqs3WF7VHUGtrIjKKk&index=1<br><br>**Unit-5**<br>https://www.youtube.com/watch?v=WUYAjxnwjU4&list=PLE7VH8RC_N3bpVn-e8QzOAHziEgmjQ2qE&index=1<br>https://www.youtube.com/watch?v=BXDxYh1EV2w&list=PLE7VH8RC_N3bpVn-e8QzOAHziEgmjQ2qE&index=2<br>https://www.youtube.com/watch?v=fiIGwWieegM&list=PLVl__93X7ZlxnDtEY1_ibH-fECYEAKAQC&index=3 | 7<br>8<br><br><br>9<br>4<br>77<br>90<br>77<br>10<br>13<br><br><br>37<br><br>19<br><br>299 |
| Web References | | |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DCSE0201 | Course Name: Data Structures and Algorithms -I | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 3 | 0 | 0 | 3 |

**Pre-requisite:** C, Python, Logical Thinking

**Course Objectives:** To understand the concepts of data structures and algorithms, its representations, operations and applications for efficient problem solving with computational analysis.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Student is able to understand primitive data structures and concepts related to analysis of algorithms with array-based operations. | K2 |
| **CO2** | To understand and analyze searching, sorting, hashing techniques and operations related to linked list. | K2 |
| **CO3** | Student is able to understand stacks, queues and recursion with their applications. | K3 |
| **CO4** | Student is able to understand the concept of tree data structure and the requirement and application of BST, AVL, Huffman code and heap sort. | K4 |
| **CO5** | Analyze graph algorithms and apply suitable data structure techniques for problem solving | K4 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 1 | 2 | 2 | 2 | - | 3 | 1 | 1 | 3 | 3 | 2 | 2 | 2 |
| CO2 | 3 | 3 | 1 | 2 | 2 | 2 | - | 3 | 1 | 1 | 3 | 3 | 2 | 2 | 2 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | - | 3 | 1 | 1 | 3 | 3 | 2 | 2 | 2 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 2 | - | 3 | 1 | 1 | 3 | 3 | 2 | 2 | 2 |
| CO5 | 3 | 3 | 2 | 2 | 2 | 2 | - | 3 | 1 | 1 | 3 | 3 | 2 | 2 | 2 |

**Course Contents / Syllabus**

| Unit 1 | Fundamentals of Data Structures, Algorithms and Arrays | 9 hours |
|---|---|---|

Introduction to Data structure: Introduction to Data Structures, Need and Classification of Data Structures, Primitive and Non-Primitive Data Structures, Static and Dynamic Data Structures, Abstract Data Types (ADT)

Introduction to Algorithms: Characteristics and Design Principles of Algorithms, Algorithm Efficiency, Time and Space Complexity, Asymptotic Notations: Big Oh, Big Theta and Big Omega, Time-Space Trade-off

Arrays: One-Dimensional and Multidimensional Arrays, Memory Representation of Arrays, Row Major and Column Major Order, Index Formulae for 1-D, 2-D, 3-D and n-D Arrays, Array Operations: Traversal, Insertion and Deletion, Applications of Arrays: Sparse Matrices and their Representation.

| Unit 2 | Searching, Sorting and Linked Lists | 9 hours |
|---|---|---|

**Searching and Sorting:** Concept of Searching, Linear Search, Binary Search. Concept of Hashing & Collision resolution Techniques used in Hashing. Sorting: Insertion Sort, Selection, Bubble Sort, Merge Sort and Quick Sort.

**Link List:** Introduction to pointers and dynamic memory allocation, limitations of arrays. Singly linked lists, doubly linked lists, circular linked lists, operations (insertion, deletion, traversal, searching). Applications of linked lists: polynomial representation and addition.

| Unit 3 | Stacks and Queues | 9 hours |
|---|---|---|

**Stacks and Queues:** Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Iteration and Recursion- Principles of recursion, Tail recursion, Removal of recursion Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers. Tradeoffs between iteration and recursion.

**Queues:** Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

| **Unit 4** | **Trees** | **9 hours** |
|---|---|---|

Basic terminology used with Tree, Binary Trees, Binary Tree Representation: Array Representation and Pointer(Linked List) Representation, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree. Extended Binary Trees, Tree Traversal algorithms: Inorder, Preorder and Postorder, Constructing Binary Tree from given Tree Traversal, Operation of Insertion, Deletion, Searching & Modification of data in Binary Search. Threaded Binary trees, Traversing Threaded Binary trees. Huffman coding using Binary Tree. Concept & Basic Operations for AVL Tree, Binary Heaps and Heap Sort.

| **Unit 5** | **Graph** | **9 hours** |
|---|---|---|

Introduction to graphs, terminology, types of graphs. Graph representations (adjacency matrix and adjacency list). Graph traversal techniques: BFS and DFS. Minimum spanning tree algorithms: Prim's and Kruskal's. Shortest path algorithms: Dijkstra's and Bellman Ford algorithm.

| | |
|---|---|
| **Total Lecture Hours** | **45 hours** |

**Textbook:**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1** | "Data Structures and Algorithms in Python: An Indian Adaptation", 1st Edition, 2021. | Michael T. Goodrich, Roberto Tamassia |
| **2** | "Data Structures" Schaum's Outline Series, Tata McGraw-hill Education (India) Pvt. Ltd, 2nd Edition, 2017. | Lipschutz |
| **3** | "Fundamentals of Data Structures", Computer Science Press, 1st Edition, 1993. | Horowitz and Sahani |

**Reference Books:**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1** | Introduction to Algorithms, 4th ed. Cambridge, MA, USA: MIT Press, 2022. | T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein |
| **2** | Data Structures and Algorithms Made Easy: Data Structure and Algorithmic Puzzles, 5th ed. Noida, India: CareerMonk Publications, 2016. | N. Karumanchi |
| **3** | Grokking Algorithms: An Illustrated Guide for Programmers and Other Curious People, 2nd ed. Shelter Island, NY, USA: Manning Publications, 2024 | A. Y. Bhargava |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | https://www.udemy.com/course/datastructurescncpp/?couponCode=UDEAFFHP22025' | 30 hours |
| Video Lectures | **Unit 1**<br>https://www.youtube.com/watch?v=I_JuQ5ayPmc&list=PLkIpj7mL1E7uSElwIoJpgBnOQ8RJrYKzX<br>**Unit 2**<br>https://www.youtube.com/watch?v=AV0qlnUcDW4&list=PLydVRO-Y2TQmxJvYFLQqv5tSTK7IAG0VF<br>**Unit 3** | 11 m<br><br>9 m |

| | | |
|---|---|---|
| | https://www.youtube.com/watch?v=nqowUJzG-iM&list=PL_z_8CaSLPWekqhdCPmFohncHwz8TY2Go<br>**Unit 4**<br>https://www.youtube.com/watch?v=DKCbsiDBN6c&list=PLGq9jf3A_hHCe2w7jmjKAUiyg_bfoGzH1<br>**Unit 5**<br>https://www.youtube.com/watch?v=hq_3iqS0Hq0 | 14 m<br><br>8 m<br><br>8 m |
| Web References | https://mrcet.com/downloads/digital_notes/CSE/II%20Year/DATA%20STRUCTURES%20DIGITAL%20NOTES.pdf<br><br>https://gtl.csa.iisc.ac.in/hari/wp-content/uploads/2021/10/dsa.pdf | |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DCSE0202 | Course Name: Intelligent Interaction Systems | L | T | P | C |
|---|---|---|---|---|---|
| **Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated)** | | **2** | **0** | **0** | **2** |

**Pre-requisite:** Basic proficiency in C programming and familiarity with AI

**Course Objectives:** This course emphasizes the study and application of AI-driven technologies including prompt engineering, large language models (LLMs), generative AI tools, for engineering education, research, and industry challenges. It aims to solve real-world problem-solving scenarios while adhering to ethical and industry standards.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Apply principles of prompt engineering, and large language models (LLMs) | K3 |
| **CO2** | Analyze GenAI tools for solving real-world problems. | K4 |
| **CO3** | Analyze effectively knowledge engines and version control system for up-to-date information management. | K4 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 3 | 2 | 3 | - | - | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 2 |
| **CO2** | 3 | 3 | 3 | 3 | 3 | 1 | - | 2 | 2 | 2 | 2 | 3 | 1 | 2 | 2 |
| **CO3** | 3 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 3 | 3 | 2 | 3 | 1 | 2 | 2 |

**Course Contents / Syllabus**

| **Unit 1** | **Commanding Intelligence: The Magic of Prompts** | **6 hours** |
|---|---|---|

