BENNETT UNIVERSITY
THE TIMES GROUP

Program Structure, Syllabus & Common University Rules

Bachelor of Technology (Computer Science Engineering)

Second Semester Syllabus Booklet

Duration: 04 Years

Batch: 2024-2028

School of Computer Science Engineering and Technology

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Vision of the University:

To be a global leader in education, research, and innovation, empowering higher learning ecosystem

Mission of the University:

- Empower all the members of the Bennett ecosystem and provide thought leadership, focus on nation building and prepare our graduates to move with the Times.
- Cultivate international partnerships and collaborations with academic institutions, industry, and government organizations and provide a rigorous and innovative education that equips students with the knowledge, skills, and ethical values required to excel in their careers.
- Foster a culture of lifelong learning, adaptability, and critical thinking, ensuring graduates are prepared to tackle challenges in all academic fields.
- Drive interdisciplinary research and innovation, pushing the boundaries of human knowledge, addressing pressing global issues and solving real world problems.
- Enhance a collaborative environment that encourages faculty and students to engage in research, innovation, and entrepreneurship, creating a lasting impact on society.
- Promote diversity, equity, and inclusion, ensuring that all individuals, regardless of background, feel welcomed, respected, and empowered.
- Prepare students to become global citizens, capable of addressing global challenges and contributing to the well-being of communities worldwide.
- Provide a globally connected career services networking with graduate employers and alumni.
- Foster a strong sense of ethical responsibility in our graduates, emphasizing the importance of ethical conduct, sustainability, and social impact in professional practice.
- Commit to ongoing assessment and improvement of our programs and invest in modern infrastructure and advanced technology to support teaching, research, and innovation adapting to the evolving needs of students, industries, and society.

Vision of the Department:

International Excellence and National Relevance in teaching, research, and technology development.

Mission of the Department:

1) Strive to continuously adapt and improve teaching-learning pedagogy and encourage the use of technology and online learning.
2) Innovate through Entrepreneurial framework, Research Projects, Quality publications and Consultancy.
3) Transparency, Teamwork and Timely execution will be three mantras of the department

Program Educational Objectives (PEO):

PEO1: Provide graduates with a solid foundation in engineering principles to solve complex computer science problems effectively.

PEO2: Equip graduates with skills in software development, project management, and communication to design and implement innovative solutions using emerging technologies.

PEO3: Foster a mindset of continuous learning, enabling graduates to adapt to technological advancements and contribute to the field through research and development activities.

PEO to Mission Statement Mapping:

Mission Statements → / PEO Statements ↓	M1	M2	M3
PEO1	1	2	1
PEO2	2	3	3
PEO3	3	1	2

1: Low 2: Medium 3: High

Program Outcomes (POs) and Program Specific Outcomes (PSOs):

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO1: Analyse a complex problem and propose its solution using various computer system concepts.

PSO2: Apply software development and project management methodologies on various platforms using emerging technologies to design, develop and implement solutions of problems.

PSO3: Foster the field of computing by taking a deep dive into its latest trends and going through new research & development activities.

Mapping of POs/PSOs to PEOs:

PEO Statements → / Program Outcomes ↓	PEO1	PEO2	PEO3
PO1	3	2	
PO2	3	1	
PO3	2	3	
PO4	3		1
PO5	1	3	2
PO6		2	
PO7	2	2	
PO8		2	
PO9		3	2
PO10		2	1
PO11		2	
PO12		2	3
PSO1	3	2	1
PSO2	2	3	1
PSO3	1	2	3

1: Low **2: Medium** **3: High**

Course Curriculum

Semester: 2

Curriculum for Batch 01 to Batch 56						
S.No.	**Code**	**Title**	**Lecture Hrs./Week**	**Tutorial Hrs./Week**	**Practical Hrs./Week**	**Credit**
1	CSET109	Object Oriented Programming using Java	3	1	4	6
2	CSET105	Digital Design	3	0	2	4
3	CSET106	Discrete Mathematical Structures	3	1	0	4
4	EMAT102L	Linear Algebra and Ordinary Differential Equations	3	1	0	4
5	*CSET108	Environment and Sustainability	3	0	0	3
6	*EPHY111L	Electromagnetism and Mechanics	3	1	2	5
Curriculum for Batch 57 to Batch 93						
S.No.	**Code**	**Title**	**Lecture Hrs/Week**	**Tutorial Hrs/Week**	**Practical Hrs/Week**	**Credit**
1	CSET109	Object Oriented Programming using Java	3	1	4	6
2	CSET105	Digital Design	3	0	2	4
3	CSET106	Discrete Mathematical Structures	3	1	0	4
4	EMAT102L	Linear Algebra and Ordinary Differential Equations	3	1	0	4
5	*CSET102	Introduction to Electrical and Electronics Engineering	2	1	2	4
6.	*CSET103	New Age Life Skills	2	0	0	2

***CSET102, CSET103, EPHY111L & CSET108 will be run in both Sem-I and Sem-II. Half of CSE students will get (EPHY111L + CSET108) and another half (CSET103+CSET102) in Semester - I and vice versa in Semester - II.**

Course Syllabuses

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	CSET109: Object Oriented Programming using Java	L	T	P	C
Owning School/Department	School of Computer Science Engineering and Technology	3	1	4	6
Pre-requisites/Exposure	-				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1: To examine different programming structures in a platform independent language such as wrapper classes, collections, exceptions, and multithreading.

CO2: To explain the concepts of object-oriented programming like encapsulation, abstraction, inheritance and polymorphism.

