Detailed Syllabus
Lab-wise Breakup

Course Code	18B15GE111	**Semester:** Even **(specify Odd/Even)**	**Semester:** II**; Session** 2022-2023 **Month from:** Jan - June
Course Name	Engineering Drawing and Design		
Credits	1.5	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Ms. Madhu Jhariya, Dr. Niraj Kumar
	Teacher(s) (Alphabetically)	Mr. Chandan Kumar, Ms. Madhu Jhariya, Dr. Niraj Kumar, Mr. Nitesh Kumar, Dr. Prabhakar Jha, Mr. Rahul Kumar, Dr. Satyanarayan Patel, Mr. Shwetabh Singh, ,

COURSE OUTCOMES		**COGNITIVE LEVELS**
C178.1	Recall the use of different instruments used in Engineering Drawing and Importance of BIS and ISO codes.	Remembering Level (C1)
C178.2	Illustrate various types of mathematical curves and scale.	Understanding Level (C2)
C178.3	Classify different types of projection and Construct Orthographic projection of Point, Line, Plane and Solid.	Applying Level (C3)
C178.4	Construct Isometric Projection and Conversion of Orthographic view to Isometric view and vice-versa.	Applying Level (C3)
C178.5	Construct Engineering model in Drawing software (AutoCAD) and Compare it with conventional drawing.	Analyzing Level (C4)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Introduction to Engineering Drawing	• Principles of engineering graphics and their significance, usage of drawing instruments. • Technical vertical capital letters which includes English alphabets and numeric.	C178.1
2.	Engineering Curves	• Constructing a pentagon and hexagon; engineering curves: Parabola, Ellipse, Hyperbola, Cycloids and Involutes.	C178.2
3.	Orthographic Projections	• **Projection of points:** Point on VP, HP, in space. • **Projection of straight lines:** Lines inclined or parallel to any one of the planes; lines inclined to both HP and VP with traces. • **Projection of planes:** Plane on VP, HP, inclined to any one of the planes; plane inclined to both HP and VP.	C178.3

4.	Projections of Regular Solids	• Projections of solids in simple position inclined to one/both the planes.	C178.3
5.	Sections and Sectional Views of Right Angular Solids	• **Sections of solids:** Section of standard solids and true shape section of standard machine elements for the section planes perpendicular to one plane and parallel or inclined to other plane.	C178.3
6.	Isometric Projections	• Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa.	C178.4
7.	Overview of Computer Graphics	• Demonstrating knowledge of the theory of CAD software; Dialog boxes and windows; Shortcut menus; the Command Line; the Status Bar; Isometric Views of lines, Planes, Simple and compound Solids.	C178.5
8.	Customization & CAD Drawing	• CAD Drawing along with customization tools, Annotations, layering & other functions. Orthographic Projections; Model Viewing; Co-ordinate Systems; Multi-view Projection; Surface Modeling; Solid Modeling.	C178.5
9.	Demonstration of a simple team design project	• Technical 2D/3D orthographic and Isometric projections; Demonstration of a simple team design project.	C178.5

Evaluation Criteria Components	**Maximum Marks**
Mid Viva	20
End Viva	20
TA	60
Total	**100**

Project based learning: Auto-CAD is a computer-aided software used for creating 2D/3D models of different machine & structures along with all their components to visualize and analyze the feasibility of the same well before the actual manufacturing/construction. The laboratory mainly focused on engaging the students by replicating 2D and 3D models of common engineering equipment and instrumentation diagrams that enhances student's perception of their graphic expression skills.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Bhatt N.D., Panchal V.M. & Ingle P.R., Engineering Drawing, Charotar Publishing House, 2014.
2.	Shah, M.B. & Rana B.C., Engineering Drawing and Computer Graphics, Pearson Education, 2008.
3.	George Omura, Mastering AutoCAD 2021 and AutoCAD LT 2021, Sybex, 2020.
4.	Alan J. Kalameja, AutoCAD 2010 Tutor for Engineering Graphics, Autodesk Press, 2009.