Introduction to Prompt Engineering, Understanding Large Language Models (LLMs), Principles of Effective Prompt Design, Prompt Engineering Techniques Applications in Engineering and Emerging Technologies, Prompt engineering hands on exercises (using ChatGPT or similar tools)

| **Unit 2** | **Generative AI: Role in Modern Classrooms and Workplaces** | **8 hours** |
|---|---|---|

Introduction to Generative AI Tools in Engineering, how GenAI works, Use cases of personal tutoring, automatic grading assistance, lecture plan, customer support automation, content creation for emails, reports, startup investor pitch using ChatGPT, coding education in terms of code generation, bug, error tracking in real-time, brainstorm design solutions, rapid prototyping of collaborative project, code generation, SQL query optimization using Copilot.

| **Unit 3** | **Integrating Conversational and Multimodal AI in Education and Research** | **8 hours** |
|---|---|---|

Introduction to Conversational AI and Multimodal AI, Overview of Google Bard (conversational), and Google Gemini (multimodal), use case of conversational Al- Personalized Student Feedback ( tailored feedback on essays or coding assignments), Interactive Learning Assistants (chatbots answering student queries) in real time using Bard, use case of Multimodal Al - Multimodal Assessments (Analyzing student submissions combining text, sketches, and audio).

| **Unit 4** | **Leveraging Knowledge Engine & Version Control System** | **8 hours** |
|---|---|---|

Introduction of knowledge engine, use case of Research Assistance, Lesson Planning, Critical Thinking Development (Market trends and analysis), Knowledge Retention (centralized repositories for students training), using Perplexity.

Introduction of version control engine, use case of automated assignment grading, peer review workflow, collaborating on codebases, track changes, and resolve conflicts, Version-controlled technical manuals ensure up-to-date knowledge sharing using GitHub.

| | |
|---|---|
| **Total Lecture Hours** | **30 hours** |

**Textbook:**

| S.No | Book Title with publication agency & year | Author |
|---|---|---|
| 1 | Github for dummies Kindle Edition | Sarah Guthals |

**Reference Books:**

| S.No | Book Title with publication agency & year | Author |
|---|---|---|
| 1 | Chat GPT: The Evolution of AI Kindle Edition | Moksh Khatri |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | **Prompt Engineering:**<br>https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013719953643773952304_shared/overview<br>**Evaluating Large Language Model:**<br>https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013861821299793920151_shared/overview<br>**Git & GitHub - The Practical Guide:**<br>https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_014157700643831808217/overview | 3h36m<br>3h23m<br>10h24m |
| Video Lectures | **Unit 1**:<br>https://www.youtube.com/watch?v=_ZvnD73m40o<br>**Unit 2**:<br>https://www.youtube.com/watch?v=bBqTdOkso2Y<br>**Unit 3**:<br>https://www.youtube.com/watch?v=DJtX3S7qx2s<br>https://www.youtube.com/watch?v=NqqBfW4PYlQ<br>**Unit 4**:<br>https://www.youtube.com/watch?v=9G5Y2DiBVek | 41m35s<br>1h52m7s<br>1h18m59s<br>1h29m21s<br>31m32s |
| Web References | https://www.ibm.com/think/topics/prompt-engineering<br>https://www.ibm.com/think/topics/large-language-models<br>https://www.geeksforgeeks.org/artificial-intelligence/what-is-conversational-ai/<br>https://www.geeksforgeeks.org/artificial-intelligence/what-is-multimodal-ai/<br>https://www.geeksforgeeks.org/git/version-control-systems/<br>https://www.geeksforgeeks.org/git/what-is-git-version-control/ | 5h |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DASL0202 | Course Name: French Language | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 2 | 0 | 0 | 2 |

**Pre-requisite: Basic understanding of the English language.**

**Course Objectives:**

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

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Identify and recall basic elements of the French language, including greetings, simple vocabulary, and expressions related to identity. | K1 |
| **CO2** | Recall and reproduce common phrases used for self-introduction and basic everyday communication in French. | K1 |
| **CO3** | Explain and use simple French expressions to ask questions and navigate everyday situations such as directions and locations. | K2 |
| **CO4** | Describe routine activities and personal preferences using basic French vocabulary and sentence structures. | K2 |
| **CO5** | Apply appropriate French language structures to describe people, family relationships, and personal interests in simple conversational contexts. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | - | 1 | 1 | - | - | - | - | - | - | 2 | - | - | - |
| **CO2** | - | 1 | - | - | - | 1 | - | - | 1 | 3 | - | - | - |
| **CO3** | - | 2 | - | - | - | 2 | - | - | 2 | 3 | - | - | - |
| **CO4** | - | - | - | - | - | 2 | - | - | 2 | 3 | - | - | - |
| **CO5** | - | - | - | - | - | 3 | 1 | 2 | 2 | 3 | - | - | - |

**Course Contents / Syllabus**

| **Unit 1** | **Basics of French language and Identity** | **6 hours** |
|---|---|---|

- Culture & Civilization
- Salutations (formal and informal)
- Alphabets and Accents
- Numbers
- Definite articles
- Vocabulary: Countries and Nationalities; Professions
- Filling a registration Form/ ID card

| **Unit 2** | **Introducing Oneself and Everyday Communication** | **6 hours** |
|---|---|---|

- Subject pronouns; Use of 'tu' and 'vous'
- Verbs: Être and Avoir
- Possessive Adjectives

- Introduction (1st person, 3rd person)
- Give and take Personal Information
- Indefinite Articles
- Days of the Week, Months of the Year
- Vocabulary: Daily Life Objects
- Talk about Likes and Dislikes (Aimer, Adorer, Détester, Préférer + Noun/ Verb)
- Negation (ne…pas)

| **Unit 3** | **Navigating the City and Asking Questions** | **6 hours** |
|---|---|---|

- Vocabulary: Places in a city
- Prepositions
- Contracted Articles
- Vocabulary: Modes of Transports
- Verbs: Prendre, Déscendre, Aller
- Talk about one's city
- Interrogation (close-ended); Interrogation (open-ended)
- Directions; Time
- Invitation to a Place: Acceptance & Refusal

| **Unit 4** | **Talking About Activities and Preferences** | **6 hours** |
|---|---|---|

- Talk about activities, places, weather, etc
- Verbs: Venir, Faire
- Vocabulary: Professions, Sports and Cultural Activities
- Verbs: Faire, Aller + Contracted Articles + Activities

| **Unit 5** | **Describing People, Family, and Interests** | **6 hours** |
|---|---|---|

- Qualitative Adjectives
- Talk about interests and hobbies
- Vocabulary: Family
- Talk about a family

| | **Total Lecture Hours** | **30 hours** |
|---|---|---|

**Text Book :**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1.** | Alter Ego | Annie Berthet, Catherine Hugot, Véronique M. Kizirian, Emmanuelle Daill |

**Reference Books :**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1.** | Edito 1 (Méthode de français/Cahiers d'exercices) | Lucie Mensdorff-Pouilly, Caroline Spérandio, Roxane Amoravain (et al.) |
| **2.** | Saison A1 (Méthode de français/Cahier d'exercices) | Marie-Noëlle Cocton, Delphine Ripaud, Anne-Laure Kieffer |

| **Self-Study Content Links:** | **Duration (in Hrs)** |
|---|---|

| | | |
|---|---|---|
| MOOCs | https://www.udemy.com/share/103BEs3@_JNcFDcpMjZHwIefu_aoNEGRrOgcZH0W8oJB_366JGb14wajJLW7WoGRRe8j_JAwcg==/<br>https://www.udemy.com/share/101CD03@1rBLasBniB-WwikfO2XBbfgg050QZagfzpo6TEiBkSqIajUNMDfKsE9MSQCiAeELDg==/<br>https://www.coursera.org/learn/french-beginner#modules | **10hrs** |
| Video Lectures | https://www.youtube.com/playlist?list=PL8zlR8aXkW8E2RNQbZvLdprSzhvgBfmax<br>https://apprendre.tv5monde.com/fr/exercices/premiere-classe | **6hrs** |
| Web References | https://www.ccubeacademy.com/french-grammar-quiz/<br>https://www.ccubeacademy.com/numbers-in-french-0-to-100/<br>https://archive.org/details/AlterEgo1.CahierDactivites/page/n11/mode/2up<br>https://www.scribd.com/document/647857104/Edito-A1-Nouvelle-Edition-Cahier#page=15 | **4hrs** |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DASL0203 | Course Name: German | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 2 | 0 | 0 | 2 |