CO3: Make use of GUI and database-based programming to develop Applications for real life problems.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3		3	3								3		
CO2	3	3		3	3								3	3	3
CO3			3		3								3	3	3

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module I: **10 lecture hours**

Handling user input/output using Scanner class, Platform independence of Java (JVM), Operators (unary, arithmetic, logical, shift left, shift right, ternary, assignment) Exploring bitwise operators, compound assignment, if/else, Using switch for menu-driven applications while, For, do-while, Introduction to Abstraction and Polymorphism Objects Lifecyle: creation, dereference, garbage collection, Wrapper classes (Boolean, Integer, Double, Character), Autoboxing, unboxing, String (concat, indexOf, split, length, toLowerCase, toUpperCase, replace, trim), Array declaration, instantiation, multidimensional arrays, Designing methods for modularity and reusability Static variables, Static methods, Static blocks, Constructors and destructors, Instance Initialization Blocks, Security aspects in class design Encapsulation, Inheritance, single, multilevel, Hierarchical.

Module II: **11 lecture hours**

Polymorphism, Function Overloading method overriding, Concrete Class Abstraction abstract methods, non-availability of multiple inheritance, interfaces, Interfaces vs abstract class, Embedded Interface Anonymous class, Inbuilt Packages, User defined packages, Array List collection, LinkedList Collection Vector collection, Exception handling, Checked and unchecked exception, try, catch, finally, Propel, Propagate, Data Stream Handling.

Module III: **11 lectures hours**

Thread and process, Parallel Computing Concurrent Programming synchronization, Swing features, JavaFX Features MySQL database, NoSQL Databases getConnection, createStatement, executeQuery, JEE (client-server architecture for

web based applications), Microservices Architecture Running Servlet, Generic Servlet, HTTP Servlet, Servlet Config, Web Filters Servlet to handle Get and Post Methods, Startups on programming, Session Management.

Module IV: **10 lectures hours**

JSPs, Struts framework, Spring MVC framework Regular expressions (Lambda expressions), Collection framework Concurrency in Java, HashMap, Linked Hash Map, Tree Map, Kotlin for Android WebSockets JPA (Java Persistence API), Microservices with Spring Boot.

Studio Work / Laboratory Experiments:

Students will gain hands-on experience on core JAVA. Students will be able to solve simple to medium level computation problems in Java. Emphasis will be that the student code themselves as much as they can. They learn to debug the programs resulting in error free code. Instructor will be giving assignments based on the content covered in the lecture classes in the corresponding week.

Text Books :

1. Schildt, Herbert. *Java: the complete reference*. 10th ed. McGraw-Hill Education Group, 2014. ISBN 978-93392120.
2. Bloch, Joshua. *Effective java (the java series)*. 1st ed. O'Reilly Media, Inc., 2017. ISBN 978-0134686097.

Reference Books :

1. Anuradha A. Puntambekar, *ObjectOriented Programming*. 1st ed. UNICORN Publishing Group, 2020. ISBN 9789333223819.

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	**CSET105: Digital Design**	**L**	**T**	**P**	**C**
Owning School/Department	**School of Computer Science Engineering and Technology**	**3**	**0**	**2**	**4**
Pre-requisites/Exposure	**-**				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1: Identify appropriate truth table and examine gate level implementation from combinational logic function.
CO2: Build sequential circuits.
CO3: Experiment with the circuit diagram for combinational and sequential logic using Verilog.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1				2							1	3		
CO2	1		2	1		1								3	
CO3			3	2											2

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module I: **10 lecture hours**

Digital Logic, Analog v/s Digital Systems, Data Representation, Binary Number System, Decimal Number System, Octal Number System, Hexa-Decimal Number System, Binary Arithmetic, Unsigned and Signed Numbers, Signed Magnitude, 1's Complement, 2's Complement, Fixed- and Floating-Point Numbers, Weighted Codes, BCD Code, Basic Logic Gates, Universal Logic Gates, Truth Table

Module II: **10 lecture hours**

Laws of Boolean Algebra, Reduction of Boolean Expression using Boolean Laws, Conversion of Boolean Expression to Logic Diagram, Conversion of Logic Diagram to Boolean Expression, Boolean Function Representation using SoP and PoS form, Standard Sum of Products, Standard Product of Sum, Two Variable K-Map, Implicants, Prime Implicants and Essential Prime Implicants, Three Variable K-Map, Four Variable K-Map, Don't Care Condition, Design and Analysis of Combinational Circuits, Half Adder, Full Adder and Carry Propagation, Subtractor, Four Bit Binary Adder-Subtractor, Excess-3, Gray Code, Parity, Hamming Code, Binary Multiplier, Magnitude Comparator, Multiplexer, Implement Boolean Function using Mux, DeMultiplexer, Implement Full Subtractor using De-Mux.

Module III: **10 lectures hours**

4 * 2 Encoder, Octal to Binary Encoder, Priority Encoder, 2*4 Decoder, Implement Full Adder using Decoder, BCD to 7-segment Display Decoder, Sequential Circuits, Sequential v/s Combinational Circuits, Clock, SR Latch, D Latch, Edge Trigger and Level Triggered, SR Flip Flop Circuit Diagram, SR Flip Flop Truth Table, SR Flip Flop Characteristic Table, SR Flip Flop Excitation Table, JK Flip Flop Circuit Diagram, JK Flip Flop Truth Table, JK Flip Flop Characteristic Table, JK Flip Flop Excitation Table, Race Around Condition, Master Slave JK Flip Flop, D Flip Flop, T Flip Plop, State Diagram, State Equation and State Table, Mealy State Machine, Moore State Machine, State Reduction, State Assignment, ASM Chart, Analysis using JK Flip Flop.