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11EC111	**Semester:** Even	**Semester:** II **Session:** 2022 -23 **Month from:** Jan-June
Course Name	**Electrical Science -1**		
Credits	4	**Contact Hours**	3-1-0

Faculty (Names)	**Coordinator(s)**	Satyendra Kumar, Shamim Akhter
	Teacher(s) (Alphabetically)	Archna Pandey, Ashish Gupta, K.Nisha, Rachna Singh, Ritesh Kumar Sharma,Smriti Bhatnagar, Varun Goel,Vivek Dwivedi

COURSE OUTCOMES		**COGNITIVE LEVELS**
C113.1	Recall the concepts of voltage, current, power and energy for different circuit elements. Apply the Kirchhoff laws and different analyzing techniques to identify the different circuit parameters.	Applying Level (C3)
C113.2	Define and apply the networks theorems in the complex AC and DC circuits, networks. Demonstrate the physical model for given Sinusoidal AC signal and construct the phasor diagrams.	Applying Level (C3)
C113.3	Demonstrate the concept of resonance and operate different instrumental and measurement equipment's.	Understanding Level (C2)
C113.4	Demonstrate the construction and working of a single phase transformer.	Understanding Level (C2)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Basic Concepts	Voltage, Current, Power and Energy analysis for Circuit elements (R, L, C), Independent and Dependent Sources, Kirchhoff's Laws, Voltage Divider rule, Current Divider rule.	7
2.	DC Circuit Analysis	Star-Delta Transformation, Source transformation, Mesh and Supermesh Analysis, Nodal and super nodal Analysis	7
3.	Network Theorems	Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem.	8
4.	Sinusoidal Steady State Analysis	Physical Model for a Sinusoid, Average Value, Effective Value, Phasor presentation, Addition of Phasor using Complex Numbers, Concepts of impedance and admittance.	5
5.	AC Network Analysis and Theorems	Mesh and Nodal analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem.	7
6.	Resonant Circuits	Series and Parallel resonance, frequency response of Series and Parallel resonance, Q-Factor, Bandwidth.	3
7.	Electrical Instruments	Essentials of an Instrument, voltmeter, ammeter, Ohmmeter, Cathode Ray Oscilloscope	2
8.	Single Phase Transformer	Principle of operation, construction, e.m.f. equation, equivalent circuit, power losses, efficiency (simple numerical problems),	3

		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment, quiz, attendance)
Total	**100**

Project based learning component: Students will learn fundamental concepts, working and applications of voltmeter, ammeter, Ohmmeter, Cathode Ray Oscilloscope that develop aptitude among students to design minor and major projects. They will also develop knowledge about step-up and step-down transformers which can be further used to design advanced circuits in communication and robotics. It will also help develop concepts about instrumentation in electrical/electronics/biotech/communication based industries.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

Text Book

1	Robert L. Boylestad, Louis Nashelsky, " Electronic Devices and Circuit Theory ", 11thed, Prentice Hall ofIndia, 2014.
2	D.C. Kulshreshtha, Basic Electrical Engineering,Revised 1st ed, Tata Mc Graw Hill, 2017 .

Reference Book

1	R.C. Dorf and James A. Svoboda, "Introduction to Electric Circuits"**,** 9th ed, John Wiley & Sons, 2013.
2	Charles K. Alexander (Author), MatthewN.O Sadiku, " Fundamentals of Electric Circuits", 6th ed, Tata Mc Graw Hill, 2019.

Course Description

Course Code	15B17EC171	**Semester -:** Even (specify Odd/Even)	**Semester** II **Session:** 2022 -23 **Month- :** January - June
Course Name	Electrical Science Lab-1		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Vivek Dwivedi & Bajrang Bansal
	Teacher(s)	Atul kumar Srivastav, Akansha Bansal, BhawnaGupta, Gaurav Verma, Juhi Gupta, Mandeep Singh Narula, Kuldeep Baderia,Samriti Kalia, Shamim Akhter, Vishal Narayan Saxena, K. Nisha, Shradha Saxena,Ankur Bhardwaj, Smiriti BhatNagar, Rachana Singh

COURSE OUTCOMES		**COGNITIVE LEVELS**
C176.1	Understand various active and passive components and instruments (Multimeter, Bread board, Regulated D.C. power supply).	Understanding (Level II)
C176.2	Acquire the knowledge of electrical network and circuit such as branch, node, loop and mesh in networks and circuits.	Analyzing (Level IV)
C176.3	Study and verification of reduction technique using different network theorem.	Remembering (Level I)
C176.4	Study and verification of series and parallel AC circuits as well as Open & Short Circuit Test in single phase transformer.	Applying (Level III)

Module No.	**Title of the Module**	**List of Experiments**	**COs**
1.	Introduction of active and passive components	Introduction to various components (Resistor, Capacitor, inductor, and IC) and instruments. Multimeter, Bread board, Regulated D.C. power supply and CRO.	C176.1
2.	Analysis and verifications of Mesh and Node	Verification of KVL and KCL using a given circuit.	C176.2
3.	Study and Analysis of Superposition Theorem	Verification of Superposition Theorem.	C176.3
4.	Analysis and verification of Thevenin's Theorem	Verification of Thevenin's Theorm.	C176.3
5.	Analysis and verification of Maximum Power Transfer Theorem	Verification of Maximum Power Transfer Theorem.	C176.3
6	Analysis and	Verification of Reciprocity Theorem	C176.3