**Pre-requisite: No prior knowledge of German language is required; willingness to learn a foreign language is encouraged.**

**Course Objectives:**

- To develop basic proficiency in listening, speaking, reading and writing through structured beginner-levels tasks.
- To enable students to use basic German expressions effectively in familiar personal and social contexts.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Identify and recall elementary German sounds, expressions and basic vocabulary used in familiar everyday contexts. | K1 |
| **CO2** | Explain and use foundational grammatical structures to form simple sentences and basic question forms in German. | K2 |
| **CO3** | Use basic spoken German expressions to communicate effectively in routine situations, including self-introduction and everyday social interactions. | K3 |
| **CO4** | Interpret and produce short beginner-level texts such as forms, simple messages and guided written responses in German. | K3 |
| **CO5** | Demonstrate basic proficiency in listening, speaking, reading and writing through guided communicative tasks aligned with foundational CEFR A1 learning outcomes. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | - | 1 | - | - | - | - | 1 | 1 | 2 | 3 | 1 | | |
| **CO2** | - | 2 | 1 | - | - | - | 1 | 1 | 2 | 3 | 1 | | |
| **CO3** | - | 2 | 2 | - | - | 1 | 1 | 1 | 3 | 3 | 1 | | |
| **CO4** | - | 2 | 2 | 1 | - | - | 1 | 1 | 2 | 3 | 2 | | |
| **CO5** | - | 2 | 2 | 1 | - | - | 1 | 2 | 3 | 3 | 2 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Introductory Communication in German (Greetings, Introductions and Personal Information)** | **6 hours** |
|---|---|---|

**• Learning Objectives**

- Greetings and farewells (Grüßen und Verabschieden)
- Spelling words and alphabet
- Self-introduction and introducing others (Sich und andere vorstellen)
- Asking about well-being (Nach dem Befinden fragen)
- Numbers 1-20 (Zahlen bis 20)
- Phone numbers and email addresses (Telefonnummer und E-Mail-Adresse)

**Grammar Topics:**

- W-questions (W-Fragen)
- Statement sentences (Aussagesätze)

- Verbs (regelmäßige Verben) and personal pronouns (Personalpronomen in Texten)
- Countries and languages

**Skill Focus (LSRW):**

- **Listening:** Understanding greetings, introductions and short exchanges involving personal information, numbers and contact details through guided audio input.
- **Speaking:** Self-introduction, spelling practice, and simple question–answer interactions using basic personal information.
- **Reading:** Reading short introductory dialogues and simple texts related to personal information and everyday interactions.
- **Writing:** Writing basic self-introductions and completing simple personal information forms.

| Unit 2 | Personal Interest and Social Interaction (Hobbies, Professions and Everyday Interaction) | 5 hours |
|---|---|---|

- **Learning Objectives:**

- Describing hobbies and free time activities
- Talking about professions and work
- Using numbers and time expressions
- Plural forms of nouns
- Zahlen ab 20(Numbers 20 onwards)

**Grammar Topics:**

- Unregelmäßige Verben (Irregular Verbs) und Personalpronomen
- Verben haben und sein
- Definite articles (der, die, das)
- Plural formation and endings
- Numbers and working hours
- Ja/Nein Fragen (Yes/NO questions)

**Skill Focus (LSRW):**

- **Listening**: Understanding short conversations related to hobbies, professions, numbers and simple time-related expressions.
- **Speaking:** Pair practice on introducing interests, talking about professions, asking and answering simple questions, and exchanging information about schedules and working hours.
- **Reading:** Reading short dialogues and simple texts related to work, hobbies and everyday activities.
- **Writing:** Constructing simple sentences and guided descriptive writing using basic vocabulary, numbers and time expressions.

| Unit 3 | Everyday Functional Communication (City Life, Directions and Orientation) | 6 hours |
|---|---|---|

- **Learning Objectives:**

- Describing cities and famous buildings
- Giving directions and talking about transportation
- Months and seasons
- Cultural sites and events

**Grammar Topics:**

- Indefinite articles (ein, eine)
- Negation with "nicht und kein"
- Imperativ mit Sie
- Adjektive mit sein(verb)

- Transportation vocabulary
- Prepositions for directions (links, rechts, geradeaus)

**Skill Focus (LSRW):**

- **Listening**: Understanding short conversations related to directions, transportation, time expressions (months and seasons) and place-related information.
- **Speaking**: Guided speaking practice for asking and giving directions, describing locations and places, and using polite imperative forms in simple interactions.
- **Reading**: Reading short notices, maps, signs and simple dialogues related to places, travel and cultural activities.
- **Writing**: Writing simple descriptions of places and short responses related to directions, travel and basic situational contexts.

| Unit 4 | Situational Interaction Skills (Food, Shopping and Daily Life Communication) | 6 hours |
|---|---|---|

**Learning Objectives:**

- Food and drink vocabulary
- Shopping for groceries
- Ordering in restaurants
- Talking about taste and preferences
- Daily eating habits and mealtimes

**Grammar Topics:**

- Accusative case
- Verbs with Akkusativ
- Articles in accusative case
- Food-related Verbs (essen, trinken, kosten, schmecken)
- Verben (mögen und möchten)
- Quantities and measurements

**Skill Focus (LSRW):**

- **Listening:** Understanding short conversations related to food, ordering in restaurants and simple shopping situations.
- **Speaking:** Guided speaking practice for ordering food, expressing preferences using mögen/möchten, and interacting in simple shopping situations.
- **Reading:** Reading short menus, price lists and simple dialogues related to food and shopping.
- **Writing:** Writing simple sentences and short messages describing food preferences, meal habits and basic shopping interactions.

| Unit 5 | Everyday Life (Family, Time and Routine Activities) | 6 hours |
|---|---|---|

**Learning Objectives:**

- Daily routines and schedules
- Family relationships
- Telling time (official and unofficial)
- Making telephonic appointments
- Expressing necessity and possibility by using Modal verbs

**Grammar Topics:**

- Time Expression and telling time
- Time Expression: am, um, von……bis
- Modal verbs (können, müssen, wollen)
- Possessive pronouns (mein, dein, sein, ihr) (Nominativ und Akkusativ)

**Skill Focus (LSRW):**

- **Listening:** Understanding short conversations related to daily routines, family interactions, time expressions and telephonic appointments.
- **Speaking:** Guided conversational practice describing daily activities, family members, telling time, and making simple appointments using modal verbs.
- **Reading:** Reading short texts and dialogues related to routines, schedules, appointments and family life.
- **Writing:** Writing simple sentences, short messages and brief paragraphs describing daily routines, time schedules and basic personal situations.

| | |
|---|---|
| **Total Lecture Hours** | **30 hours** |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | Netzwerk Neu A1 | Klett Sprachen |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | Studio D A1 (Cornelsen Verlag GmbH & Co.) | Hermann Funk, Christina Kuhn, Silke Demme |
| 2. | Langescheidt Dictionary | |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | Alison – Beginner German 101 and 102 - Beginner German 101\| Alison and Beginner German 102 \| Alison<br>NOC: German - I, IIT Madras - German - I \| SWAYAM -IIT MADRAS VHS A1 Learn Deutsch - A1-Deutschkurs - A1-Deutschkurs<br>DW Learn Deutsch – Harry gefangen in der Zeit – A1 DW Learn Deutsch – Nicos Weg A1- A1-Nicos Weg DW | 10 |
| Video Lectures | Goethe Institut - Deutsch für dich<br>Goethe Institut - Goethe-Zertifikat A1: Start Deutsch 1 – Prüfungsteil Hören mit Lösungen Offical<br>Deutsche Welle Deutsch lernen mit der DW - Officiall | 6 |
| Web References | Klett Netzwerk Neu A1 - Deutsch als Fremdsprache \| Klett Sprachen Netzwerk Neu A1- Netzwerk neu - Start - Ernst Klett Sprachen GmbH Netzwerk A1 Interaktives Übungsbuch- Netzwerk neu A1.1 \| Digital book VHS Lernportal - A1 Strat vhs-Lernportal<br>Goethe Institut - Deutsch Üben- Goethe-Institut | 4 |

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**GREATER NOIDA-201306**

**(An Autonomous Institute)**

| Course Code: DASL0204 | Course Name: Japanese | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 2 | 0 | 0 | 2 |