Module IV: **12 lecture hours**

Register, Parallel Register, Shift Registers, Bi-Directional Shift Register, Universal Shift Register, Counter, Asynchronous v/s Synchronous Counter, Ripple Counter (UP, DOWN, UP/DOWN), Synchronous Counter (UP, DOWN, UP/DOWN), Ring Counter, Johnson's Counter, Programmable Logic, Types of PLDs, Architecture of PROM, PLA Architecture, PAL Architecture, System on Chip Design, Logic Synthesis in Quantum Computing.

Studio Work / Laboratory Experiments:

In this course students will start with basic digital components such as Arithmetic and logical operation, Memory etc. Then finally design soft IP. The Lab will use Altera Quartus prime Lite tool for design and FPGA Altera DEII utilize for physical implementation.

Text Books :

1. Mano, M. Morris. *Digital Design: with an Introduction to the Verilog HDL, VHDL and System Verilog.* 6th ed. Pearson, 2018. ISBN 978- 0134549897.

Reference Books :

1. Wakerly, John F. *Digital Design: Principles and Practices*. 5th ed. Prentice Hall, 2008. ISBN 9780134460093.

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	CSET106: Discrete Mathematical Structures	L	T	P	C
Owning School/Department	School of Computer Science Engineering and Technology	3	1	0	4
Pre-requisites/Exposure	-				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1 : To explain logical notation to illustrate sets, relations, functions, and integers.
CO2 : To examine induction hypotheses and prove elementary properties of modular arithmetic.
CO3 : Experiment and solve critical examples of algebraic structures and graph theory.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1											2	3		
CO2		3	1	2										3	1
CO3		1	1	2										2	3

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module I: **11 lecture hours**

Introduction and applications of Discrete mathematical structures, Proposition, Logical operators, Converse, Inverse, Contrapositive, Compound propositions, Precedence of logical operators, Tautology, Contradiction, Logical Equivalence, Derived implications, Well-formed formula, Tautological Implication, Logical equivalence laws, Rules of inference, Predicates and Quantifiers, Nested quantifiers, English to logic conversion, Direct proof, Proof by contradiction, Proof by induction, Russell's paradox.

Module II: **11 lecture hours**

Representation of Sets, Types of Sets, Power Set, Venn Diagrams, Operations on Sets, Partition of Sets, Fuzzy Sets. Functions, Types of Functions, Sum and Product of Functions, Relation, Relation vs Function, Different Types of Relations, Graphical Representation of Relations, Matrix Representation of Relations, Closure of relations.

Module III: **10 lectures hours**

Representation of integers, Binary operations, Divisibility, Euclidean Theorem for GCD, Residue classes, Linear congruence, Chinese remainder theorem, inclusion-exclusion principle, Binomial coefficients, Permutation, and combination, Pigeonhole principle, Recurrence relations and generating functions, semi-group, Monoid, and group, Abelian group, Cyclic group, Addition modulo m, Multiplication modulo m, Ring, Field, and integral domain.

Module IV: **09 lectures hours**

Partially ordered set, Elements of Posets, properties of lattices, Bounded, distributive, Complemented Lattice, Graphs, Homomorphism and Isomorphism, Euler graph, Hamiltonian circuit, Handshaking lemma (Havel Hakimi theorem), Graph Score Theorem, Bipartite graphs, Kionig's Theorem, Graph coloring, Chromatic number, Clique, Matching, Trees, forest, rooted trees, Binary trees, height of trees.

Text Books :

1. Bisht, Raj Kishor, and H. S. Dhami. *Discrete mathmatics*. 1st ed. Oxford University Press. 2015. ISBN 97-80199452798.
2. Rosen, Kenneth H. *Discrete mathematics and its applications*. 8th ed. The McGraw Hill Companies,, 2007. ISBN 978- 9390727353.

Reference Books :

1. Fortney, Jon Pierre. *Discrete Mathematics for Computer Science: An Example-based Introduction*. 1st ed. CRC Press, 2020. ISBN 978-1000296806.

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	**EMAT102L: Linear Algebra and Ordinary Differential Equations**	**L**	**T**	**P**	**C**
Owning School/Department	**School of Computer Science Engineering and Technology**	**3**	**1**	**0**	**4**
Pre-requisites/Exposure	**-**				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1: Solving system of linear equations by using Gaussian elimination to reduce the augmented matrix to row echelon form or to reduced row echelon form.
CO2: To be familiar with the concepts of dimension of a subspace and the rank and nullity of a matrix.
CO3: To calculate the eigenvalues and eigenvectors of a square matrix using the characteristic polynomial.
CO4: Fundamental concepts of ordinary differential equations
CO5: Solving linear differential equations of both first and higher order

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												2		
CO2	2													2	
CO3	2											2			3
CO4	1		2										1		
CO5			2									2	1		

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module I: **12 lecture hours**

Review of Matrices, System of linear equations, Gauss elimination method, Elementary matrices, Invertible matrices, Gauss-Jordon method for finding inverse of a matrix, Review of Basic properties of determinant, Cofactor expansion, Determinant method for finding inverse of amatrix, Cramer's Rule, Vector space, Subspace and Examples, Linear span, Linear independence and dependence and Examples, Basis, Dimension, Extension of a basis of a subspace, Intersection and sum of two subspace, Examples. Linear transformation, Kernel and Range of a linear map, Rank-Nullity Theorem, Rank of a matrix, Row and column spaces, Solvability of system of linear equations, some applications, Inner product, Cauchy-Schwartz inequality.

Module II: **09 lecture hours**

Orthogonal basis, Gram-Schmidt orthogonalization process, Orthogonal projection, Orthogonal complement, Projection theorem, Fundamental subspaces. Fundamental subspaces and their relations, An application (Least square solutions and least square fittings). Eigen-values, Eigen- vectors, Characterization of a diagonalizable matrix, Diagonalization: Example, An application. Diagonalization of a real symmetric matrix, Representation of a real linear map by matrices.

