Mathematics-2 (15B11MA211)

Course Description

Course Code	15B11MA211	**Semester** Even	**Semester** II **Session** 2020-2021 **Month from** Jan 2021- 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**
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 andPartial 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**

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" 44thEdition, Khanna Publisher, New Delhi, 2018.

Detailed Syllabus
Lecture-wise Breakup

Course Code	**15B1NHS435**	**Semester: Even**	**Semester Session:**2020-21 **Month from: Jan-June 2021**
Course Name	Financial Accounting		
Credits	3	**Contact Hours**	3 (2,1,0)

Faculty (Names)	**Coordinator(s)**	Dr. Mukta Mani (Sec-62), Dr. Sakshi Varshney (Sec-128)
	Teacher(s) (Alphabetically)	Dr. Mukta Mani, Dr. Sakshi Varshney

COURSE OUTCOMES		**COGNITIVE LEVELS**
C206-8.1	Understand the basic concepts of Accounting.	Understanding level (C2)
C206-8.2	Apply accounting concepts for recording of business transactions.	Applying level (C3)
C206-8.3	Compare and reconcile the accounting records with other sources of information	Analyzing level (C4)
C206-8.4	Evaluate the accounting records to identify and rectify the errors made during accounting process.	Evaluating level (C5)
C206-8.5	Construct the final accounts and cash flow statement of a business	Creating (C6)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Accounting	Meaning of Accounting, Objectives of Accounting, Understanding Company Management, Stakeholders versus Shareholders, Financial Reporting Standards, Financial Reporting	2
2.	Understanding Accounting Elements	Elements of Financial Statements- Assets, Current assets, Liabilities, Current liabilities, Equity, Income, Expenses, Accounting Equation	2
3.	Accounting Concepts	Business entity concept, Money measurement concept, Going concern, Consistency, Matching concept, Cost concept, Dual aspect concept, Materiality,Full disclosure,Generally Accepted Accounting Principles (GAAP)	2
4.	Journal Transactions	Journal, Rules of Debit and Credit, Compound Journal entry, Opening entry	2
5.	Ledger Posting and Trial Balance	Ledger, Posting, relationship between Journal and Ledger, Rules regarding Posting, Trial balance	3
6.	Rectification of Errors	Different types of errors, their effect on trial balance, rectification and preparation of suspense account	5

7.	Bank Reconciliation Statement	Meaning of Bank Reconciliation Statement, technique of preparing BRS, Causes of difference	2
8.	Final Accounts	Trading account, Profit and Loss account, Balance sheet, Adjustment entries	6
9.	Cash Flow Statement	Introduction of Cash Flow Statement,Classification of Cash inflows and Cash Outflows Activities,prepare the statement of cash flows using direct and Indirect method	4
		Total number of Lectures	**28**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project+ Class test/Quiz+Class Participation)
Total	**100**

Project Based learning: Students form a group of 4-5 students. Each group is required to choose a company listed in Indian stock exchange and download its latest annual report. Students are required to describe the company,composition of board of directors, number of company's executives,independent directors,background of independent directors. They are required to find outfinancing, investing and operating activities and examines the change in total assets, sales and net profit of the company. As per auditor's report, company's position and future plans for growth of the company is also analyzed.

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.	Maheshwari S. N., Financial and Management Accounting, 5th Ed., S. Chand & Sons Publication, 2014. ISBN No.: 978-81-8054-529-0
2.	Ghosh, T.P., Financial Accounting for Managers, 4th Ed., Taxmann Publications, 2009
3.	Tulsian,P., Financial Accounting,1st Ed., Pearson Education India,2002
4.	Bhattacharya, A., Financial Accounting for Business Managers, 4th Ed., Prentice Hall of India,2012
5.	Weygandt.J., Kimmel, P., Kieso,D., Accounting Principles, 12th Edition, John Wiley & Sons,2015
6.	Barton,M., Bhutta, P.,S. O'Rourke,J.,Satyam Computer Services Ltd: Accounting fraud in India,London,SAGE Publications Ltd, 2017,

Detailed Syllabus
Lecture-wise Breakup

Subject Code	**15B11HS111**	**Semester: EVEN**	**Semester IV Session 2020-2021 Month from Jan to June**
Subject Name	**LIFE SKILLS**		
Credits	**2**	**Contact Hours**	**2 (1 1 0)**
Faculty (Names)	**Coordinator(s)**	Dr. Praveen Sharma & Dr. Deepak Verma	
	Teacher(s) (Alphabetically)	Dr.Akarsh Arora,Dr. Amandeep Kaur, Dr. Badri Bajaj, Dr. Kanupriya Bakhru, Dr Praveen Sharma, Dr. Anshu Banwari, Dr. Deepak Verma, Dr. Ekta Shrivastava, Dr. Nilu Choudhary	