	verification of Verification of Reciprocity Theorem		
7.	Study and Verification of AC Signal in term of RMS and PP Value	To study the Root-Mean-Square (RMS), Peak, and Peak-to-Peak Values, Measurements with Oscilloscope.	C176.4
8	Study and Verification of of Star-Delta Theorem	Verification of Star-Delta Theorem	C176.4
9.	Study and Analysis of Series Resonance Circuit	To study the behavior of Series- RLC Circuit at Resonance.	C176.4
10	Study and Analysis of Parallel Resonance Circuit	To study the behavior of Parallel RLC Circuit at Resonance.	C176.4
11.	Study of open Circuit Test	Open Circuit Test in Single Phase Transformer using Vlab.	C176.4
12.	Study of Short Circuit test	Short Circuit Test in Single Phase Transformer using Vlab.	C176.4

Evaluation Criteria

Components	**Maximum Marks**
Viva1	20
Viva2	20
Report file, Attendance, and D2D	60 (15+15+30)
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Nilsson Riedel, Electric Circuits," Pearson, 11th Edition, 2019
2.	Abhijit Chakrabarti, "Circuit Theory Analysis and Synthesis," Dhanpat Rai & Co.; 7th Edition, 2018
3.	U. S. Bkashi A.U. Bakshi S. Ilaiyaraja,, "Circuit Theory Technical Publications; 3rd Edition, 2019
4.	Roman Malaric, "Instrumention and Measurement in Electrical Engineering, "Universal Publisher, 3rd Edition, 2011.
5.	DP Kothar and I J Nagrath, "Electric Machine," TMH; 4 th Edition, 2010

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11PH211	**Semester: Even**	**Semester: II Session** 2022-23 **Month from: January to June**
Course Name	PHYSICS-2		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	**Dr. Sandeep Chhoker and Dr. Ashish Bhatnagar**
	Teacher(s)	Prof. S. P. Purohit, Prof. R. K. Dwivedi, Prof. Navendu Goswami, Dr. Vikas Malik, Dr. Prashant Kumar Chauhan, Dr. Anshu D Varshney, Dr. B C Joshi Dr. Alok P S Chauhan, Dr. Dinesh Tripathi, Dr. Anuraj Panwar , Dr. Manoj Tripathi, Dr.Guru Prasad Kadam, Dr. Sandeep Mishra, Dr.Vaibhav Raut, Dr. Ravi Gupta

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Recall the basic concepts relating to electromagnetic theory, lasers, fiber optics and solid state physics.	Remembering (C1)
CO2	Illustrate the various physical phenomena with interpretation based on the mathematical expressions involved.	Understanding (C2)
CO3	Apply the basic principles in solving a variety of problems related to lasers, electromagnet theory, fiber and solid state physics.	Applying (C3)
CO4	Analyze and examine the solution of the problems using physical and mathematical concepts involved in the course.	Analyzing (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Electromagnetism**	Introduction of electromagnetism, Basic idea of Cartesian, Spherical polar and cylindrical coordinate systems, Basics of fields, Gradient, Divergence and Curl, Coulomb's law, Electric Flux & Gauss's law , Applications of Gauss law for Spherical and Cylindrical symmetries (all important cases), Electric field due to charged conductor, Force per unit area on the surface of the charged conductor, Laplace and Poisson's equations and their applications to solve electrostatic problems in Cartesian and cylindrical systems, Treatment of electrostatic problems using Laplace and Poisson's equations in spherical coordinate system, Maxwell's correction to Ampere's law, Displacement current, Maxwell's equations in free space and dielectric media (both differential and integral forms) Poynting's theorem (derivation) and Poynting vector, Electromagnetic waves in free space (equations and solutions) and Transverse nature of EM waves, Energy and momentum in EM waves, Radiation pressure, Propagation of EM waves through boundary, Boundary Conditions across the medium ,Reflection and Transmission of EM waves at normal incidence, Reflection and Transmission at oblique incidence- Laws of Reflection and Refraction , Oblique incidence-p polarization, Fresnel's equations, Total internal Reflection and Brewster's Law for EM waves	17