Module III: **12 lectures hours**

Introduction to DE, Order of DE, First Order ODE F (x, y, y') = 0. Concept of solution (general solution, singular solution, implicit solution etc.) Geometrical interpretations (direction fields), Separable form, Reduction to separable form, Exact equations, Integrating factors, Linear equations, Bernoulli equation, orthogonal trajectories, Picard's existence and uniqueness theorem (without proof), Picard's iteration method, Second order linear ODE: fundamental system and general solutions of homogeneous equations, Wronskian, Reduction of order, Characteristic equations: real distinct roots, complex roots, repeated roots, Non-homogeneous equations: Undetermined coefficients and Variation of parameters.

Module IV: **09 lectures hours**

Extension to higher order differential equations, Euler-Cauchy equation, Real analytic solutions ofLinear second order equations, Linear system of Differential equations, Fundamental Set, Linearlyindependent solutions, Laplace transform: Laplace and inverse Laplace transforms, First shifting theorem, Transforms of derivative and integral, Differentiation and Integration of transforms, unit step function, Second shifting theorem, Convolution and applications, Initial value problems.

Text Books :

1. Strang, Gilbert. *Introduction to linear algebra*. 4th ed. Wellesley-Cambridge Press, 2006. ISBN 978- 0030105678.
2. Kreyszig, Erwin. *Advanced Engineering Mathematics 10th Edition with Wiley Plus Set*. John Wiley & Sons, 2010. ISBN 978-0470458365.

Reference Books :

1. Hoffmann, Kenneth, and Ray Alden Kunze. *Linear algebra*. 2nd ed. Prentice-Hall, 2004. ISBN 9789332550070.
2. Simmons, George F. *Differential equations with applications and historical notes*. 2nd ed. McGraw-Hill Education (India) Pvt Limited, 2002. ISBN 978-0070530713.
3. Coddington, Earl A. *An introduction to ordinary differential equations*. 1st ed. DoverPublication, 1989. ISBN 9780486659428.

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	CSET108: Environment and Sustainability	L	T	P	C
Owning School/Department	School of Computer Science Engineering and Technology	3	0	0	3
Pre-requisites/Exposure	-				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1 : Demonstrate analytical thinking skills concerning environmental topics.
CO2 : Demonstrate an ability to combine the many disciplines and fields that intersect with environmental concerns.
CO3 : Illustrate an integrative approach to environmental issues with a focus on sustainability.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2			3				2			2	3		2
CO2	2	2		2						3			2	2	1
CO3	3	3	3	2	3				2					2	2

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module I: 06 lecture hours

Environmental Sustainability, Ecosystems, and Climate Change: Overview of Environmental Sustainability, Sustainability and Population Growth, Exploration of Growth Curves, Way forward – Ecosystems and climate change introduction – Ecosystem dynamics –Tragedy of commons - Tragedy of commons solutions – Ecosystems and extinctions – Weather vs. Climate – Climate changes in the past – Climate change in the present – Climate processes.

Module II: 05 lecture hours

Biodiversity and its conservation: Biodiversity – Value of biodiversity – Threats to biodiversity - Conservation of biodiversity – Case studies.

Module III: 08 lectures hours

Natural resources: Natural Resources and Their Challenges, Renewable and Non-renewable Energy Sources, Water's Role in Agriculture, Agriculture's Connection to Food Production, Addressing Issues and Solutions in Agriculture and Food Production.

Module IV: 08 lectures hours

Environmental pollution: Causes, effects and control measures of various types of pollutions - Air pollution - Water pollution - Wastewater treatment - Soil pollution - Noise pollution - Thermal pollution - - Solid waste management - E-waste - Case studies on pollution.

Module V: **07 lectures hours**

Ethical Perspectives on the Environment, Global Environmental Policies, Environmental Legislation in India, Environmental Impact Assessment, Challenges Encountered in Enforcing Environmental Laws.

Module VI: **08 lectures hours**

Life cycle analysis and sustainability thinking: Introduction of LCA – Methodology of LCA – ISO 14044 Significance of LCA – Case studies of LCA .

Text Books :

1. Bharucha, Erach. *Textbook of environmental studies for undergraduate courses*. 2nd ed. Universities Press, 2013. ISBN 978-8173718625.

Reference Books :

1. Lodish, Harvey, Arnold Berk, S. Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James Darnell. *Molecular Cell Biology*. 8th ed. WH Freeman, 2016. ISBN 978-1319067748.

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	**EPHY111L: Mechanics and Electromagnetism**	L	T	P	C
Owning School/Department	Physics	3	1	2	5
Pre-requisites/Exposure	NIL				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1: Calculate electrostatic fields and potentials, produced by regularly shaped charged bodies.
CO2: To understand magnetic fields produced by variously shaped current-carrying bodies.
CO3: To appreciate the interconnectedness of electric and magnetic phenomena and to realize the significance of Maxwell's equations,
CO4: Learn how to apply Newton's Laws and understand the concept of energy
CO5: Solve problems involving rotational motion
CO6: Get introduced to central forces and conversion of two body problems into one body problem
CO7: Perform basic physics experiments, tabulate observations, analyze data and draw conclusion

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1								3		2
CO2	3	3	2	2									3		2
CO3	3	3	2		2		2						3		2
CO4	3	3	2	2	1								3		2
CO5	3	3	2	2									3		2
CO6	3	3	2	2									3		2
CO7				3	3								2		3

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module 1 **10 lecture hours**

Vector operators and coordinate systems, Gauss' law and its applications; Electrostatic potential; Electric fields in matter; Electric polarization, Bound charges, Displacement vector; Electric Permittivity and dielectric constant

Module 2 **11 lecture hours**

Biot-Savart law; Ampere's law and applications; Magnetic fields in matter, Magnetization, Bound currents; Faraday's law of electromagnetic induction; Displacement current and the generalized Ampere's law; Maxwell's equations; Electromagnetic waves

Module 3 **13 lecture hours**

Mathematical prerequisites, Kinematics, Newton's Laws, Work-Energy Theorem, Conservation of Momentum and Energy, Conservative Forces and Potential Energy, Non-conservative forces, Rotational Motion, Conservation of Angular Momentum, Moment of Inertia, Rigid Body Motion, Euler's Equations, Non-Inertial Frames of Reference, Pseudo Forces, Coriolis, and Centrifugal Forces, Central Forces, Kepler's Laws, Planetary Motion.

