Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11CI211	**Semester:** Even	**Semester:** II **Session:** 2020-21 **Month from:** Jan 2021 to June 2021
Course Name	Software Development Fundamentals – II		
Credits	4	**Contact Hours**	3-1-0

Faculty (Names)	**Coordinator(s)**	MukeshSaraswat (J128), Manish Kumar Thakur (J62), Ashish Mishra (J62)
	Teacher(s) (Alphabetically)	J128 - Anuradha Gupta, Arti Jain (T), Avinash Pandey, Himani Bansal, Kritika Rani, Shailesh Kumar, Swati (T) J62 – Aditi Sharma, AlkaSinghal, Anita Sahoo, Ankita Verma, ArpitaJadhav Bhatt, Ashish Mishra, K. Vimal Kumar, Manish Kumar Thakur, Manju (T), MeghaRathi (T), Mradula Sharma (T), NeetuSardana, Niyati Aggarwal

COURSE OUTCOMES		**COGNITIVE LEVELS**
C110.1	Explain various object-oriented concepts like class and objects, friend function, function and operator overloading, etc.	Understand Level(Level 2)
C110.2	Apply and implement the relationships of association, aggregation, composition, and inheritance	Apply Level (Level 3)
C110.3	Analyze the output of the source code and able to debug the errors	Analyze Level (Level 4)
C110.4	Design the class diagram for real life problems and implement it using virtual functions, abstract classes, templates, and exception handling	Create Level (Level 6)
C110.5	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 Function and 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	Models, Views and Model Elements, Class Diagram,	8

	Implementation in C++	Relationships of Association, Aggregation, Composition, and 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	RamezElmasri, 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
Lecture-wise Breakup

Course Code	15B11EC111	**Semester:** Even	**Semester:** II **Session:** 2020 -2021 **Month from** Jan 2021 to June 2021
Course Name	Electrical Science -1		
Credits	4	**Contact Hours**	3-1-0

Faculty (Names)	**Coordinator(s)**	Vimal Kumar Mishra, Neetu Joshi
	Teacher(s) (Alphabetically)	Archana Pandey, Bhagirath Sahu, Jyoti Vyas, Mandeep Narula, Megha Agarwal, Nisha, Rachna Singh, Sajaivir Singh, Shraddha Saxena.

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.	Apply 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 equipments.	Understanding Level (C2)
C113.4	Demonstrate the construction and working of 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	6
2.	DC Circuit Analysis	Star-Delta Transformation, Source transformation, Mesh and Supermesh Analysis, Nodal and super nodal Analysis	6
3.	Network Theorems	Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem	6
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.	4
5.	AC Network Analysis and Theorems	Mesh and Nodal analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem	6
6.	Resonant Circuits	Series and Parallel resonance, frequency response of Series and Parallel resonance, Q-Factor, Bandwidth	4
7.	Electrical Instruments	Essentials of an Instrument, Permanent Magnet Moving Coil (PMMC) Instruments, voltmeter, ammeter, Ohmmeter, Meter Sensitivity (Ohms-Per-Volt Rating); Loading Effect; Multimeter; Cathode Ray Oscilloscope: Construction,	6

		Working and Applications. Function Generators	
8.	Single Phase Transformer	Principle of operation, construction, e.m.f. equation, equivalent circuit, power losses, efficiency (simple numerical problems), introduction to auto transformer.	4
		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 Permanent Magnet Moving Coil (PMMC) Instruments, voltmeter, ammeter, Ohmmeter, Cathode Ray Oscilloscope and Function Generators that develop aptitude among students to design minor and major projects. They will also develop knowledge about step-up and step-down transformer 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)

1.	R.C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", 9th ed, John Wiley & Sons, 2013.
2.	Charles K. Alexander (Author), Matthew N.O Sadiku, " Fundamentals of Electric Circuits", 6th ed, Tata Mc Graw Hill, 2019.
3.	Robert L. Boylestad, Louis Nashelsky, " Electronic Devices and Circuit Theory ", 11th ed, Prentice Hall of India, 2014.
4.	D.C. Kulshreshtha, Basic Electrical Engineering,Revised 1st ed, Tata Mc Graw Hill, 2017 .

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B11MA211	**Semester:** Even	**Semester:** II **Session:** 2020-2021 **Month from** Jan 2021 to June 2021
Course Name	Mathematics 2		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**	Prof. Lokendra Kumar, Dr. DCS Bisht	
	Teacher(s) (Alphabetically)	Prof. Lokendra Kumar, Dr. DCS Bisht, Prof. Alka Tripathi, Dr. Anuj Bhardwaj, Dr. Yogesh Gupta, Prof. R.C. Mittal, Dr. Trapti Neer, Dr Pankaj Srivastava, Dr. Mohd. Sarfaraz, Dr. Neha Ahlawat	

COURSE OUTCOMES		**COGNITIVE LEVELS**
C106.1	Apply different methods for solving ordinary differential equations of second order.	Apply Level (C3)
C106.2	Explain different tests/methods of convergence for infinite series.	Understand Level (C2)
C106.3	Find the series solution of differential equations and use it to construct Legendre's polynomials and Bessel's functions.	Apply Level (C3)
C106.4	Classify the partial differential equations and apply Fourier series to find their solution.	Apply Level (C3)
C106.5	Explain Taylor's & Laurent's series expansion, singularities, residues and transformations.	Understand Level (C2)
C106.6	Apply the concept of complex variables to solve the problems of complex differentiation and integrations.	Apply 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	Residues, Cauchy's residue theorem and its	5

	Integration	applications.	
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**

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.