2.	**Lasers, Optical Fiber and their applications**	Introduction to Laser, spontaneous and stimulated emission, population inversion, Einstein A and B coefficients, Principles and working of lasers, Three level Laser Scheme, Ruby laser, Applications of lasers , Concept of optical fiber and Principle of Total Internal Reflection in optical fiber, Numerical aperture and Single, multistep & graded index fiber, Attenuation coefficient, Transmission losses in optical fiber, Applications of an optical fiber: Endoscopy and sensing applications (discussion of one specific example) of an optical fiber.	08
3.	**Solid State Physics**	Basic ideas of Bonding, Ionic bonding, covalent bonding and Metallic Bonding, Inter-atomic coulomb forces in ionic crystals and Determination of equilibrium separation, Minimum Potential energy and determination of Madelung constant 'α 'for NaCl crystal in 1D , Lattice points and space lattice, Basis and crystal structure, Unit cell and Primitive cell, Seven crystal systems and Fourteen, Bravais space lattice, Coordination number, nearest neighbor distance, atomic radius and packing factor in crystal structure, Calculation of lattice constant, Lattice planes and Miller indices,Separation between lattice planes, Derivation and examples, X-ray diffraction, Bragg's law of X- ray diffraction, Electrical properties of metals: Classical free electron theory of conduction in metals , Quantum mechanical treatment: Quantum theory of electronic conduction in metals , Kronig Penney Model: Periodic Potential and Allowed Energies, Emergence of Bands through Kronig Penney Model and Band Theory of Solids, Distinction between metals, Semiconductors and insulators, intrinsic and extrinsic semiconductors,Effective Mass: Concept and Significance, Brillouin zone: Relation with Lattice Structures, Types of Brillouin zones, Energy and Momentum ,Brillouin zone: Origin of Forbidden Bands	15

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	D. J. Griffiths, Introduction to Electrodynamics, Prentice-Hall India.
2.	Jerrold Franklin, Classical Electromagnetism, Pearson India.
3.	G. Keiser, Optical Fiber Communications, Tata Mc Graw Hill Education.
4.	A. Beiser, Concepts of Modern Physics, Mc Graw Hill International.
5.	S. O. Pillai, Solid State physics, New Age International (P) Limited.
6.	B. G. Streetman and S. Banerjee, Solid State Electronic Devices, Prentice-Hall India.

PBL Assignment Physics-II: Project report with a working model of project (preferred). Maximum of 3 students can work on one topic which will be identified during the semester. Report should include introduction, definition, mathematics, principle, working, figures, applications etc.

PBL Topics (not limited to):

1. Verify Inverse Square Law using Mobile Phone.
2. Lichtenberg figures
3. Working of 5G antenna
4. Study of the material used in foldable mobile phones screen

5. Optical Fiber in Medical diagnostic/space/mechanical inspection/internet security/communication
6. Types of electromagnet and its applications in medical/space
7. Earth as big capacitor
8. Satellite positioning using geographical coordinates
9. LASER scanners

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17PH271	**Semester:** Even Semester	**Semester:** II **Session** 2022 -2023 **Month: from** Jan-June
Course Name	Physics Lab-2		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Dr. Anshu Dhirendra Varshney and Dr. Ravi Gupta
	Teacher(s) (Alphabetically)	Amit Verma, Anuj Kumar, Ashish Bhatnagar, Anshu Varshney, B.C. Joshi, Dinesh Tripathi, Guru Prasad Kadam, Manoj Kumar, Manoj Tripathi, Navendu Goswami, Papia Chowdhary, Prashant Chauhan, R. K. Diwedi, Ravi Gupta Sandeep Chhoker, S. P. Purohit, Sandeep Mishra, Suneet Kumar Awasthi, Vikas Malik Vaibhav Rawoot

COURSE OUTCOMES		**COGNITIVE LEVELS**
C171.1	Recall laser, fibre optics, semiconductor and solid state physics principles behind the experiments.	Remembering (C1)
C171.2	Explainthe experimental setup and the principles involved behind the experiments performed.	Understanding (C2)
C171.3	Plan the experiment and set the apparatus and take measurements.	Applying (C3)
C171.4	Analyze the data obtained and calculate the error.	Analyzing (C4)
C171.5	Interpret and justify the results.	Evaluating (C5)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Semiconductor Physics	**1(a).** To determine the band gap in a semiconductor using its p-n junction diode. **1(b).** To draw the I-V characteristic of Solar cell and find maximum power and fill factor. **2(a).** To measure resistivity of semiconductor at different temperatures by Four Probe Method. **2(b).**To determine Band Gap of the semiconductor. **3.**To study the Hall effect in semiconductor and to determine its allied coefficients.	1-5
2.	Solid State Physics	**4.** To study the Magnetostriction in metallic rod with the help of Michelson interferometer arrangement. **5.** To find the susceptibility of a paramagnetic substance ($FeCl_3$) in the form of liquid or a solution. **6.**Study of dielectric (constant) behavior and determination of Curie's temperature of ferroelectric ceramics.	1-5
3.	Modern Physics	**7.**To study the magneto resistance of given semiconductor material. **8(a).** To determine the value of specific charge (e/m) of an electron by Magnetron method. **8(b).** To determine the velocity of ultrasonic wave in the medium of liquid using ultrasonic interferometer and to determine the compressibility of the given liquid.	1-5

