INTEGRATED M. TECH BIOTECHNOLOGY

SEMESTER- 2

Detailed Syllabus

Lecture wise Breakup

Subject Code	**22B12HS111**	**Semester: EVEN**	**Semester: II Session: 2022-23**
Subject Name	**LIFE SKILLS AND EFFECTIVE COMMUNICATION**		
Credits	**2**	**Contact Hours**	**(1-2-0)**
Faculty (Names)	**Coordinator(s)**	Dr. Kanupriya Misra Bakhru	
	Teacher(s) (Alphabetically)	Dr. Amandeep Kaur, Dr. Anshu Banwari, Dr. Ankita Das, Dr. Chandrima Chaudhuri, Dr. Debjani Sarkar, Dr. Ekta Srivastava, Dr. Nilu Choudhary, Dr. Monali Bhattacharya, Dr. Swati Sharma, Ms Shikha Kumari	

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Understand different life skills required for Self, Family, Society and lifelong success.	Understand (C2)
CO2	Apply listening, speaking, reading and writing skills in professional environment.	Apply (C3)
CO3	Develop Work-place skills for personal and professional excellence.	Analyze (C4)
CO4	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.	Advanced LSRW 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 (SarvabhaumVyawastha)- 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
End Semester Examination	35
TA	25 (Technical presentation, 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. They have to document their 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)

1.	Wadkar Alka, Life Skills for Success, Sage Publication Pvt Ltd, 2019
2.	Carnegie Dale, Become an Effective Leader, New Delhi: Amaryllis, 2012
3.	Harold R. Wallace et. al, Personality Development, Cengage Learning India Pvt. Ltd; New Delhi, 2006
4.	Barun K. Mitra, Personality Development & Soft Skills, Oxford University Press, New Delhi, 2012.
5.	Mark G. Frank, David Matsumoto, Hyi Sung Hwang, Nonverbal Communication: Science and Applications, 2012, 1st Edition, Sage Publications, New York.
6.	William S. Pfeiffer, Public Speaking, Pearson, Delhi, 2012.
7.	Human Values, A.N. Tripathi, New Age International Pvt Ltd. Publishers New Delhi ,2005
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

Detailed Syllabus

Lecture wise Breakup

Course Code	**15B11MA212**	**Semester** Even	**Semester** II **Session** 2022-23
Course Name	**Basic Mathematics- 2**		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**	Prof. Lokendra Kumar	
	Teacher(s) (Alphabetically)	Prof. Lokendra Kumar, Dr. Nisha Shukla	

	OUTCOMES	**COGNITIVE LEVELS**
C108.1	explain the basic concepts of convergence of series and Fourier series.	Understanding Level(C2)
C108.2	explain the concepts of two-dimensional coordinate geometry.	Understanding Level(C2)
C108.3	explain the basic concepts of vectors and 3D coordinate geometry.	Understanding Level(C2)
C108.4	apply differentiation in scalar and vector valued functions.	Applying level(C3)
C108.5	classify and solve the ordinary differential equations with constant coefficients.	Applying Level(C3)
C108.6	apply basic numerical methods for finding roots, interpolation and integration.	Applying Level(C3)

Modul e No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Sequence and Series	Convergence and divergence. Simple tests for convergence. Absolute convergence. Fourier series.	06
2.	Two-dimensional coordinate Geometry	Cartesian coordinate system. Distance between two points. Equation of line in different forms. Equations of circle, ellipse and parabola. Equation of a tangent to a curve. Area of a triangle.	07
3.	Vectors and Coordinate e Geometry (3D)	Vectors and their algebra. Simple applications to geometry and mechanics. Unit vectors, vectors *i, j* and *k.* Components of a vector. Position vector. Direction cosines and direction ratios. Dot and cross products. Projection of a vector on another. Distance between two points. Equations of a line, plane and sphere.	08