Module 4 **08 lecture hours**

Harmonic Oscillator: Free, Damped, and Forced Oscillations, Resonance, Special Theory of Relativity: Lorentz Transformation, Length contraction, Time Dilation, Energy-Mass-Momentum Relations.

List of Experiments

1. Estimation of Error in Vernier Calipers & Screw Gause
2. Study of Hall Effect
3. Determination of Moment of Inertia of a Flyewheel
4. Determination of Specific Charge (e/m) of Electron
5. Determination of Coefficient of Viscosity
6. Verification of Biot-Savart Law
7. Determination Young's Modulus

8. Determination of Equipotential Lines
9. Determination Coefficient of Static Friction
10. Verification of Principle of Superposition using Helmholtz Coils
11. Additional Experiments

Text Books :

1. D. J. Griffiths, Introduction to Electrodynamics (4th Edition), Pearson Education India Learning Private Limited, 2015, ISBN 978-9332550445.
2. D. Kleppner & R. Kolenkow, An Introduction to Mechanics (1st Edition), McGraw-Hill Education, 2017, ISBN 978-0070647787.

Reference Books :

1. D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics, John Wiley & Sons, 2021, ISBN 978-1119773512,
2. H. D. Young, R. A. Freedman, University Physics with Modern Physics (14th Edition) , Pearson, 201, ISBN 978-0194577199.

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	CSET102: Introduction of Electrical and Electronics Engineering	L	T	P	C
Owning School/Department	School of Computer Science Engineering and Technology	2	1	2	4
Pre-requisites/Exposure	-				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1 : To articulate the fundamental parameters governing an electrical circuit such as current, voltage.
CO2 : To explain basic electronic components such as resistors, capacitors, and inductors.
CO3 : To make use of concepts, working, and application of various circuits using the components on a breadboard.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1				2							3		
CO2	2	1				1								2	
CO3		1		1		1						1			2

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module I: **07 lecture hours**

Basic Circuit Theory: Charge, current, voltage, electric field, conductance, resistance, Ohm's law; current source, voltage source, dc, ac, periodic signal concept, examples of different periodic signals, their average, RMS value, resistors in series and parallel, voltage and current division. Kirchoff's current law (KCL) and Kirchhoff's voltage law (KVL), Nodal analysis and Mesh analysis.

Module II: **07 lecture hours**

Network theorems: Maximum power transfer theorem, Source Transformation, Superposition theorem, Thevenin's theorem, Norton's theorem. Introduction to capacitor (C), introduction to phasor diagram, series and parallel combination of capacitors, Impedance and frequency dependency, Introduction to inductor (L), introduction to phasor diagram, series and parallel combination of inductors, Impedance and frequency dependency, units of L, C measurements, lowpass, highpass and bandpass filter, transfer function, Single phase motors, dc motors, stepper motors, their applications.

Module III: **08 lectures hours**

Diodes and its applications, Semiconductor Materials: Electrons and Holes, Intrinsic and Extrinsic Semiconductors, doping of n and p-type semiconductors, Diode circuits: PN Junction diode and its applications: Half wave, center tapped full wave rectifier circuit, bridge rectifier circuit, the efficiency of rectifier circuits, ripple factor, rectifiers with filter circuits.

Module IV: **06 lectures hours**

Op-Amp: Characteristics of an Op-amp. Inverting and Non-inverting amplifier, Integrator, Differentiator.

Text Books :

1. Charles, K. Alexander, and N. O. Matthew. *Fundamentals of electric circuits*. 1st ed. McGraw-hill Education, 2017. ISBN 9789353165505.
2. Boylestad, Robert L., and Louis Nashelsky. *Electronic devices and circuit theory*. 1st ed. Pearson Education India, 2009. ISBN 9788131703144.
3. Tsividis, Yannis. *A First Lab in Circuits and Electronics*. 1st ed. Wiley, 2002. ISBN 9780471386957.

Reference Books :

1. Neamen, Donald A. *Microelectronics: circuit analysis and design*. 1st ed. New York: McGraw-Hill, 2009. ISBN 978-0073380643.
2. Bell, David A. *Electronic instrumentation and measurements.* 3rd ed. Oxford University Press India, 2013. ISBN 978-0195696141.

Name of Program	Bachelor of Technology (Computer Science Engineering)				
Course	CSET103: New Age Life Skills	L	T	P	C
Owning School/Department	School of Computer Science Engineering and Technology	3	0	0	3
Pre-requisites/Exposure	-				

Course Outcomes (COs)

On completion of this course, the students will be able to:

CO1: By the end of this course, students should be able to express their role in improving their quality of life.
CO2: By the end of this course, students should be able to understand human psychology and its applications to improve human achievements and happiness to substantial extent.
CO3: By the end of this course, students should be able to reflect on the aspects of leadership, motivation, and stress management.
CO4 : By the end of this course, students should be able to appreciate the nature of positive and proactive thinking and assertiveness.
CO5: By the end of this course, students should be able to apply concepts, tools and frameworks of emotional intelligence and stress management

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						**3**	**2**	**3**	**3**	**3**	**3**			**3**	**1**
CO2						**3**	**2**	**3**	**3**	**3**	**3**			**3**	**1**
CO3						**3**	**2**	**3**	**3**	**3**	**3**			**3**	**1**
CO4						**3**	**2**	**3**	**3**	**3**	**3**			**3**	**1**
CO5						**3**	**2**	**3**	**3**	**3**	**3**			**3**	**1**

1=weakly related 2= moderately related 3=strongly related

Course Contents:

Module I: **4 lecture hours**

Introduction to Life Skills, the critical role of management skills, Developing Self-awareness: Key dimensions, enigma of self-awareness, Understanding and Appreciating Individual differences, Self-esteem, Case studies and Practice Sessions.