		9(a). To determine Planck‟s Constant using LEDs of known wavelength. **9(b).** To study the photovoltaic cell and hence verify the inverse square law.	
4.	Optical Fiber	**10(a).** To determine the numerical aperture of a given multimode optical fiber. **10(b).** To measure the power loss at a splice between two multimode fibers and tostudy the variation of splice loss with Longitudinal and Transverse misalignments of thegiven fibers.	1-5

Evaluation Criteria

Components	**Maximum Marks**
Mid Term Viva (V1) :	20
End Term Viva (V2) :	20
D2D	: 60 = 30 (Day to day viva) + 10 (PBL) + 10 (attendance) + 10 (Lab Record)
Total	**: 100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Dey and Dutta, Practical Physics
2.	Lab Manuals

Project based learning: Each student in a group of 3-4 or individually will develop a mini project with the help of various concepts of semiconductor physics, solid state physics, and optical fiber. Individually or in a team they will learn how to apply the concepts for problem solving in a meaningful way.

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11CI211	**Semester:** Even 2023 **(specify Odd/Even)**	**Semester: II Session: CSE/IT/ECE** **Month from:** Jan to June
Course Name	Software Development Fundamentals – II		
Credits	4	**Contact Hours**	4 (3 Hrs. Theory, 1 Hr. Tutorial)

Faculty (Names)	**Coordinator(s)**	Prantik Biswas (J62), Rashmi Kushwah (J128)
	Teacher(s) (Alphabetically)	J62 – Aditi Sharma, Ankita Verma, Ashish Mishra, Mradula Sharma, Neetu Sardana, Prantik Biswas, Prashant Kaushik, Sangeeta Mittal, Shardha Porwal, Suma Dawn J128 – Arti Jain, Mukesh Saraswat, Raju Pal, Rashmi Kushwah, Shailesh Kumar

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Explain various object-oriented concepts like class and objects, friend function, function and operator overloading, etc.	Understand Level(Level 2)
CO2	Apply and implement the relationships of association, aggregation, composition, and inheritance	Apply Level (Level 3)
CO3	Analyze the output of the source code and able to debug the errors	Analyze Level (Level 4)
CO4	Design the class diagram for real life problems and implement it using virtual functions, abstract classes, templates, and exception handling	Create Level (Level 6)
CO5	Apply SQL commands to create tables and perform various operations like insert, delete, select, *etc.*	Apply Level (Level 3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Object Oriented Programming	Comparison of Procedural and Object-Oriented Approach, Characteristics of Object-Oriented Languages, Separation of behavior and implementation	2
2.	OO Concepts using C++	Objects, Classes, Internal representations of Objects, Constructors, Destructors Functionand Operator Overloading, Static and Friend Functions	8
3.	Inheritance using C++	Base Class, Derived class, Method Overriding, Private and Public Inheritance, Multiple Inheritance.	3
4.	Polymorphism using C++	Virtual Functions, Pure Virtual Functions, Abstract Classes, Dynamic Dispatch, Internal representations of method tables, RTTI	3
5.	UML/Relationship Implementation in	Models, Views and Model Elements, Class Diagram, Relationships of Association, Aggregation, Composition, and	8

	C++	Inheritance, *etc.* and their implementing	
6.	Exceptions, Templates, and STL in C++	Exceptions, Try, Catch and Throw, Re-throwing exceptions, Exception and Inheritance, Function Templates, Overloading Functions Template, Class Templates, Collection classes and iteration protocols (STL)	8
7.	Introduction to Database	Fundamentals of Database and Database Management System, Introduction to Relational Database, Table, Attributes, Records, Introduction to SQL, Data types in SQL, Various operations on single table like create, insert, delete, update, alter, etc. using SQL, SQL queries on single table using select statement with or without where/ group by clause, etc.	10
		Total number of Lectures	**42**

Project based learning: Each student in a group of 3-4 will have to develop a mini project based on object-oriented programming concepts. The students have to design the class diagram for any real-world application. The students have to implement the mini project using C++/Java language. Project development and its presentation will enhance the knowledge and employability of the students in IT sector.