4.	Calculus of two or more variables	Partial differentiation. Taylor's series. Differentiation of a vector. Tangent to a curve. Gradient of a scalar.	09
5.	Elementary y Differentia l Equations	Definitions of order, degree, linear, nonlinear, homogeneous and non- homogeneous. Solution of first order equations. Complementary function and particular integral. Initial and boundary value problems. Linear differential equations with constant coefficients.	07
6.	Numerical Methods	Solution of algebraic and transcendental equations -Bisection method, Newton Raphson method. Linear and quadratic interpolation. Trapezoidal and Simpson's rule.	05
Total number of Lectures			**42**
Project based learning: Students will be divided in a group of 4-5 to collect literature and submit a report on applications of differential equations and explain the use of numerical methods in biosciences.			

Evaluation Criteria Components **Maximum Marks** T1 20 T2 20 End Semester Examination 35 TA 25 (Quiz, Assignments, PBL, Tutorials etc.) **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.	**Thomas, G. B. & Finney, R. L.,** Calculus and analytical geometry, 9th Ed., Pearson Education Asia (Adison Wesley), New Delhi, 2000.
2.	**NCERT.** Mathematics Textbook for class XI and XII, 2009.
3.	**Sharma, R.D.,** Mathematics, Dhanpat Rai Publications, New Delhi, 2011.
4.	**Kreyszig, E.**, Advanced Engineering Mathematics, 10th Ed., John Wiley, 2015.

Detailed Syllabus

Lecture wise Breakup

Course Code	**15B11PH212**	**Semester: Even**	**Semester:** II	**Session** 2022-23
Course Name	**BIO-PHYSICAL TECHNIQUES**			
Credits	4	**Contact Hours**	4	
Faculty (Names)	**Coordinator(s)**	Prof. S. P. Purohit		
	Teacher(s) (Alphabetically)	S. P. Purohit		

COURSE OUTCOMES		**COGNITIVE LEVELS**
C104.1	Select biophysical spectroscopic technique(s) for their application(s) in determining structural details and properties of molecules.	Remembering (C1)
C104.2	Explain underlying principles of different biophysical techniques at atomic and molecular level and working principles of related spectrometers/microscopes.	Understanding (C2)
C104.3	Apply different biophysical techniques and choose appropriate technique(s) for investigating structural details and properties of a molecular sample.	Applying (C3)
C104.4	Analyze spectroscopic/microscopic data obtained from different biophysical techniques.	Analyzing (C4)
C104.5	Evaluate numerical values of different physical parameters involved in the modelling of different biophysical techniques at atomic and molecular level.	Evaluating (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Principles and Applications	Biophysical techniques and their applications, Quantization of energy levels in atoms and molecules, Concept of matter waves, uncertainty principle and Schrödinger wave equation, Rigid rotor, non- rigid rotor, Harmonic Oscillator, and anharmonic oscillator, Regions of the electromagnetic spectrum, Types of spectra – absorbance, Beer-Lambert's law, emission, and fluorescence Width and intensity of spectral lines, optically allowed and forbidden transitions.	8
2.	Microwave Spectroscopy	Microwave active molecules, Rotation of molecules, Rotational spectra of di-atomic molecules, Rigid rotor and non-rigid rotor, Microwave spectroscopy technique, Example of molecular microwave spectra.	3
3.	Infrared Spectroscopy	IR active molecules, Vibration spectra of diatomic molecules, Vibration rotation spectra of diatomic molecules, FTIR, Example of molecular IR spectra.	3
4.	Raman Spectroscopy	Raman effect, Molecular polarizability, Rotational and vibrational Raman Spectra, Raman spectrometry technique, example of molecular Raman spectra.	3