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11PH211	**Semester:** Even	**Semester:** II **Session** 2020-21 **Month from:** Jan 2021 to June 2021
Course Name	PHYSICS-2		
Credits	4	**Contact Hours**	3-1-0

Faculty (Names)	**Coordinator(s)**	Prof. R.K. Dwivedi & Dr. Suneet Kumar Awasthi
	Teacher(s) (Alphabetically)	Alok Pratap Singh Chauhan, Anshu D. Varshney, Anuj Kumar, Ashish Bhatnagar, Dinesh Tripathi, Himanshu Pandey, Manoj Kumar, Navendu Goswami, R. K. Dwivedi, S C Katyal, Suneet Kumar Awasthi, Vikas Malik

COURSE OUTCOMES		**COGNITIVE LEVELS**
C102.1	Recall the basic concepts relating to electromagnetic theory, statistical physics, lasers, fiber optics and solid state physics.	Remembering (C1)
C102.2	Illustrate the various physical phenomena with interpretation based on the mathematical expressions involved.	Understanding (C2)
C102.3	Apply the basic principles in solving variety of problems related to lasers, electromagnet theory, fiber and solid state physics.	Applying (C3)
C102.4	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 and Optical Fiber	Coulomb's law, Gauss law and its applications, Treatment of electrostatic problems by solution of Laplace and Poisson's equations, Biot-Savart law, Ampere's law, Maxwell's equations in free space and dielectric media. Electromagnetic waves, Derivations of expressions for energy density and energy flux (Poynting vector) in an electromagnetic field, Radiation pressure. Propagation of EM waves through boundary-Reflection, Refraction, Absorption and Total Internal Reflection. Light propagation in fibers and Graded Index fibers, Numerical Aperture and Attenuation, Single and Multimode.	18
2.	Statistical Distributions and Lasers	Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac distributions and their applications. Principle and working of laser, Einstein A and B coefficients, Ruby Laser.	08
3.	Solid State Physics	Basic ideas of bonding in solids, Crystal structure, Bragg's law X-ray diffraction, Band theory of solids, Distinction between metals, semiconductors and insulators. Electronic conduction in metals, Intrinsic and extrinsic (n and p-type) semiconductors and their electrical conductivity. p-n junction and Hall effect in semiconductors.	14
		Total number of Lectures	**40**

Evaluation Criteria

Components	**Maximum Marks**

T1	**20**	
T2	**20**	
End Semester Examination	**35**	
TA	**25**	
		(a) Quizes /class tests (07 M), (b) Attendance (07 M) (c) Internal Assessment (05) (d) Assignments in PBL mode (06 M)
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.	D. J. Griffiths, Introduction to electrodynamics, Pearson India.
2.	G. Keiser, Optical Fiber Communications, Tata Mc Graw Hill Education.
3.	A. Beiser, Concepts of Modern Physics, Mc Graw Hill International.
4.	S. O. Pillai, Solid State physics, New Age International (P) Limited.
5.	B. G. Streetman & S. Banerjee, Solid State Electronic Devices, Prentice-Hall India.

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17CI271	**Semester:**Even	**Semester:** II **Session:** 2020-21 **Month from:** Jan 2021 to June 2021
Course Name	Software Development Lab - II		
Credits	1	**Contact Hours**	2 hrs

Faculty (Names)	**Coordinator(s)**	Anita Sahoo, Niyati Aggrawal, Himani Bansal (J128)
	Teacher(s) (Alphabetically)	(J62) Adwitiya Sinha, Anita Sahoo, Ankita Verma, Arpita Yadav, Bhawna Saxena, Chetna Dabas, Deepti, Hema N., K Vimal Kumar, K. Rajalakshmi, Manju, Megha Rathi, Mradula Sharma, Neetu Sardana, Niyati Aggrawal, Prantik Biswas, Shardha Porwal (J128) Ambalika Sarkar, Anubhuti Mohindra, Arti Jain, Avinash Pandey, Devpriya Soni, Himani Bansal, Kritika Rani, Mukesh Saraswat, Nitin Shukla, Rashmi Kushwah, Shailesh Kumar, Shariq Murtuza, Shilpa Budhkar, Swati Gupta.