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Mini Project (10), Attendance (10), Tutorial Assignments (5))
Total	**100**

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1	Herbert Schildt, C++: The Complete Reference, McGraw-Hill Osborne Media, 4th Edition, 2017
2	Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, Pearson, 7th Edition, 2016
3	Stroustrup B., The C++ Programming Language, Addison Wesley, 4th Edition, 2013
4	Avi Silberschatz, Henry F. Korth, and S. Sudarshan, "Database System Concepts", 6th edition, McGraw-Hill, 2010.
5	Robert Lafore, Object Oriented Programming in C++, SAMS, 4th Edition, 2002
6	John Hubbard, Schaum's Outline of Programming with C++, McGraw-Hill, 2nd Edition, 2000

Detailed Syllabus
Lab-wise Breakup

Course Code	15B11CI271	**Semester:** Even	**Semester: II Session: 2022-23** **Month from:** Jan to June
Course Name	Software Development Lab - II		
Credits	1	**Contact Hours**	2 hrs

Faculty (Names)	**Coordinator(s)**	(J62) Neetu Sardana, Mradula Sharma (J128) Mukesh Saraswat
	Teacher(s) (Alphabetically)	(J62) Adwitiya Sinha, Aditi Sharma, Amarjeet Prajapati, Anil Kumar Mehto, Alka Singhal, Ashish Mishra, Amit Mishra, Ankit Vidyarthi, Arpita Yadav, Amanpreet, Indu Chawla, Janardhan, Megha Rathi, Mradula Sharma, Niyati Agarwal, Neetu Sardana, Parul Sharma, Prashant Kaushik, Prantik Biswas, Raghu Vamsi, Sakshi Agarwal, Sandeep Kumar Singh, Sonal, Sarishty Gupta, Suma Dawn. (J128) Akanksha Bhardwaj, Ambalika Sarkar, Arti Jain, Chetna Gupta, Payal Khurana Batra, Raju Pal, Rashmi Kushwah, Shailesh Kumar, Shariq Murtuza

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Write programs in C++ to implement OOPs concepts related to objects, classes, constructor, destructor, and friend function.	Apply Level (Level 3)
CO2	Write programs in C++ using OOPs concept like encapsulation, inheritance, polymorphism and abstraction.	Apply Level (Level 3)
CO3	Write programs in C++ using Standard Template Library.	Apply Level (Level 3)
CO4	Perform exception handling in C++ programs.	Apply Level (Level 3)
CO5	Write MySQL queries to perform operations like ADD, DELETE, UPDATE, SELECT on relational databases.	Apply Level (Level 3)

Module No.	**Title of the Module**	**List of Experiments**	**No. of Labs for the module**
1.	OO Concepts using C++	Write output-based C++ programs to implement the concepts of Objects, Classes, Internal representations of Objects, encapsulation, Constructors, Destructors, Function and Operator Overloading, Static and Friend Functions.	3
2.	Inheritance using C++	Write programs in C++ to implement concepts of Base Class, Derived class, Method Overriding, Private and Public Inheritance, Multiple Inheritance.	2
3.	Polymorphism using C++	Write programs in C++ using Virtual Functions, Pure Virtual Functions, Abstract Classes, Dynamic Dispatch, Internal representations of method tables, RTTI, operator overriding.	2
4.	UML/Relationship Implementation in C++	Write programs in C++ using based on Class diagram, Relationships of Association, Aggregation, Composition, and Inheritance.	1

5.	Exceptions, Templates, and STL in C++	Write programs in C++ using Exceptions, Try, Catch and Throw, Re-throwing exceptions, Exception and Inheritance, Function Templates, Overloading Functions Template, Class Templates, Collection classes and iteration protocols (STL)	2
6.	Introduction to Database	Design simple SQL queries using MYSQL to apply various operations on single table like create, insert, delete, update, alter, etc., Queries on single table using select statement with or without where/ group by clause, etc.	2
		Total number of Labs	**12**

Evaluation Criteria

Components	**Maximum Marks**
Evaluation 1	15
Lab Test1	20
Evaluation 2	15
Lab Test 2	20
Mini Project	10
Attendance	10
TA	10
Total	**100**

Project based leaning: Groups of 3-4 students will choose a project topic. They will use the concepts of OOP and/or database to execute their project. In a team, they will learn how to apply the concepts for problem solving in a meaningful way.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1	Herbert Schildt, C++: The Complete Reference, McGraw-Hill Osborne Media, 4th Edition, 2017
2	Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, Pearson, 7th Edition, 2016
3	Stroustrup B., The C++ Programming Language, Addison Wesley, 4th Edition, 2013
4	Avi Silberschatz, Henry F. Korth, and S. Sudarshan, “Database System Concepts”, 6th edition, McGraw-Hill, 2010.
5	Robert Lafore, Object Oriented Programming in C++, SAMS, 4th Edition, 2002
6	John Hubbard, Schaum's Outline of Programming with C++, McGraw-Hill, 2nd Edition, 2000