5.	UV Visible Spectroscopy	UV Visible spectroscopy of molecules, electronic transitions in molecules, Frank-Condon principle, Dissociation energy, UV Visible spectroscopic technique, Example of molecular UV- Visible spectra.	3
6.	Mass Spectrometry	Working principle of mass spectrometer, Mass spectrum and the base peak, Nitrogen rule, Identifying compounds and isotopes, Determination of molecular formula, Mass spectrometer, Example of molecular mass spectra.	4
7.	NM R	Interaction between spin and magnetic field, Nuclear Magnetic Resonance (NMR), PMR and C NMR, Chemical shift, NMR technique and applications, Example of molecular NMR spectra.	5
8.	Crystallography	Bonding in solids, Types of crystals, Miller Indices, Reciprocal lattice, X-ray diffraction, Bragg's law and its application, Energy dispersive X-ray spectroscopy (EDX) Example of X-ray diffraction from molecular structure.	5
9.	Electron Microscopy	Electron Microscopy – basic principle, Scanning Electron Microscope (SEM), Example of some SEM images. Transmission Electron Microscope (TEM), Example of some TEM images, Scanning Probe Microscopy (STM and AFM)	6
Total number of Lectures			**40**

Evaluation Criteria Components
Maximum Marks T1 20
T2 20
End Semester Examination 35
TA 25 [2 Quiz (10 M), Attendance (10 M) and Cass performance (5 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.	**Text 1:** Fundamentals of Molecular Spectroscopy, C. N. Banwell and E. M. McCash, Tata McGraw- Hill, 4rd Edition 1995.
2.	**Text 2:** Crystallography applied to Solid State Physics, A R Verma, O N Srivastava, New Age International Publishers
3.	**Text 3:** Electron Microscopy and Analysis, P. J. Goodhew, J. Humphreys, R Beanland, 3rd Edition, 2000.
4.	**Reference 1.** Conformation of Biological Molecules. Govil G. and Hosur R.V. (1982), Springer Verlag, Berlin, Heidelberg, New York.
5.	**Reference 2.** Practical Biochemistry, K. Wilson and J. Walker, Cambridge Press, 5th edition.

Project based Learning: Short projects will be assigned to students as assignments to develop an understanding of the role of various spectroscopic techniques for today's Industrial applications with specific attention to applications in the areas of medical sciences like X-RAY scan, MRI scan, fluorometry, fluoroscopy etc. Through projects students will learn to operate various spectrometers. The projects related to applied spectroscopy will develop their analytic capabilities and provide first exposure to R& D activities.

Detailed Syllabus

Lecture wise Breakup

Course Code	15B11EC111	**Semester:** Even	**Semester:** II	**Session:** 2022-23
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/electronic/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.

Detailed Syllabus

Lecture wise Breakup

Course Code	**18B11CI121**	**Semester Even**	**Semester:** II	**Session** 2022-23
Course Name	**Fundamental of Computer Programming II**			
Credits	**4**		**Contact Hours**	**Contact Hours**
Faculty (Names)	**Coordinator(s)**	Somya Jain		
	Teacher(s)	Somya Jain		

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Define basics of C programming language like its data types, operators, control flow and loop control.	Remember (C3)
CO2	Develop C programs using Controls flows like while, do while, for loops, if else, switch case, etc.	Apply (C3)
CO3	Experiment with single and multi-dimensional arrays, structure and functions in C programming Language.	Apply (C3)
CO4	Explain basic features of object-oriented design such as encapsulation, polymorphism, inheritance, and abstraction and compare it with function-oriented programming.	Understand(C2)
CO5	Develop a simple web application with client and server-side scripting using JavaScript and PHP and connect with a given relational database	Apply (C3)

Module No.	**Title of the Module**	**List of Experiments**	**COs**
1	C Programming	Syntax and semantics, data types and variables, expressions and assignments, array and struct, simple I/O, conditional and iterative control structures Programs on unit conversion, approximating the square root of a number, finding the greatest common divisor, average, sum, min, max of a list of numbers, common operations on vector, matrix, polynomial, strings, programs for pattern generation	16
2	Functions in C Programming	Functions and parameter passing (numbers, characters, array, structure), recursion, e.g., factorial, Fibonacci, Scope of variable	10
3	functions oriented programming Vs object-oriented programming	comparison between FOP and OOP, OOPs Concepts	7
4	HTML forms, Introduction to client and servers side scripting, introduction to PHP	HTML forms, creating dynamic web pages with database connectivity using MySQL	9
		Total Number of lectures	42