COURSE OUTCOMES		**COGNITIVE LEVELS**
C209.1	Understand Life Skill required to manage self and one's environment	Understand (C2)
C209.2	Apply comprehensive set of skills for life success for self and others	Apply (C3)
C209.3	Analyze group dynamics for its effective functioning	Analysing (C4)
C209.4	Evaluate the role of women leadership and gender issues	Evaluate (C5)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No. of Lectures for the module**
1.	Introduction	Introduction to Life Skills; basic Concepts and Relevance for Engineers	1
2.	Individual-1	Emotional Intelligence, Stress Management, Goal Setting	4
3.	Individual-II	Dimensions of Personality, Values and Attitudes, Assertiveness, Well being,	3
4.	Group Dynamics	Group, Group types, Group Relationship, Social Loafing, Social Facilitation	3
5.	Women Leadership	Gender Sensitization, Women Leadership.	3
Total number of Hours			14

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment & Project)
Total	**100**

Project Based Learning: Students are supposed to form a group (Maximum 5 students in each group) and identify a Women leader of their choice. They are supposed to do the in-depth study on the leadership style of their identified

leader and explain it. They are also supposed to explain identified women leader's personality traits by referring the Big five personality traits model. The project provides understanding to students on Women leadership and personality traits.

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.	Stephen P. Robbins, Organizational Behaviour, 9th Edition, Prentice-Hall India 2001
2.	Smith, E., Hoeksema, S., Fredrickson, B., & Loftus, G. Introduction to Psychology. Thompsons and Wadsworth Co, 2003
3.	Daniel Goleman, Working With Emotional Intelligence, Bantom Books 1998
4.	Sue Bishop, Assertiveness Skills Training, Viva Books, New Delhi, 2004
5.	Adele B. Lynn 50 Activities for Developing Emotional Intelligence, Ane Books, 2003
6.	Sivasailam Thiagarajan, Glenn M. Parker; Teamwork and Teamplay, Games and Activities for Building and Training Teams., Jossey-Bass, 1999
7.	Kaul A.& Singh M., *"New Paradigms for Gender Inclusivity*", PHI Pvt Ltd 2012

Software Development Lab - II

Detailed Syllabus
Lab-wise Breakup

Course Code	15B11CI271	**Semester:** Even **(specify Odd/Even)**	**Semester: II Session: 2020-21** **Month from:** Jan to June
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 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	Write programs in C++ using Exceptions, Try, Catch and Throw, Re-throwing exceptions, Exception and Inheritance,	2

	STL in C++	Function Templates, Overloading Functions Template, Class Templates, Collection classes and iteration protocols (STL)	
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	15
Attendance	15
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
Lecture-wise Breakup

Course Code	15B11PH211	**Semester: 2**	**Session** 2020-21 **Month from: January to June**
Course Name	PHYSICS-2		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	**Prof. R.K. Dwivedi & Dr. Suneet Kumar Awasthi**
	Teacher(s) (Alphabetically)	Alok Pratap Singh Chauhan (ALC) Anshu D. Varshney (ADV) Anuj Kumar (AK) Ashish Bhatnagar (ABH) Dinesh Tripathi (DT) Himanshu Pandey (HP) Manoj Kumar (MKC) Navendu Goswami (NG) R. K. Dwivedi (RKD) S C Katyal (SCK) Suneet Kumar Awasthi (SKA) Vikas Malik (VM)

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 solutionof Laplace and Poisson's equations, Biot-Savartlaw, Ampere's law, Maxwell's equations in freespace and dielectric media. Electromagneticwaves, Derivations of expressions for energydensity and energy flux (Poynting vector) in anelectromagnetic field, Radiation pressure.Propagation of EM waves through boundary-Reflection, Refraction, Absorption and TotalInternal Reflection. Light propagation in fibersand Graded Index fibers, Numerical Apertureand 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 Bcoefficients, Ruby Laser.	08

3.	Solid State Physics	Basic ideas of bonding in solids, Crystalstructure, Bragg's law X-ray diffraction, Bandtheory of solids, Distinction between metals,semiconductors and insulators. Electronicconduction in metals, Intrinsic and extrinsic (nandp-type) semiconductors and their electricalconductivity. p-njunction and Hall effect insemiconductors.	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 (07M), (b) Attendance (07M) (c) Internal Assessment (05) (d) Assignments in PBL mode (06M)	
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	**15B17PH271**	**Semester:**Even Semester	**Semester:**II **Session** 2020 -2021 **Month: from** June-July
Course Name	Physics Lab-2		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Prof. Navendu Goswamiand 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	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. **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.	1-5

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
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
Lecture-wise Breakup

Course Code	15B11EC111	**Semester** Even **(specify Odd/Even)**	**Semester** 2nd **Session** 2020 -2021 **Month from** Jan-June
Course Name	**Electrical Science -1**		
Credits	4	**Contact Hours**	3+1

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 .

Course Description

Course Code	15B17EC171	**Semester -:** Even (specify Odd/Even)	**Session:** 2020 -21 **Month- :** January - May
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	Verification of Super Node using Voltage Source.	C176.2

	of Super Node		
5.	Analysis and verification of Divider rules for Current and Voltage	To verify the voltage divider rule (VDR) and the current divider rule (CDR).	C176.2
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	18B15GE111	**Semester :** Even **(specify Odd/Even)**	**Semester:** II[nd] **Session** 2020-2021 **Month from:** Jan to June
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. DeepakKumar, Mrs. Madhu Jhariya, Mr. Nitesh Kumar, Dr. Prabhakar Jha, Mr. VimalSaini

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 CriteriaComponents **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