**Pre-requisite: NA**

**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 Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Understand and be familiar with basic Japanese Language concepts and the culture. | K1 |
| **CO2** | Recognise the fundamental vocabulary. | K1 |
| **CO3** | Use simple vocabulary and sentences in everyday conversations. | K3 |
| **CO4** | Read and write simple sentences. | K2 |
| **CO5** | Use complex sentences and develop basic writing skills. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | - | 1 | 1 | - | - | - | 1 | 1 | 2 | 3 | 1 | - | - |
| **CO2** | - | 1 | 1 | - | - | - | 1 | 1 | 2 | 3 | 2 | - | - |
| **CO3** | - | 2 | 2 | 1 | - | 1 | 1 | 1 | 2 | 3 | 2 | - | - |
| **CO4** | - | 2 | 2 | 1 | - | 1 | 1 | 1 | 3 | 3 | 2 | - | - |
| **CO5** | - | 2 | 2 | 1 | - | 1 | 1 | 1 | 3 | 3 | 2 | - | - |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction to Japanese** | **6 hours** |
|---|---|---|

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 (jikoshokai)

| **Unit 2** | **Vocabulary building** | **6 hours** |
|---|---|---|

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

| **Unit 3** | **Everyday common simple sentences** | **6 hours** |
|---|---|---|

Vocabulary lessons 5&6, Grammar explanation, Colour & taste, Conversations in post office, Conversations with friends, Making a request, Making an enquiry – Railway Station, Buying Fruits & Vegetables, Names of the Animals, Question formation.

| **Unit 4** | **Reading and Writing** | **6 hours** |
|---|---|---|

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

| **Unit 5** | **Skilled Writing** | **6 hours** |
|---|---|---|

| | |
|---|---|
| NIET Greater Noida Autonomous Institute | **NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**<br>**GREATER NOIDA-201306**<br>**(An Autonomous Institute)** |

| | | | |
|---|---|---|---|
| Write short text on oneself., Grammar: Pronouns – subject, object, possessive, Modal verbs | | | |
| | | **Total Lecture Hours** | **30 Hours** |
| **Textbook:** | | | |
| **S.No** | **Book Title** | **Author** | |
| 1. | Minna no nihongo – N5 | 3A Corporation | |
| **Self-Study Content Links:** | | | **Duration (in Hrs)** |
| MOOCs | https://nptel.ac.in/courses/121104005https://nptel.ac.in/courses/121104005<br>https://www.coursera.org/learn/japanese-language-1<br>https://www.udemy.com/course/japanese-n5-course/<br>https://alison.com/course/japanese-language-introduction-to-japanese-scripts<br>https://alison.com/course/japanese-for-beginners | | 10hrs |
| Video Lectures | https://youtu.be/c069yRMdPyY?si=nFtcvhjgx-kHCC6m<br>https://youtu.be/RrCkS2PEL7I?si=zYC4RBIgWsiGDjQK<br>https://youtu.be/3iSXUpA0wzY?si=VfE2YbAJVYgAX7Uv<br>http://youtu.be/ArOfXbCC-WE?si=Jojvv_EXCuykl27F<br>https://youtu.be/xcTI2rPN_BE?si=Zz40L7xE5UOT2XZK<br>https://youtu.be/EDCbKMNalVc?si=5YcpD-rTFNAWsXnX<br>https://youtu.be/jcGWIWgOmWw?si=bY-NPf6B61UvuNOW<br>https://youtu.be/3nIKTbSsjvg?si=RS15u5NYDghDxYzM | | 6hrs |
| Web References | https://www.marugoto-online.jp/info/jp/sp/index.html#mainContents<br>https://www.hikidasu.jpf.go.jp/en/corner/drama/ | | 4hrs |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| LAB Course Code: DEC0251 | LAB Course Name: Digital Electronics and IoT Systems Lab | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 0 | 0 | 2 | 1 |

**Pre-requisite:**

**Course Objectives:** The student will learn about

1. Verification of truth table of various type of logic gates.
2. Designing and verification of different type of combinational circuits.
3. Implementation and verification of truth table of various type of flip-flops.
4. Designing and implementation of different types of sequential circuits.
5. Implementation of Programming in IoT development boards with IO sensors.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Verify truth table of various type of Logic Gates. | K2 |
| **CO2** | Design, implement and verify combinational logic circuits. | K4 |
| **CO3** | Implement and verify truth table of various types of flip-flops. | K3 |
| **CO4** | Design and analyse different types of sequential logic circuits. | K4 |
| **CO5** | Implement programming in IoT development boards with IO sensors | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | - | - | - | - | - | - | 3 | 2 | 2 | 1 | 2 | 2 |
| **CO2** | 3 | 3 | 3 | - | - | - | - | - | 3 | 2 | 2 | 1 | 2 | 2 |
| **CO3** | 3 | 2 | 3 | - | - | - | - | - | 3 | 2 | 2 | 1 | 2 | 2 |
| **CO4** | 3 | 3 | 3 | - | - | - | - | - | 3 | 2 | 2 | 1 | 2 | 2 |
| **CO5** | 3 | 3 | 3 | - | - | - | - | - | - | 2 | 2 | 1 | 2 | 2 |

**List Of Practical's (Indicative & Not Limited To)**

1. Verification of the truth tables of Basic Logic Gates and Universal Logic Gates using TTL ICs.

a) AND (7408)
b) OR (7432)
c) NOT (7404)
d) NAND (7400)
e) NOR (7402)

2. Implementation of the given Boolean function using TTL Logic Gates (NOT, AND and OR Gates) in SOP for following Boolean expressions:

a) Y1=AB' +A'B
b) Y2=ABC + A'B'C' + A'C

| | |
|---|---|
| c) | F(A,B,C,D)=∑(0,2,5,7,8,10,13,15) |
| **3.** | Implementation of the given Boolean function using TTL Logic gates (NOT, AND and OR Gates) in POS forms for following Boolean expressions:<br>a) Y1=(A'+B)(A+B')<br>b) Y2= (A+B+C)(A'+B'+C')(A'+C)<br>c) F(A,B,C,D)= M(0,2,5,7,8,10,12,15) |
| **4.** | Implementation of Half-adder, Full-adder and Full-adder using two Half-adder with TTL Logic Gates (EXOR-7486, AND-7408, OR-7432) and verify its truth table. |
| **5.** | Implementation of Half-subtractor, Full-subtractor and Full-subtractor using two Half-subtractor with TTL Logic Gates (EXOR-7486, AND-7408, OR-7432) and verify its truth table. |
| **6.** | Implement 2 Bit magnitude comparator using logic gates and verify the truth table. |
| **7.** | Implement and verify F (A,B,C) = ∑ (3, 5, 6, 7) using<br>a) 8:1 multiplexer.<br>b) 4:1 multiplexer |
| **8.** | Verification of truth table of flip-flop using NAND gate (7400) & NOR gates (7402).<br>a) RS Flip Flop<br>b) JK Flip Flop<br>c) D Flip Flop<br>d) T Flip Flop |
| **9.** | Implement D flip flop using SR flip flop and verify the truth table. |
| **10.** | Design Mod – N Synchronous Up Counter & Down Counter using 7476 JK Flip-flop |
| **11.** | Describing hardware in IoT: Hardware Architecture of Arduino UNO Board, Types of Arduino Board |
| **12.** | Fundamentals of Arduino Programming: Installation of Arduino IDE, Working with structures, Variables, Flow control, Digital i/o f. Analog i/o, Time, Math, Random, Serial |
| **13.** | Interfacing Arduino with I/O Devices: Push button, LED, Ultrasonic Sensor |
| | **Total Hours: 30 hrs.** |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| LAB Course Code: DCSE0251 | LAB Course Name: Data Structures and Algorithms Lab -I | L | T | P | C |
|---|---|---|---|---|---|
| **Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated)** | | **0** | **0** | **4** | **2** |