Evaluation Criteria
Components Maximum Marks
T1 20

T2 20

End Semester Examination 35

TA 25(Attendance = 07, Class Test, Quizzes, etc. = 07, Internal Assessment = 05, Assignments in PBL mode = 06)

Total 100

Text Reading material:	
1	Deitel, Paul; Deitel, Harvey, C: How to Program (8 Edition.). Pearson. ISBN 978-0133976892, 2015.
2	Perry, Greg; Miller, Dean, C Programming: Absolute Beginner's Guide (3 ed.). Que. ISBN 978-0789751980, 2013.
3	C Programming: The Definitive Beginner's Reference, Harry H. Chaudhary, First MIT Createspace-Inc, 2014.
4	Programming in ANSI C, E Balagurusamy, 8th Edition, Mc Graw Hill 2019,
5	Stroustrup, Bjarne, The C++ Programming Language (Fourth ed.). Addison-Wesley. ISBN 978-0-321-56384-2, 2013.
6	Nixon, Robin. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5. " O'Reilly Media, Inc.", 2014.
7	David Griffiths, and Dawn Griffiths “Head First C 1/e Edition”, O’Reilly Publication, 2012.
8	D. S. Malik, “C++ Programming: From Problem Analysis to Program Design, 6th Edition, Course Technology, Cengage Learning, 2012
Recommended Reading material: (Reference Books)	
1	B W. Kernighan and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, Prentice-HallIndia, New Delhi, 2002.
2	H. Schildt, **“**C: The Complete Reference”, Tata McGraw-Hill Education, 4th Edition, TMH 2000.
3	Y. Kanethkar, “Let Us C”, BPB Publication, 16th Edition, 2018.

Project based Learning: all students have to make group of 3-4 students for developing their mini-project based on the fundamentals of computer programming. It will be evaluated at the end of this semester.

Detailed Syllabus

Lecture wise Breakup

Course Code	**18B15BT111**	**Semester:** Even	**Semester:** II **Session 2022-23**
Course Name	Basic Bioscience Lab		
Credits	**1**	**Contact Hours**	**2 hours**

Faculty (Names)	**Coordinator(s)**	**Ekta Bhatt**
	Teacher(s) (Alphabetically)	Prof. Pammi Gauba Prof. Vibha rani Prof. Indira P. Sarethy Dr. Shweta Dang Ms. Ekta Bhatt

COURSE OUTCOMES		**COGNITIVE LEVELS**
C177.1	Demonstrate good laboratory practices and documentation.	Understand Level (C2)
C177.2	Show working of equipment's& instruments.	Understand Level (C2)
C177.3	Apply knowledge of essential concepts related to biomolecules.	Apply Level(C3)
C177.4	Analyze experimental data and drawing valid conclusion.	Analyze Level(C4)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Laboratory safety guidelines	Good and bad laboratory practices. Safety handling of instruments, equipment's and documentation.	Understand Level (C2)
2.	Concept of ph. and pKa	Basic principle of ph and pka. Preparation of stock buffers	Apply Level (C3)
3.	Essential concept of biomolecules	Qualitative and quantitative estimation of Carbohydrates and Proteins.	Apply Level (C3)
4.	Analyze experimental data	Analyze experimental data and drawing valid conclusion.	Analyze Level (C4)
Total No. of Labs			**12**

Evaluation Criteria Evaluation Criteria

Components	**Maximum Marks**
Mid-Semester lab-viva/ test	20
End-Semester lab-viva/ test	20
Day to Day performance (Learning laboratory Skills and handling Laboratory Equipments, attendance)	45
Laboratory record	15
Total	**100**

Project based learning- Estimation of Biomolecules (Protein, Carbohydrate and Amino acid)