Course Description

Course Code	15B11MA211	**Semester** Even	**Semester** II **Session** 2022-23 **Month from** Jan - Jun 2023
Course Name	Mathematics 2		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**	Dr. Yogesh Gupta, Dr. Pankaj Kumar Srivastava	
	Teacher(s) (Alphabetically)	Prof. Alka Tripathi, Prof. Amrish Kumar Aggarwal, Prof. Bhagwati Prasad Chamola, Prof. Lokendra Kumar, Dr. Anuj Bhardwaj, Dr. Himanshu Agarwal, Dr. Richa Sharma, Dr. Neha Singhal, Dr. Nisha Shukla, Dr. Manish Bansal, Dr. Shruti, Dr. Ram Surat Chauhan, Dr. Aradhana Narang, Dr. Amita Bhagat, Dr. Pinkey Chauhan, Dr. Neha Ahlawat, Dr. Mohd. Sarfaraz	

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C106.1	apply different methods for solving ordinary differential equations of second order.	Applying Level (C3)
C106.2	explain different tests/methods of convergence for infinite series.	Understanding Level (C2)
C106.3	find the series solution of differential equations and use it to construct Legendre's polynomials and Bessel's functions.	Applying Level (C3)
C106.4	classify the partial differential equations and apply Fourier series to find their solution.	Applying Level (C3)
C106.5	explain Taylor's & Laurent's series expansion, singularities, residues and transformations.	Understanding Level (C2)
C106.6	apply the concept of complex variables to solve the problems of complex differentiation and integrations.	Applying Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Second Order Linear Differential Equations	Linear Differential Equations of Second Order with constant coefficients and with variable coefficients, Change of Variable, Variation of Parameters.	5
2.	Convergence of Series	Convergence of series, Tests of convergence, Alternating Series, Absolute & Conditional Convergence, Uniform Convergence.	7
3.	Series Solution and Special Functions	Series Solutions, Bessel Function, Recurrence Relations and Orthogonality. Legendre functions, Recurrence relations and Orthogonality.	7
4.	Fourier Series and Partial Differential Equations	Fourier Series. Classification and Solution of PDE, Equation of vibrating string, Solution of one dimensional wave & heat equations.	5
5.	Complex Variables	Limit, Continuity and Differentiability of Functions of Complex Variables, Analytic Functions, Cauchy's Riemann Equations.	3

6.	Complex Integration	Cauchy Integral Theorem, Cauchy Integral Formula and Applications.	4
7.	Series Expansion	Taylor and Laurent Series Expansion, Poles and Singularities.	4
8.	Contour Integration	Residues, Cauchy's residue theorem and its applications.	5
9.	Conformal Mapping	Bilinear transformation	2
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials)
Total	**100**

Project based learning: Each student in a group of 3-4 will apply the concepts of Fourier Series, partial differential equations and contour integration to solve practical problems.

Recommended Reading material:

1.	**Jain, R. K. &Iyenger, S. R. K.,** Advanced Engineering Mathematics, 5th Ed., Narosa Publishing House, New Delhi, 2016.
2.	**Brown, J.W. & Churchill, R.V.,** Complex Variables and Applications, 6th Ed., McGrawHill, 1996.
3.	**Prasad, C.,** (a) Mathematics for Engineers (b) Advanced Mathematics for Engineers, Prasad Mudranalaya, 1982.
4.	**Kreysizg, E.,** Advanced Engineering Mathematics, 10th Edition, John Willey & Sons, Inc., 2015.
5.	**Simmons, G. F.,** Differential Equations with Applications and Historical Notes, 2nd Ed. McGraw Hill, 1991.
6.	**Spiegel, M.R.,** Complex Variables, Schaum's outline series, Mac Graw-Hill, 2009.
7.	**Grewal, B. S.,** Higher Engineering Mathematics, 44th Edition, Khanna Publisher, 2018.

Detailed Syllabus
Lecture-wise Breakup

Subject Code	**22B12HS111**	**Semester: EVEN**	**Semester: 2 Session: 2022-2023** **Month from Jan to June**
Subject Name	**LIFE SKILLS AND EFFECTIVE COMMUNICATION**		
Credits	**2**	**Contact Hours**	**(1-2-0)**
Faculty (Names)	**Coordinator(s)**	Dr. Badri Bajaj & Dr. Praveen Kumar Sharma	
	Teacher(s) (Alphabetically)	Dr. Amandeep Kaur, Dr. Anshu Banwari, Dr. Ankita Das, Dr. Chandrima Chaudhuri, Dr. Debjani Sarkar, Dr. Deepak Verma, Dr. Ekta Srivastava, Dr. Nilu Choudhary, Dr. Kanupriya Misra Bakhru, Dr. Monali Bhattacharya, Dr. Swati Sharma,	