**Pre-requisite:** Any Programming Language preferably C, C++, Java and Python

**Course Objectives:**

Learn to implement linear data structures.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Operations on single and multi-dimensional array, and how to use them for implementation of matrix operations. | K3 |
| **CO2** | Implement Link list, Stack and Queues with their applications. | K3 |
| **CO3** | Implement and analyse of various operation like searching sorting and hashing. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | **3** | 3 | 2 | 2 | 1 | 1 | - | 3 | 1 | 1 | 2 | 3 | 2 | 2 | 2 |
| **CO2** | 3 | 3 | 3 | 2 | 2 | 1 | - | 3 | 1 | 1 | 2 | 3 | 2 | 2 | 2 |
| **CO3** | 3 | 3 | 3 | 2 | 2 | 1 | - | 3 | 1 | 1 | 2 | 3 | 2 | 2 | 2 |

| **List Of Practical's (Indicative & Not Limited To)** | **Mapped CO** |
|---|---|
| 1. Construct a Code to find the maximum element in an array. | CO1 |
| 2. Construct a Code to calculate the sum of all elements in an array. | CO1 |
| 3. Construct a Code to reverse the elements of an array. | CO1 |
| 4. Construct a Code to check if an array is sorted in ascending order. | CO1 |
| 5. Construct a Code to count the occurrence of a specific element in an array. | CO1 |
| 6. Construct a Code creation and traversal of 2D Array in row major and column major order. | CO1 |
| 7. Construct a code to print the transpose of a given matrix using function | CO1 |
| 8. Program to find if a given matrix is Sparse or Not and print Sparse Matrix | CO1 |
| 9. Construct a code to represent a sparse matrix in triplet form. | CO1 |
| 10. Construct a code to Implement Linear Search | CO3 |
| 11. Construct a code to implement Binary Search | CO3 |
| 12. Construct a program to Implement Selection Sort | CO3 |
| 13. Construct a program to Implement Bubble Sort | CO3 |
| 14. Construct a program to Implement Insertion Sort | CO3 |
| 15. Construct a program to compare the time complexities of selection, bubble and insertion sort by plotting the graph | CO3 |
| 16. Construct a program to compare the time complexities of various algorithms by varying size "n". | CO3 |

| | |
|---|---|
| 17. Construct a program to Implement Shell Sort | CO3 |
| 18. Construct a program to Implement Counting Sort | CO3 |
| 19. Create a single linked list and perform basic operations (insertion, deletion, traversal). | CO2 |
| 20. Create a double linked list and perform basic operations (insertion, deletion, traversal). | CO2 |
| 21. Create a circular linked list and perform basic operations (insertion, deletion, traversal). | CO2 |
| 22. Create a circular double linked list and perform basic operations (insertion, deletion, traversal). | CO2 |
| 23. Reverse a single linked list. | CO2 |
| 24. Check if a linked list is palindrome. | CO2 |
| 25. Reverse a double linked list. | CO2 |
| 26. Find the middle element of a single linked list. | CO2 |
| 27. Find the middle element of a double linked list. | CO2 |
| 28. Merge two sorted single linked lists. | CO2 |
| 29. Detect and remove a loop in a circular linked list. | CO2 |
| 30. Construct a code to add two polynomials using linked list | CO2 |
| 31. Construct a program to Implement stack using array | CO2 |
| 32. Construct a program to Implement stack using a linked list | CO2 |
| 33. Construct a code to Infix to postfix conversion using a stack | CO2 |
| 34. Construct a code for Balanced parentheses checker using a stack | CO2 |
| 35. Implement Reverse a string using a stack. | CO2 |
| 36. Implement Binary Search using Recursion. | CO3 |
| 37. Construct a program to print Fibonacci Series using Recursion. | CO2 |
| 38. Construct a code to implement Tower of Hanoi. | CO2 |
| 39. Construct a program to implement queue using array. | CO2 |
| 40. Construct a code for implementing a circular queue. | CO2 |
| 41. Construct a program to Implement queue using stack | CO2 |
| 42. Construct a program to Implement priority queue | CO2 |
| 43. Construct a program to Implement double ended queue | CO2 |
| 44. Write a program for binary tree creation, printing, searching, and traversal (inorder, preorder, postorder). | CO3 |
| 45. Write a program for Binary Search Tree (BST) creation, searching, insertion, deletion, and traversal. | CO3 |
| 46. Write a program to find the height of a binary tree. | CO3 |
| 47. Write a program to calculate the height and balance factor of the AVL Tree. | CO3 |
| 48. Write a program to implement heap sort on an array. | CO3 |
| 49. Write a program to encode a string using Huffman codes. | CO3 |
| 50. Write a program to represent a graph using adjacency matrix and adjacency list. | CO3 |
| 51. Write a program to implement Breadth First Search (BFS) traversal of a graph using an adjacency list. | CO3 |
| 52. Write a program to implement Depth First Search (DFS) traversal of a graph (recursive and iterative). | CO3 |
| 53. Write a program to implement Breadth First Search (BFS) traversal of a graph using an adjacency list. | CO3 |

| | |
|---|---|
| 54. Write a program to implement Depth First Search (DFS) traversal of a graph (recursive and iterative). | CO3 |

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

GREATER NOIDA-201306

(An Autonomous Institute)

| LAB Course Code: DCSE0252 | LAB Course Name: Problem Solving using Python | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated) | | 0 | 0 | 6 | 3 |

**Pre-requisite: Basic Computer Knowledge, Logical Thinking & Basic Mathematics**

**Course Objectives:** To provide Basic knowledge of Python programming and to implement programming skill for solving real world problems

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Apply basic Python constructs (variables, data types, control flow) | K2 |
| **CO2** | Develop modular programs using functions, recursion, and modules. | K4 |
| **CO3** | Use data structures, file operations, and exception handling in Python. | K5 |
| **CO4** | Implement object-oriented concepts | K4 |
| **CO5** | Build GUI applications using Tkinter and OOP techniques. | K3 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 1 | 1 | - | 2 | - | - | 1 | - | - | 2 | | | |
| **CO2** | 3 | 2 | 2 | 1 | 2 | - | - | 1 | - | - | 2 | | | |
| **CO3** | 2 | 2 | 2 | 1 | 1 | - | - | 1 | - | - | 2 | | | |
| **CO4** | 3 | 3 | 2 | 1 | 2 | - | - | 1 | - | - | 2 | | | |
| **CO5** | 3 | 3 | 2 | - | 2 | - | - | 1 | - | 2 | 2 | | | |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction** | **14 hours** |
|---|---|---|

Introduction: A Brief History of Python, Applications areas of python, Keywords and Identifiers, variables, data types and type conversion, Indexing and Slicing, operators in python, Operator precedence and associativity, Conditional Statements: if statement, if-else statement, Nested-if statement and elif statements. Loops: Purpose and working of loops, while loop, for loop, else with loop statement, Nested Loops, break, continue and pass statement.

| **Unit 2** | **Function and Modules** | **15 hours** |
|---|---|---|

Function: Built in function, user defined function, Function arguments, passing functions to a function, recursion, Lambda functions, Namespaces. Functional Programming: higher order functions, Map, filter, Reduce. Closures and its characteristics, Decorators, decorating function with argument and iterator, Modules and Packages: Importing Modules, writing own modules, Standard library modules, Packages in Python.

| **Unit 3** | **Basic Data structures, Exception and File Handling** | **14 hours** |
|---|---|---|

Python Basic Data Structures: Strings, Basic operations of strings, comparing strings, string formatting, Built-in string methods and function, Lists, Tuples, Sets and Dictionaries with built-in methods, List Comprehension. Exception Handling: Errors, Run Time Errors,

Try-except statement, Raise, Assert. Files and Directories: Open a File, Reading and Writing data from files close a File, Read and Write operation.

| **Unit 4** | **Object Oriented Concepts** | **14 hours** |
|---|---|---|

Object-oriented programming: User-defined classes, Object as an argument, Class variables and Instance variables, Constructor, Parameterized constructor, Encapsulation: Introduction, Data hiding, Instance methods, Class method, Static methods, property method, Magic Methods in python, Instances as Return Values.

| **Unit 5** | **Advanced Object-Oriented Techniques and GUI Programming** | **15 hours** |
|---|---|---|

Introduction to inheritance, Types of inheritance, super () function, Abstract class, Polymorphism: Method overriding, Method Overloading. Tkinter: Creating a GUI Application, Widgets: Frame, Label, Button, Entry, Radio button, Check button, Canvas, and Menu.

| **Total Lecture Hours** | **72 hours** |
|---|---|

**Textbook:**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1** | "Beginning Python-From Novice to Professional"—Third Edition, Apress | Magnus Lie Hetland |
| **2** | Python Programming using Problem solving approach by OXFORD Higher education | Reema Thareja |