Module II: **4 lecture hours**

Introduction to communicating and thinking, Communication, Thinking and reasoning, Proactive thinking, Positive thinking, Assertiveness, Emotional Intelligence, Values and Ethics, Case studies and Practice Sessions.

Module III: **4 lectures hours**

Setting goals, Goal Setting: Setting SMART Goals, what are the main components, Managing time and prioritizing, Time Management matrix, Balancing Time and Goal, case studies, Practice Sessions.

Module IV: **4 lectures hours**

Diagnostic Surveys for Creative Problem Solving, Problem Solving, Creativity and Innovation, Steps in Analytical Problem Solving, Multiple Approaches to creativity, Conceptual Blocks, Case studies and Practice Sessions.

Module V: **4 lectures hours**

Attitudes, what are the main components? Behavior and attitude, Major job attitude, Job satisfaction, Satisfied and dissatisfied employees on the workplace, Personality, The Myers-Briggs Type Indicator, The Big Five Personality Model, other personality traits relevant to Life skills, Case studies and Practice Sessions.

Module VI: **5 lectures hours**

Diagnostic Surveys for Building Effective Teams, Team Development Behaviour, Developing Credibility, Leading Teams, Exercises in Building Effective Teams, Team Development Behaviour, Developing Teams and Work, Leading Teams, Team Membership, Developing Credibility, Exercises in Building Effective Teams, Case studies and Practice Sessions.

Module VII: **4 lectures hours**

Making Oral and Written Presentations, Introduction to Technical Communication, Process of communication, Essential Elements of Effective Presentations, speaking as a Leader, presenting yourself professionally, developing your Interpersonal Skills, Argument Building, develop your facilitation skills, Making Formal Presentations, Creative Writing for social media, developing self-brand, Case studies and Practice Sessions.

Module VIII: **4 lectures hours**

Diagnostic Survey for Gaining Power and Influence, Building a Strong Power Base and Using Influence wisely, Strategies for gaining organizational power, Transforming power into influence, activities for gaining power and influence, Diagnostic Survey for Motivating Others, Increasing Motivation and Performance, Diagnosing Work Performance Problems, Enhancing Individual abilities, Fostering a Motivating Work Environment, Elements of an Effective Motivation Program, Activities for Motivating Others, Case Studies and Practice Sessions.

Module IX: **4 lectures hours**

Diagnostic Survey for Managing Conflict, Interpersonal Conflict Management, Diagnosing the Type of Interpersonal Conflict, Selecting the Appropriate Conflict Management Approach, Resolving Interpersonal Confrontations Using the Collaborative Approach, Conflict Management Strategies, activities for Improving Managing Conflict Skills, Case Studies and Practice Sessions.

Module X: **5 lectures hours**

Diagnostic Survey for Empowering and Delegating, Management Dilemma Involving Empowerment, The Meaning of Empowerment, Dimensions of Empowerment, Self-Efficacy, Self-Determination, Personal Consequence, How to Develop Empowerment, providing Support, providing Information, Providing Resources, Inhibitors to Empowerment, Delegating Work, Advantages of Empowered Delegation, Review of Delegation Principles, Case Studies and Practice Sessions.

Studio Work/Laboratory Experiments:

1. Group Presentations
2. Group Activities
3. Role Plays
4. Group Decision Making activity
5. Group Treasure Hunt
6. Creating Team profiles
7. Creating Self Profiles

Text Books :

1. *Whetten David A. and Kim S. Cameron, Developing Management Skills (8th ed.), Pearson, 2017. ISBN 9789332584686, ISBN 9332584680.*

2. *Wadkar Alka, Life Skills for Success (1st ed.), Sage Publications, 2016. ISBN 9789351507314, ISBN 9351507319.*

Attendance Policy

(i) All undergraduate/integrated program students are expected to be present in every lecture, tutorial, practical or project interaction session scheduled for them.

(ii) A student must have a minimum attendance of 75% in a course during a semester, in lectures, tutorials or practical's taken together (as applicable). A student with less than **75% attendance** in a course will be **Debarred** from that course examination and awarded **'DB'** grade in that course irrespective of his/her performance in the tests during the semester.

(iii) A student should meet the above attendance requirement irrespective of the number of days he/she is on medical and/or other leave for any reason, whatsoever.

(iv) A relaxation of up to 10% may be given on the following special /exceptional grounds:

a. Any continuous illness of two weeks --like contagious diseases-- supported by a proper medical certificate. Smaller absences for shorter duration e.g. a few days at a time due to medical reasons shall not count towards this relaxation. A student must meet the program or course coordinator and submit the medical documents to prove the genuineness of the request.

b. The student being deputed to represent the University with the prior approval of the Dean.

c. Any special personal reason, on the recommendation of the Dean and approval of the Vice Chancellor.

Leave Policy

In accordance with the attendance rules outlined in our academic policies on, we recognize the importance of maintaining a **minimum attendance of 75%** in each course throughout the semester. However, we also understand that there may be valid reasons for falling short of this requirement, particularly due to medical reasons.