COURSE OUTCOMES		**COGNITIVE LEVELS**
C173.1	Write programs in C++ to implement OOPs concepts related to objects, classes, constructor, destructor, and friend function.	Apply Level (Level 3)
C173.2	Write programs in C++ using OOPs concept like encapsulation, inheritance, polymorphism and abstraction.	Apply Level (Level 3)
C173.3	Write programs in C++ using Standard Template Library.	Apply Level (Level 3)
C173.4	Perform exception handling in C++ programs.	Apply Level (Level 3)
C173.5	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 basedC++ programs to implement the concepts of Objects, Classes, Internal representations of Objects, encapsulation, Constructors, Destructors, Functionand 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++ usingVirtual 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, Relationshipsof Association, Aggregation, Composition, and Inheritance	1
5.	Exceptions, Templates, and STL in C++	Write programs in C++ usingExceptions, 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
TA10	
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

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17EC171	**Semester:** Even	**Semester:** II **Session:** 2020-21 **Month from** Jan 2021 to June 2021 **(Due to COVID-19 pandemic, it was run in Fast Track mode from June'21 to Jul'21)**
Course Name	Electrical Science Lab-1		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Bhagirath Sahu & Shradha Saxena
	Teacher(s)	Archana Pandey, Ashish Gupta, Atul Kumar Srivastav, Bhagirath Sahu, Garima Kapur, Gaurav Verma, Juhi Gupta, Kaushal Nigam, Kirmender Singh, Mandeep Singh Narula, Neetu Singh, Pankaj Kumar Yadav, Parul Arora, Raghvenda Kumar Singh, Sajai Vir Singh, Shivaji Tyagi, Shradha Saxena, Vijay Khare, Vivek kumar Dwivedi

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.	Analysis and verification of Transform Network	Realization of Equivalent Resistance of Star to Delta and Delta to Star Transformation.	C176.2
4.	Analysis and verification of of Super Node	Verification of Super Node using Voltage Source.	C176.2
5.	Analysis and verification of Divider rules	To verify the voltage divider rule (VDR) and the current divider rule (CDR).	C176.2

	for Current and Voltage		
6.	Study and Analysis of Superposition Theorem	Verification of Superposition Theorem.	C176.3
7.	Analysis and verification of Thevenin's/ Norton Theorem	Verification of Thevenin's Theorm and Norton Theorm.	C176.3
8.	Analysis and verification of Maximum Power Transfer Theorem	Verification of Maximum Power Transfer Theorem.	C176.3
9.	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
10.	Study and Analysis of Resonance Circuit	To study the behavior of Series-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
Lab-wise Breakup

Course Code	15B17PH271	**Semester:** Even	**Semester:** II **Session** 2020 -2021 **Month from** Jan 2021 to June 2021 **(Due to COVID-19 pandemic, it was run in Fast Track mode from June'21 to Jul'21)**
Course Name	Physics Lab-2		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Prof. Navendu Goswami and Dr. Vikas Malik.
	Teacher(s) (Alphabetically)	Ashish Bhatnagar, B.C. Joshi, Dinesh Tripathi, Manoj Kumar, Manoj Tripathi, Navendu Goswami, Sandeep Chhoker, Suneet Kumar Awasthi, Vikas Malik,

COURSE OUTCOMES		**COGNITIVE LEVELS**
C171.1	Recall laser, fibre optics, semiconductor and solid state physics principles behind the experiments.	Remembering (C1)
C171.2	Explain the 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. 9(a). To determine Planck"s Constant using LEDs of known wavelength.	1-5

		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 to study the variation of splice loss with Longitudinal and Transverse misalignments of the given fibers.	1-5

Evaluation Criteria

Components	**Maximum Marks**
Mid Term Viva (V1)	20
End Term Viva (V2)	20
D2D	60
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

Detailed Syllabus
Lab-wise Breakup

Course Code	18B15GE111	**Semester :** Even	**Semester:** II **Session:** 2020-2021 **Month from:** Jan 2021 to June 2021
Course Name	Engineering Drawing and Design		
Credits	1.5	**Contact Hours**	3

Faculty (Names)	**Coordinator(s)**	Mr. Chandan Kumar, Mr. Rahul Kumar
	Teacher(s) (Alphabetically)	Mr. Deepak Kumar, Mrs. Madhu Jhariya, Mr. Nitesh Kumar, Dr. Prabhakar Jha, Mr. Vimal Saini

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 I)
C178.2	Illustrate various types of mathematical curves and scale.	Understanding (Level II)
C178.3	Classify different types of projection and Construct Orthographic projection of Point, Line, Plane and Solid.	Applying (Level III)
C178.4	Construct Isometric Projection and Conversion of Orthographic view to Isometric view and vice-versa.	Applying (Level III)
C178.5	Construct Engineering model in Drawing software (AutoCAD) and Compare it with conventional drawing.	Analyzing (Level IV)

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: AutoCAD is a computer-aided software used for creating blueprints for bridges, buildings, interior & exterior designs etc. The software is widely used by designers and drafters for creating 2D and 3D computer drawings. Each student will opt an Automobile or Manufacturing Industry of India and learn more about their projects and latest designs.

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.	Agrawal B. &Agrawal C. M., Engineering Graphics, TMH Publication, 2012.
4.	Narayana, K.L. & P Kannaiah , Text book on Engineering Drawing, Scitech Publishers, 2008