**Reference Books:**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1.** | Introduction to Computation and Programming Using Python ‘‘, Revised and expanded Edition, MIT Press. | John V Guttag |
| **2.** | Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition. | Charles Dierbach |
| **3.** | “Think Python: How to Think Like a Computer Scientist”, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers. | Allen B. Downey, |
| **4.** | Introduction to Programming in Python: An Inter- disciplinary Approach, Pearson India Education Services Pvt. Ltd.,2016. | Robert Sedgewick, Kevin Wayne, Robert Dondero: |
| **5.** | An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd. | Guido van Rossum and Fred L. Drake Jr, |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | Unit 1: https://nptel.ac.in/courses/106106145<br>Unit 2: https://nptel.ac.in/courses/106106145<br>Unit 3: https://nptel.ac.in/courses/106106145<br>Unit 4: https://nptel.ac.in/courses/106106145<br>Unit 5: https://nptel.ac.in/courses/106106145 | 60hrs |
| Video Lectures | Unit 1: https://www.youtube.com/watch?v=PqFKRqpHrjw<br>Unit 2: https://www.youtube.com/watch?v=oSPMmeaiQ68&t=2s<br>Unit 3: https://www.youtube.com/watch?v=m9n2f9lhtrw<br>https://www.youtube.com/watch?v=ixEeeNjjOJ0&t=4s<br>https://www.youtube.com/watch?v=NMTEjQ8-AJM<br>Unit 4: https://www.youtube.com/watch?v=JeznW_7DlB0 | 15m<br>39m<br>39m<br>31m<br>21m<br>53m |

| | | |
|---|---|---|
| | Unit 5: https://www.youtube.com/watch?v=ibf5cx221hk | 38m |
| Web References | 1.https://www.python.org/<br>2. https://www.w3schools.com/python/<br>3. https://www.kaggle.com/learn/python | |

**List of Practical's**

| Sr. No | Program Title | CO Mapping |
|---|---|---|
| 1 | Print "Hello, World!" and perform basic arithmetic operations. | CO1 |
| 2 | Display Python keywords and identifiers. | CO1 |
| 3 | Program to demonstrate variable declaration and type conversion. | CO1 |
| 4 | Demonstrate indexing and slicing on a list and string. | CO1 |
| 5 | Use arithmetic, relational, and logical operators in a program. | CO1 |
| 6 | Show operator precedence and associativity with example expressions. | CO1 |
| 7 | Write a program using if and if-else conditions. | CO1 |
| 8 | Implement nested if and elif statements to categorize age groups. | CO1 |
| 9 | Write a program using a while loop to generate Fibonacci series. | CO1 |
| 10 | Use a for loop to print the multiplication table of a number. | CO1 |
| 11 | Create and call a user-defined function for factorial. | CO2 |
| 12 | Write a function to compute GCD of two numbers using recursion. | CO2 |
| 13 | Program with all types of function arguments (default, keyword, variable-length). | CO2 |
| 14 | Use lambda function to sort a list of tuples by second element. | CO2 |
| 15 | Implement higher-order functions: map, filter, and reduce. | CO2 |
| 16 | Create a closure that captures the outer function's variable. | CO2 |
| 17 | Write and use a simple decorator to log function execution. | CO2 |
| 18 | Import and use built-in module math and datetime. | CO2 |
| 19 | Create and import a user-defined module. | CO2 |
| 20 | Create a package with multiple modules and use them in a script. | CO2 |
| 21 | Perform basic operations on strings and demonstrate built-in string methods. | CO3 |
| 22 | Compare strings and demonstrate different string formatting styles. | CO3 |
| 23 | Create a list and demonstrate slicing, appending, and sorting. | CO3 |
| 24 | Implement tuple packing and unpacking with basic operations. | CO3 |
| 25 | Create a set, add/remove items, and perform set operations. | CO3 |
| 26 | Create and manipulate a dictionary with nested structures. | CO3 |
| 27 | Demonstrate list comprehension to generate a square number list. | CO3 |
| 28 | Handle exceptions using try-except-finally blocks. | CO3 |

| | | |
|---|---|---|
| 29 | Raise custom exceptions with raise and validate input with assert. | CO3 |
| 30 | Read a file line by line and count the frequency of each word. | CO3 |
| 31 | Create a class with instance variables and methods. | CO4 |
| 32 | Implement constructor and parameterized constructor in a class. | CO4 |
| 33 | Show encapsulation using private attributes and getter/setter. | CO4 |
| 34 | Demonstrate class method, static method, and property decorator. | CO4 |
| 35 | Override __str__ and __len__ magic methods for a custom class. | CO4 |
| 36 | Create and return class instances from another class. | CO4 |
| 37 | Demonstrate single and multiple inheritance with method overriding. | CO4 |
| 38 | Use super() to invoke parent methods from a subclass. | CO4 |
| 39 | Create an abstract class and implement it in a derived class. | CO4 |
| 40 | Show polymorphism with method overloading (via default args) and overriding. | CO4 |
| 41 | Reuse inheritance examples and show hierarchical/multilevel inheritance. | CO5 |
| 42 | Create a basic GUI window using Tkinter. | CO5 |
| 43 | Add Labels, Buttons, and Entry fields to a GUI form. | CO5 |
| 44 | Implement Radio buttons and Check buttons with event handling. | CO5 |
| 45 | **Personal Expense Tracker:** A Python app to record and categorize daily expenses for better budgeting. | CO5 |
| 46 | **Library Management System:** A GUI-based tool to manage book issue, return, and inventory for small libraries. | CO5 |
| 47 | **Weather Forecast App:** A real-time weather dashboard using API to display city-wise conditions. | CO5 |
| 48 | **Quiz Application:** An interactive Python quiz system with scoring and question randomization. | CO5 |
| 49 | **File Organizer:** A desktop utility to auto-sort files into folders based on their extensions. | CO5 |
| 50 | **Personal Expense Tracker:** A Python app to record and categorize daily expenses for better budgeting. | CO5 |

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**GREATER NOIDA-201306**

**(An Autonomous Institute)**

| LAB Course Code: DASL0251 | LAB Course Name: Communication for Career Enhancement | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated) | | 0 | 0 | 4 | 2 |

**Pre-requisite: The students should have completed ABC course in semester I**

**Course Objectives:**

1. To improve proficiency in Business English to the upper-intermediate level of CEFR (Common European Framework of Reference).
2. To improve professional communication skills.

**Course Outcome:** After completion of the course, the students will be able to

| S. No | Course Outcome | Bloom's Knowledge Level (KL) |
|---|---|---|
| CO1 | Apply key concepts of soft skills in real life scenarios. | K3 |
| CO2 | Understand conversations and discussions on a variety of topics. | K2 |
| CO3 | Express ideas clearly and effectively through oral communication. | K3 |
| CO4 | Understand and analyse main ideas of complex texts. | K4 |
| CO5 | Construct clear and detailed texts on a wide range of topics. | K6 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| CO2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| CO3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| CO4 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 1 |
| CO5 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 1 |

**List of Practical**

1. **Introduction**
   - To the course

   ***Anubhav* Activity**

   On score improvement

2. **Listening to a variety of accents in English**
   - The students will develop their ability to comprehend English conversations with diverse speakers.

3. **Vocabulary Games**
   - The students will enhance their vocabulary through various interesting exercises and word-games.

4. **Role Play**
   - The students will practice how to meet, greet, and converse in miscellaneous professional scenarios.

5. **Deciphering the main points and summarizing**
   - The students will develop the ability to grasp the main point and summarize lengthy documents

6.. **Writing professional emails**
   - The students will practice and develop ability to write clear and concise emails.

7. **Critiquing Films/Videos**
   - The students will improve their listening and critical thinking skills, and will revise rules of reported speech.

8. **News Reports**

- The students will practice speaking with correct pronunciation and intonation.

9. **Time Bound Case Study Analysis**
   - The students will learn to focus and analyze assigned content

10. **Essay Writing**
    - The students will practice writing essays on the domain specific topics with emphasis on corrective grammar (as per the need).

11. **Presentations based on the Essay**
    - The students will learn to organize the content logically and present their ideas coherently.

12. **Vocabulary Enhancement Exercise**
    - The students will acquire domain specific terms.

13. **Listen and Repeat (**Emphasis on accepted Accent, Rhythm, Intonation)
    **Read out loud (**Emphasis on pauses)

14. **Passage Writing Based on Pictures**
    The students will write passages on pictures and will discuss correct grammatical structures based on the passages.

15. **Peer Talk on specific topics of general interest**
    - The students will develop conversational skills by discussing topics in pairs and will record their response to general questions asked by their peers.

16. **Responding to general questions (**Ref: ES Test)
    - The students will develop the ability to respond spontaneously to general questions.

17. **Identifying Errors**
    - The students will learn to identify & rectify structural errors.

18. **Solving Para-Jumbles**
    - The students will learn to organize ideas in a passage

19. **Language Toolbox**
    - The students will do exercises on Active & Passive Voices and cloze tests.

20. **Goal setting & Self discovery**
    - The students will set their short-term & long-term goals and will explore adjectives that best describe themselves.