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.	Introductory practical book of Biochemistry by S.K. Sawhney, Randhir Singh (Narosa Publishing House)
2.	Rex M. Heyworth, Procedural and conceptual knowledge of expert and novice students for the solving of a basic problem in chemistry, *International Journal of Science Education*, 21, 2, (195), (1999).
3.	Boyer R.F. *Modern Experimental Biochemistry*. Massachusetts: Addison-Wesley Publishing Co., 1986
4.	Strong, F. C. (1952) Theoretical basis of the Bouguer-Beer law of radiation absorption. Anal. Chem. 24, 338–342
5.	Ninfa, A. J., Ballou, D. P., and Parsons, M. B. (2010) Fundamental Laboratory Approaches for Biochemistry and Biotechnology, Alexander J.Ninfa, David P. Ballou, Marilee Benore, Eds., Wiley, Hoboken, NJ

Detailed Syllabus

Lecture wise Breakup

Course Code	15B17EC171	**Semester:** Even	**Semester:** II **Session:** 2022-23
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, Bhawna Gupta, 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 Verification of Reciprocity Theorem	Verification of Reciprocity Theorem	C176.3
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	**18B15CI121**	**Semester Even**	**Semester: II**	**Session** 2022-23
Course Name	**Computer Programming lab II**			
Credits	1	**Contact Hours**	2	
Faculty (Names)	**Coordinator(s)**	Alka Singhal		
	Teacher(s) (Alphabetically)	Alka Singhal, Dharamveer Singh Rajpoot, Parmeet Kaur, Prakash Kumar, Vivek Kumar Singh		

COURSE OUTCOMES		**COGNITIVE LEVELS**
CO1	Demonstrate basic programs of different data types and operators in C.	**Understand (C2)**
CO2	Develop C programs using Controls flows like while, do while, for loops, if else, switch case, etc.	**Apply (C3)**
CO3	Make use of single and multi-dimensional arrays, structure, and functions in C programming language.	**Apply (C3)**
CO4	Demonstrate basic features of object-oriented programming such as objects and classes in C++.	**Understand (C2)**
CO5	Develop a simple web application with client and server- side scripting using JavaScript and PHP and connect with a given relational database	**Apply (C3)**

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Basic Programming In C	Data types, Declaring Variables, Initializing Variables, Type Conversion	**CO1**
2.	Operators and Expressions and Input Output In C	Conditional operators, Arithmetic, Relational, Assignment, Logical and Bitwise operators, Formatted Functions, Flags, Widths and Precision with Format String, Unformatted Functions	**CO1**
3.	Decision Statements	If statement, IF- else, If-else-if, break, continue, go to, switch case	**CO2**
4.	Loop Control	The for loops, nested for loop, the while loop, do while loop	**CO2**
5.	Data Structure: Array and structure	Array, 2 D array, Matrix operations, structure and functions	CO3
6.	C++ programming	Programs based on class and objects	CO4

7.	PHP, Java Script, and HTML Forms	Develop a simple web application with client and server- side scripting using JavaScript and PHP and connect with a given relational database	CO5

Evaluation Criteria

Components	**Maximum Marks**
Evaluation 1	15
Lab Test 1	20
Evaluation 2	15
Lab Test 2	20
TA	30 (Attendance (15), Mini project (15))
Total	**100**

PBL: The students in group of 3-4 will come up with some real-world problem and will develop a Mini project in C to solve it. The project can be an application, game or any software utility which is designed and developed to solve a real-world problem statement using C Programming. This will make them acquaint to handle real world problems with programming solutions.

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.	H. Cooper and H. Mullish, Jaico Publishing House. “Spirit of C”, 4th Edition, Jaico Publishing House,2006
2.	Herbert Schildt. “The Complete Reference C”, 4th Edition, TMH, 2000
3.	Brian W. Kernighan and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, Prentice- Hall India, New Delhi, 2002
4.	User manuals supplied by department for C, PHP, html and sql

Detailed Syllabus

Lecture wise Breakup

Course Code	18B15GE111	**Semester:** Even	**Semester:** II	**Session** 2022-23
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.	C178.3

		• **Projection of planes:** Plane on VP, HP, inclined to any one of the planes; plane inclined to both HP and VP.	
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
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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.