COURSE OUTCOMES: The students will be able to:		**COGNITIVE LEVELS**
C180.1	Understand different life skills required for Self, Family, Society and lifelong success.	Understand (C2)
C180.2	Apply listening, speaking, reading and writing skills in professional environment.	Apply (C3)
C180.3	Develop Work-place skills for personal and professional excellence.	Analyze (C4)
C180.4	Evaluate and make decisions for empowerment of self and others.	Evaluate (C5)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No of Lectures**	**No of Practical**
1.	Introduction	Overview of Life Skills: Meaning and significance of life skills, Life skills identified by various organizations, Life Skills for Self, Family, Society and lifelong success. **Practical 1: Ice-breaking and Introducing Oneself** **Practical 2: Understanding Self**	2	4
2.	AdvancedLSRW Skills	Advanced Reading and Comprehension Skills, inferring lexical and contextual meaning, employing discourse analysis, Advanced Speaking Skills: Conversations, Dialogues and Debates, Persuasion, Negotiation Skills, Expressing Opinions, Agreement and Disagreement, Advanced Listening Skills, Advanced Writing skills: The art of Condensation, Note making, Essay Writing. **Practical 3: Academic Listening** **Practical 4: Comprehensive Reading** **Practical 5: Career-oriented Writing**	2	6
3.	Work-Place Skills	Interpersonal Skills: Team- work skills, Empathy, Emotional Intelligence, VUCA Leadership, Resilience, Tolerance, Self-Belief and Time Management **Practical 6: Team Communication-1** **Practical 7: Team Communication-2**	3	4
		Presentation and Interaction Skills: Speech Delivery, Group Discussion, Presentation Skills (Focused and targeted information seeking and presentation), Public Speaking, Audience Analysis, Interviews, Assessment of Personality - Projective& Self Report Techniques - Building Self-Confidence – Enhancing Personality Skills. **Practical 8: Technical Presentation-1** **Practical 9: Technical Presentation-2**	2	4

		Creativity and Critical Thinking: Creativity: Definition; Characteristics of Creative Person: Fluency; Originality; Curiosity; Critical Thinking, Problem Solving Techniques: Six Thinking Hats, Mind Mapping etc. **Practical 10: Thinking Skills** **Practical 11: Interview Skills-1**	2	4
4.	Ethics and Holistic Life	Harmony in personal and social life: Professional Integrity, Respect & Equality, Building Trusting Relationships. Concept of personal and group Ethics; Balance between - rights and duties-welfare of self and welfare of all. Understanding Nine universal values in relationships. Understanding harmony in the Family. Harmony in the Family; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the harmony in the society (society being an extension of family): Undivided Society (AkhandSamaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family. Gender Harmony & equity. **Practical 12: Interview Skills-2**	2	2
		Character, Righteousness and Virtues for A Meaningful Life: Self-Realization Through Spiritual texts: Egoless, Humility, Righteousness, Purity, Truthfulness, Integrity, Self-restraint, Self-control, Sense of responsibility, Empathy, Love, Compassion, Maitri / Comradeship, Cooperation, Tolerance and Gratitude.	1	
		Practical 13: PROJECT **Practical 14: PROJECT**		4
Total number of Hours			14	28

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20 (Technical Presentations)
End Semester Examination	35
TA	25 (Class participation, Project)
Total	**100**

Project Based Learning:

Students, in groups of 4-5, are required to visit Old Age Home/ Underprivileged Children/ NGO/ Cancer Hospital / etc. Spend time with them for 3-4 hours. Apply Life Skills learned in understanding their feeling and help them by providing solution to ease their stress. Document your visit and present in the class.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
Text Book(s):	
1.	Wadkar Alka, Life Skills for Success, Sage Publication Pvt Ltd, 2019
2.	Human Values, A.N. Tripathi, New Age International Pvt Ltd. Publishers New Delhi ,2005
Reference Book(s):	
3.	Carnegie Dale, Become an Effective Leader, New Delhi: Amaryllis, 2012
4.	Harold R. Wallace et. al, Personality Development, Cengage Learning India Pvt. Ltd; New Delhi, 2006
5.	Barun K. Mitra, Personality Development & Soft Skills, Oxford University Press, New Delhi, 2012.
6.	Mark G. Frank, David Matsumoto, Hyi Sung Hwang, Nonverbal Communication: Science and Applications, 2012, 1st Edition, Sage Publications, New York.
7.	William S. Pfeiffer, Public Speaking, Pearson, Delhi, 2012.
8.	Shiv Khera, You Can Win, Macmillan Books, New York, 2003.

9.	S. Kumar and PushpLata, Communication Skills, Oxford University Press,1st, Ed. 2011
10.	Raman M. and S. Sharma, Technical Communication: Principles & Practices, 29th Impression, Oxford University Press, New Delhi, 2009