21. **Extempore speeches**
    - The students will hone their spontaneous public speaking skills.

22. **Group Discussions**
    - The students will improve their ability to express their views clearly while discussing a topic in a group.

23. **Role Play Activity**
    - The students will perform role plays on campus behaviour, language, and dress sense of students.

24. ***Anubhav* Activity**
    The students will reflect on the semester and the road map ahead.

**Total Hours: 60 hrs.**

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | **Listening:**<br>https://www.youtube.com/watch?v=Snve4Y8dMno<br>https://www.youtube.com/watch?v=d27bn5k9Mjw&t=101s<br>**Speaking**:<br>https://www.youtube.com/watch?v=pImF1JkpAjo&list=PLLy_2iUCG87Dz7sxcJrCV2xbjw-x46g7w&index=7<br>https://www.youtube.com/watch?v=STVxfk_relw&list=PLp02GGDX5DIoMkblgrYhq91rF7_JZsf4-&index=25<br>**Reading:**<br>https://www.youtube.com/watch?v=2h1Oaifi8mw&list=PLzf4HHlsQFwIDV-HfgMEYY7f5Jw6FmxrK&index=3 | 37m<br>1 hr<br>39m<br>35m<br>39m |

| | | |
|---|---|---|
| | https://www.youtube.com/watch?v=jJUXEcMR6Ys&list=PLzJaFd3A7DZtnTdtOxvjO3GLPd1WVe6oq&index=6<br>**Writing:**<br>https://www.youtube.com/watch?v=RASpQtZI06E&list=PLLy_2iUCG87AuIWZ3qnjA1GriD-IGF3Za&index=9<br>https://www.youtube.com/watch?v=ekFRWnPV6lc&t=535s | 36m<br><br>33m<br><br>1hr |
| Video Lectures | **Listening:**<br>https://www.youtube.com/watch?v=Ra6L83XwLko<br>https://www.youtube.com/watch?v=Qa0G_7RJ2go<br>**Speaking:**<br>https://www.youtube.com/watch?v=HAnw168huqA<br>https://www.youtube.com/watch?v=F4Zu5ZZAG7I<br>**Reading:**<br>https://www.youtube.com/watch?v=Zm8CuJGLuXU<br>https://www.youtube.com/watch?v=FMD-rHth3_g<br>**Writing:**<br>https://www.youtube.com/watch?v=gFXE9n7hrOI<br>https://www.youtube.com/watch?v=o9aVjBHEEbU | <br>34m<br>37m<br><br>58m<br>15m<br><br>15m<br>41m<br><br>24m<br>14m |
| Web References | **Listening:**<br>https://www.researchgate.net/publication/394276570_Developing_Listening_Comprehension_Using_Podcasts_in_Second_Language_Education_A_Systematic_Overview_of_Recent_Pedagogical_Innovations_2019-2025<br>https://www.tandfonline.com/doi/full/10.1080/10904018.2013.813234#d1e729<br>**Speaking:**<br>https://files.eric.ed.gov/fulltext/EJ1460111.pdf<br>https://www.jetir.org/papers/JETIR2410126.pdf<br>**Reading:**<br>https://ijrpr.com/uploads/V6ISSUE2/IJRPR38781.pdf<br>https://files.eric.ed.gov/fulltext/EJ1332254.pdf<br>**Writing:**<br>https://www.sciencedirect.com/science/article/pii/S2405844024129076<br>https://files.eric.ed.gov/fulltext/EJ1329510.pdf | |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DMB0201 | Course Name: Innovation and Entrepreneurship | L | T | P | C |
|---|---|---|---|---|---|
| Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/ M.Tech(Integrated) | | 2 | 0 | 0 | 2 |

**Pre-requisite:**

**Course Objectives:** This course is designed to ignite the innovative and entrepreneurial spirit within students by providing them with a foundational understanding of how ideas are transformed into impactful ventures. Students will learn to identify and define different types of innovation, employ creative problem-solving techniques, and grasp the core principles of entrepreneurship and the entrepreneurial mindset.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Explain the core concepts of innovation, the innovation process, and the fundamentals of entrepreneurship. | K2 |
| **CO2** | Apply techniques for idea generation, opportunity recognition, and validation for potential tech-driven ventures. | K3 |
| **CO3** | Develop a basic business model and value proposition for an innovative idea, and understand the principles of MVP development. | K.6. |
| **CO4** | Describe the basics of Intellectual Property Rights relevant to technology and the foundational elements of startup finance and team building. | K2 |
| **CO5** | Formulate and present a concise pitch for a startup concept and describe the components of the entrepreneurial ecosystem. | K6 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 2 | - | 1 | 1 | 1 | 1 | - | 2 | 1 | 2 | | |
| **CO2** | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | | |
| **CO3** | 3 | 1 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | | |
| **CO4** | 1 | 2 | 1 | 2 | 1 | - | 1 | - | - | 1 | 2 | | |
| **CO5** | 2 | 1 | 1 | 1 | 1 | 1 | - | 1 | 2 | 2 | 1 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction to Innovation** | **6 hours** |
|---|---|---|

Defining Innovation, Types (Product, Process, Service, Business Model), Importance in Technology, Disruptive vs. Sustaining vs. Incremental Innovation. Idea Generation Techniques (Brainstorming, SCAMPER), Design Thinking Overview, Problem Identification & Definition, Creative Problem Solving.

| **Unit 2** | **Entrepreneurship Development** | **6 hours** |
|---|---|---|

Defining Entrepreneurship, Entrepreneurial Mindset & Traits, Types of Entrepreneurs (Tech, Social), Myths, Role in Economic Development. Identifying Market Needs & Gaps, Sources of Ideas, Evaluating Ideas (SWOT, PESTLE basics), Basic Market Research, Customer Discovery Introduction.

| **Unit 3** | **Developing a Minimum Viable Product (MVP)** | **6 hours** |
|---|---|---|

| | | |
|---|---|---|
| Business Model Canvas (BMC) / Lean Canvas, Defining a Compelling Value Proposition, Understanding Target Customers, Basic Competitive Analysis. Concept of MVP for tech products/services, Prototyping (Lo-fi, Hi-fi), Importance of User Feedback, Lean Startup Principles (Briefly). | | |
| **Unit 4** | **Intellectual Property Rights (IPR)** | **6 hours** |
| Basics of Patents (for inventions), Copyrights (for software/content), Trademarks (for brands), Trade Secrets. Importance for tech startups. Building a Founding Team, Bootstrapping, Sources of Early-Stage Funding (Angels, VCs - Conceptual), Basic Financial Terms (Revenue, Cost, Profit). | | |
| **Unit 5** | **The Entrepreneurial Ecosystem** | **6 hours** |
| Go-to-Market Strategies (Basics), Elements of a Good Pitch, developing a Pitch Deck, Practicing the Elevator Pitch. Role of Incubators, Accelerators, Government Support Schemes, Networking. Challenges & Opportunities. Future of Tech Entrepreneurship. | | |
| | **Total Lecture Hours** | **30 hours** |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | Entrepreneurship and Innovation: Theory, Practice and Context | Tim Mazzaro, Sophie Reboud |
| 2. | Innovation and Entrepreneurship | Peter F. Drucker |

**Reference Books:**

| S.No. | Book Title | Author |
|---|---|---|
| 1. | Entrepreneurship - New Venture Creation, Pearson Publications | David H Holt |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013842970876665856284 30_shared/overview<br>https://www.coursera.org/learn/innovative-ideas?specialization=business-entrepreneurship | 06<br>05 |
| Video Lectures | https://www.youtube.com/watch?v=UEngvxZ11sw<br>https://www.youtube.com/watch?v=A6BktbsRPr4 | 03 |
| Web References | | |
| **PBL** | Capstone Project | 16 |

**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**GREATER NOIDA-201306**

**(An Autonomous Institute)**

| Course Code: DNC0202 | Course Name: Constitution of India, Law And Engineering | L | T | P | C |
|---|---|---|---|---|---|
| **Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated)** | | **2** | **0** | **0** | **NC** |

**Pre-requisite:** Basic understanding of political science

**Course Objectives:** Acquaint the students with legacies of constitutional development in India and help those to understand the most diversified legal document of India and philosophy behind it.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Identify and explore the basic features and modalities about Indian constitution. | K1 |
| **CO2** | Differentiate and relate the functioning of Indian parliamentary system at the center and state level | K2 |
| **CO3** | Differentiate different aspects of Indian Legal System and its related bodies. | K4 |
| **CO4** | Discover and apply different laws and regulations related to engineering practices. | K4 |
| **CO5** | Correlate role of engineers with different organizations and governance models. | K4 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 1 | | |
| **CO2** | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 1 | | |
| **CO3** | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 2 | 1 | | |
| **CO4** | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | | |
| **CO5** | 2 | 2 | 3 | 2 | 1 | 3 | 2 | 3 | 2 | 3 | 2 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Introduction and Basic Information about Indian Constitution** | **6 hours** |
|---|---|---|

Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947,Enforcement of the Constitution, Indian Constitution and its Salient Features, The Preamble of the Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Parliamentary System, Federal System, Centre-State Relations, Amendment of the Constitutional Powers and Procedure, The historical perspectives of the constitutional amendments in India, Emergency Provisions: National Emergency, President Rule, Financial Emergency, and Local Self Government – Constitutional Scheme in India.

| **Unit 2** | **Union Executive and State Executive** | **6 hours** |
|---|---|---|

Powers of Indian Parliament Functions of Rajya Sabha, Functions of Lok Sabha, Powers and Functions of the President, Comparison of powers of Indian President with the United States, Powers and Functions of Vice-President, Powers and Functions of the Prime Minister, Judiciary – The Independence of the Supreme Court, Appointment of Judges, Judicial Review, Public Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The Lokpal and Lok ayuktas Act 2013, State Executives – Powers and Functions of the Governor, Powers and Functions of the Chief Minister, Functions of State Cabinet, Functions of State Legislature, Functions of High Court and Subordinate Courts.

| **Unit 3** | **Introduction and Basic Information about Legal System** | **6 hours** |
|---|---|---|

The Legal System: Sources of Law and the Court Structure: Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law, Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court). Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration. Contract law, Tort, Law at workplace.

| **Unit 4** | **Intellectual Property Laws and Regulation to Information** | **6 hours** |
|---|---|---|

Intellectual Property Laws: Introduction, Legal Aspects of Patents, Filing of Patent Applications, Rights from Patents, Infringement of Patents, Copyright and its Ownership, Infringement of Copyright, Civil Remedies for Infringement, Regulation to Information, Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act.

| **Unit 5** | **Business Organizations and E-Governance** | **6 hours** |
|---|---|---|

Sole Traders, Partnerships: Companies: The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General Meetings and Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need for reformed engineering serving at the Union and State level, Role of I.T. professionals in Judiciary, Problem of Alienation and Secessionism in few states creating hurdles in Industrial development.

| | **Total Lecture Hours** | **30 hours** |
|---|---|---|

**Textbook:**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1.** | Introduction to the Indian Constitution | Brij Kishore Sharma |

**Reference Books:**

| **S.No** | **Book Title** | **Author** |
|---|---|---|
| **1.** | The Indian Constitution | Madhav Khosla |

| **Self-Study Content Links:** | | **Duration (in Hrs)** |
|---|---|---|
| MOOCs | https://www.google.com/url?sa=i&source=web&rct=j&url=https://onlinecourses.nptel.ac.in/noc25_lw02/preview&ved=2ahUKEwjL_K6Lt8KVAxUo3TgGHdmhN3oQy_kOegoIAggACAAIDxAJ&opi=89978449&cd&psig=AOvVaw3iygHhUeKYg3egnz62E-ST&ust=1783577767518000 | 10 |
| Video Lectures | https://nptel.ac.in/courses/129106411? | 10 |
| Web References | https://www.legislative.gov.in/documents/constitution-of-india? | 10 |

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
## GREATER NOIDA-201306
**(An Autonomous Institute)**

| Course Code: DNC0203 | Course Name: Essence of Indian Traditional Knowledge | L | T | P | C |
|---|---|---|---|---|---|
| **Course Offered in: B.Tech- Second Semester CSE/CSE-TWIN/IT/IT-TWIN/CS/CSE(DS)/ CSE(IOT)/CSE(AI)/AI-TWIN /CSE(AIML)/CYS/ AIML-TWIN/ECE/ECE(VLSI)/ME/M.Tech(Integrated)** | | **2** | **0** | **0** | **NC** |

**Pre-requisite:** Philosophical Systems, Spiritual Practices, Cultural Heritage, Ayurveda and Traditional Medicine, Architecture

**Course Objectives:** To enable the students to understand the importance of our surroundings and encourage them to contribute towards sustainable development.

| **Course Outcome:** After completion of the course, the student will be able to | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Understand the basics of past Indian politics and state polity. | K2 |
| **CO2** | Understand the Vedas, Upanishads, languages & literature of Indian society. | K2 |
| **CO3** | Know the different religions and religious movements in India. | K4 |
| **CO4** | Identify and explore the basic knowledge about the ancient history of Indian agriculture, science & technology, and ayurveda. | K4 |
| **CO5** | Identify Indian dances, fairs & festivals, and cinema. | K1 |

**CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)**

| CO-PO Mapping | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | | |
| **CO2** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 1 | 2 | | |
| **CO3** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 3 | 3 | 2 | 2 | | |
| **CO4** | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 1 | 2 | | |
| **CO5** | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 3 | | |

**Course Contents / Syllabus**

| **Unit 1** | **Society State and Polity in India** | **6 hours** |
|---|---|---|

State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory, Stages of State Formation in Ancient India, Kingship , Council of Ministers Administration Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life, Marriage, Understanding Gender as a social category, The representation of Women in Historical traditions, Challenges faced by Women.

| **Unit 2** | **Indian Literature, Culture, Tradition, and Practice** | **6 hours** |
|---|---|---|

Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in Pali,Prakrit And Sanskrit, **Sikh Literature**, Kautilya's Arthashastra, Famous Sanskrit Authors, Telugu Literature, Kannada Literature,Malayalam Literature ,Sangama Literature Northern Indian Languages & Literature, Persian And Urdu ,Hindi Literature.

| Unit 3 | Indian Religion, Philosophy, and Practices | 6 hours |
|---|---|---|
| Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy, Shankaracharya, Various Philosophical Doctrines , Other Heterodox Sects, Bhakti Movement, Sufi movement, Socio religious reform movement of 19th century, Modern religious practices. | | |
| **Unit 4** | **Science, Management and Indian Knowledge System** | **6 hours** |
| Astronomy in India, Chemistry in India, Mathematics in India, Physics in India, Agriculture in India, Medicine in India , Metallurgy in India, Geography, Biology, Harappan Technologies, Water Management in India, Textile Technology in India ,Writing Technology in India Pyrotechnics in India Trade in Ancient India/,India's Dominance up to Pre-colonial Times. | | |
| **Unit 5** | **Cultural Heritage and Performing Arts** | **6 hours** |
| Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Pottery, Painting, Indian Handicraft, UNESCO'S List of World Heritage sites in India, Seals, coins, Puppetry, Dance, Music, Theatre, drama, Martial Arts Traditions, Fairs and Festivals, UNESCO'S List of Intangible Cultural Heritage, Calenders, Current developments in Arts and Cultural, Indian's Cultural Contribution to the World. Indian Cinema | | |
| | **Total Lecture Hours** | **30 hours** |

**Textbook:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | Indian Art and Culture: for civil services and other competitive Examinations | Nitin Singhania |

**Reference Books:**

| S.No | Book Title | Author |
|---|---|---|
| 1. | The Wonder that was India (34th impression) | B. L. Basham |

| Self-Study Content Links: | | Duration (in Hrs) |
|---|---|---|
| MOOCs | https://www.classcentral.com/course/swayam-indian-popular-culture-292678<br>https://www.udemy.com/course/indian-history-chronology/ | 24.00<br>1.50 |
| Video Lectures | https://youtu.be/xUphsn5b1w8?si=P8PqTnYUrNP3aWU7<br>https://youtu.be/SeTjQHzLci0?si=E-DEaKnWJEPN8yHj<br>https://youtu.be/32XmLQxwhlQ?si=Ew7hFEL12E_3rPkh<br>https://youtu.be/iof_dTG4cnQ?si=QWhHFeacVcYZ7mmR<br>https://youtu.be/xmtM0ilhBIU?si=w9MQv8HSdzBXD321<br>https://youtu.be/7dT2eg3ekk0?si=YIDa9kfxJfTAyK1l<br>https://youtu.be/xhqP7rPGNu4?si=WxdcjHKqmD3HGWge<br>https://youtu.be/qE23vA4dHkk?si=6D9q-hKN57UVjUUV | 1.00<br>0.09<br>0.23<br>1.05<br>1.09<br>1.26<br>0.26<br>0.33 |
| Web References | https://en.wikipedia.org/wiki/Indian_religions | |