For the purpose of attendance, every scheduled class will be counted as one unit irrespective of the number of contact hours. **A relaxation of up to 10% may be given on the following special /exceptional grounds:**

(a) Any continuous illness of two weeks --like contagious diseases-- supported by a proper medical certificate. Smaller absences for shorter duration e.g., a few days at a time due to medical reasons **shall not count towards this relaxation.** A student must meet the program or course coordinator and submit the medical documents to prove the genuineness of the request
(b) The student being deputed to represent the University with the prior approval of the Dean
(c) Any special personal reason, on the recommendation of the Dean and approval of the Vice Chancellor.

Procedure for Medical Leave Requests and Attendance Consideration

To ensure fairness and consistency in considering medical leave requests, we have established a procedure that allows for the evaluation of such requests on a case-by-case basis. Below are the steps to follow when requesting consideration for medical leave:

Step 1: Consultation with the Program or Course Coordinator
If you anticipate that your medical condition will impact your attendance, it is essential to schedule a meeting with your program or course coordinator at the earliest opportunity. During this meeting, you should provide details of your medical situation and submit any relevant medical documents to support your request.

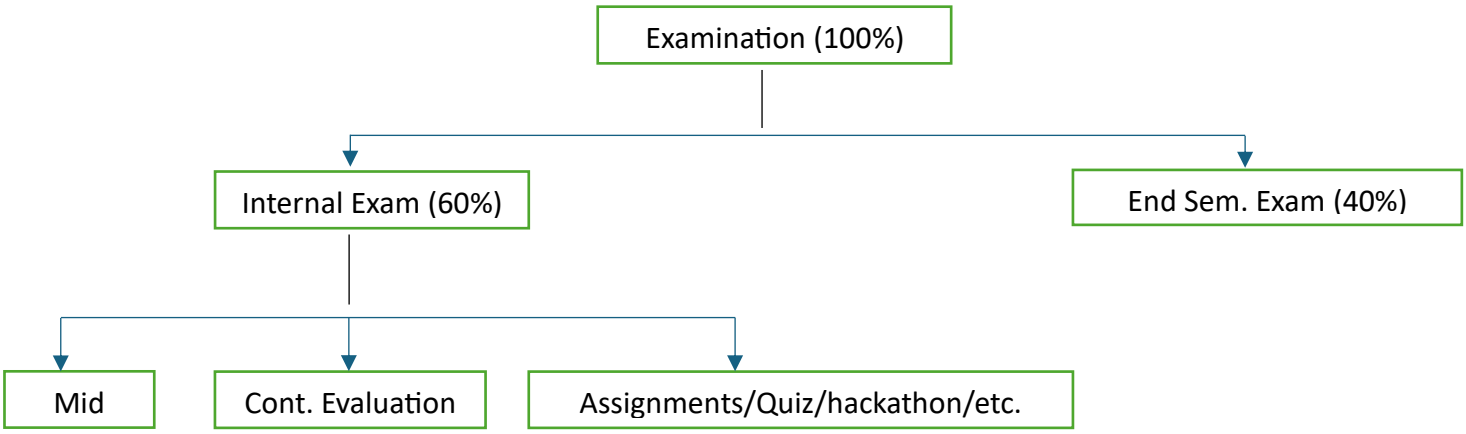
Step 2: Submission of Medical Documents to the Medical Officer of the Wellness Centre
Please ensure that the medical documents you provide are comprehensive and issued by a certified medical professional. These documents should clearly outline the nature of your illness, the duration of your recommended leave, and any other pertinent information that supports your request for consideration.

Step 3: Review and Approval Process by the Medical Officer of the Wellness Centre
Once you have submitted your medical documents, the program or course coordinator will review your request in conjunction with the attendance records for the semester. They will assess the genuineness of your request and determine whether any relaxation of the attendance requirement is warranted based on the severity and duration of your illness.

Step 4: Communication of Decision by the Medical Officer of the Wellness Centre
Following the review process, you will be informed of the decision regarding your medical leave request.

If you have any questions or require clarification regarding the medical leave request procedure, please do not hesitate to reach out to your program coordinator for assistance.

Grading and Assessment



1. **Passing Marks**: The minimum passing criteria will be overall 40 out of 100 marks.
2. **End Term Examinations:**

- It is mandatory to appear and **pass** in the End Semester exam to obtain a pass grade.
- The weightage of the end-term examination will be Minimum 40%.

In the end-term exam, the student should secure a minimum of 30% marks out of the total end-term marks to pass each course. For example, for a 40 marks end-term paper the student must score a minimum of **12 marks** (30%X40 mark =12) in each subject to get a 'Pass' grade.

Examination Policies

6.1 Mid Semester Examination:

- Mid Semester Examination will be conducted with a weightage of minimum 20% of marks.
- Mid Semester Exam will be conducted with same rule as End Semester Examination will conducted.

6.2 End Semester Examination

- End Semester Examination will be conducted with a weightage of minimum 40% of marks.
- It is mandatory to appear and pass in the End Semester exam to obtain a pass grade.
- In the end-term exam, the student should secure a minimum of 30% marks out of the total end-term marks to pass each course.

6.3 Make-up Examination (Mid and End Semester)

A student may apply for a makeup examination where he/she is not able to attend the examination schedule due to reasons of personal medical condition, compassionate reasons like the death of a very close relative or any other unavoidable contingency. Except in case of a medical emergency, a student needs to seek advance approval from the appropriate authority before missing the Examination. The following rules shall govern the makeup examinations.

Theory Courses

(i) A student missing the Mid Term Examination can be allowed to take a Make-up Examination.

(ii) The students must put up the request for a make-up examination along with the relevant necessary documents to prove the genuineness of the case (for having missed the Examination) within 5 days of the last date of the examination.

(iii) The students who miss the examination due to medical reasons must attach the opinion of the University Medical Officer (UMO) after showing all medical documents to him/her.

(iv) The genuineness shall be reviewed and approved by the School Dean and Dean Academic and finally put up to the Vice Chancellor for approval.

(v) The make-up Examination shall be held between Mid Term and End Semester Examination and the dates shall be notified in the academic calendar.

(vi) In case a student misses the make-up examination, then no second make-up chance will be provided.

(vii) The duration of the examination shall be as decided by the Faculty/Course Coordinator

(viii) Genuine approved cases shall be notified by the Dean Academic based on the requests received and only such students shall be allowed to take make-up examinations in the subjects where approval has been granted.

(ix) The date sheet need not be taken out as the makeup examination shall be conducted by the respective School.

6.4 End Term Make-up Examination

It is mandatory to appear in the end-semester major examination to obtain **PASS** grade for a course. A student who misses the end semester examination shall follow a similar procedure as outlined above to prove the genuineness of the case and to obtain the approval of the Vice Chancellor. The student whose case is approved as genuine shall be awarded an "I" Grade in the semester results in the given subject and the student shall be allowed to appear in the make-up examination of the said subject. However, the grades shall be worked out by computing the marks obtained by students in Mid Term Exams, TA, Lab and make-up examinations (equated to the weightage of end semester examination). The total marks shall be compared with the marks of the class as in the regular semester for the award of grade.

- **Make-up Examination End Term Viva of Projects**

It is mandatory to appear in the final Viva examination to obtain any grade for a project course. In case a student misses the same for genuine reasons; a similar method as given for the written examination of theory courses shall be followed.

6.5 Supplementary Examination

(i) **Eligibility**

1. A student who fails to pass any course of the semester in the regular examination and obtains "F" grade is eligible to appear for the supplementary examination.
2. A student who is unable to appear in the University Examination in any of his/her course of the semester is eligible to appear in the Supplementary Examination.
3. A student who is unable to appear in the University Examination due to lack of attendance in any of his/her course is eligible to appear in the Supplementary Examination.
4. A student who is unable to appear in the University examination due to disciplinary action, his/her eligibility for supplementary assessment will depend on the outcome of the disciplinary proceedings and the rules of the University regarding such matters.
5. A student who has been awarded "F" grade due to the use of unfair means during an examination may also be eligible for a supplementary exam, depending on the University's policies and UFM committee decision. The eligibility for such a supplementary exam is determined by the Categories of Offences and Punishments outlined by the university, which classify the severity of the misconduct and the corresponding penalties.
6. The course cleared through Supplementary Examination will be indicated with a notation in the grade sheet.

(ii) **Registration**

Registration for the supplementary examination is a mandatory process for students who wish to apply for supplementary examination. The last date for registering for the supplementary exam is mentioned in the Academic Calendar. No student will be allowed to register and pay the requisite fees after the deadline. For a one-year program, if a student has backlog courses, they are required to appear in a special supplementary examination to clear those courses.

(iii) **Examination Fee for Supplementary**

A mandatory non-refundable fee of Rs.3000/-* per course (applicable for the batches starting from 2024-25 academic session) will be charged to the students. The earlier fees will continue to apply for students enrolled before the academic session 2024-25. **The Supplementary fees is subject to change as per the discretion of the University.*

(iv) **Conduct**

Supplementary examinations for the immediately concluding semesters will be conducted twice in an academic year.

(i) Those students who get an "F" grade will have the option to appear in the Supplementary examinations as per following:

(A) After the conclusion of the semester:

For the odd semester it shall be held immediately preceding the examination in the month of December/January and for the Even Semester, before commencement of next semester or as scheduled in the academic calendar.

(B) If a student fails in the supplementary exam, he/she can re-appear for the next corresponding supplementary exam held next year (i.e. even with even and odd with odd).

(C) **N+2 Rule**: Students may be allowed to clear their failed courses through supplementary exams within a maximum of N+2, where "N" represents the minimum duration of the programme.

(ii) The Supplementary Examination shall be of the same duration as end term examination. The marks of the internal component will be retained for students appearing in supplementary exams and the weightage of the supplementary exam will be the same as that of the end term exam (40%).

(iii) **There is no provision of Supplementary exam for Mid Term Exam and Internal assessments.**

(iv) The passing marks for Supplementary exam shall be same as that of End Term exams.

(v) Supplementary examination for non-theory courses like Project/Lab courses, Practical, Moot Court, Online, Continuous Assessment, Workshops, Seminars, Internship, Presentations, VIVA, etc. will be conducted as scheduled in the academic calendar with the applicable fees.

(vi) For non-theory courses the marks of the internal component will be retained for students appearing in supplementary exams and the weightage of the supplementary exam will be the same as that of the end term exam.

(vii) The nature of the supplementary exam should be same as that of the End Term exam.

(viii) **Grading**

Grading in supplementary Exam: Grade shall be determined based on marks obtained by the students in the Supplementary Examination of the subject only. The maximum grade awarded for the Supplementary Examination shall be up to "C+" (grades comprising F, D, C, C+).

Conditions for Pass and Progression

Year	Criteria
First year -> Second Year	Should have a minimum of CGPA of **4.0** on 10-point scale after the end of FIRST year of study. OR 50% credits earned out of total **FIRST** year credits.
Second Year -> Third Year	Should have a minimum of CGPA of 4.0 on 10-point scale after the end of that year of study. OR All credits of First year(immediate Previous Year) must have been earned AND 50% credits earned out of total credits of current year (Second Year) of study.
Third Year -> Final Year	Should have a minimum of CGPA of 4.0 on 10-point scale after the end of that year of study. OR All credits of Second year(immediate Previous Year) must have been earned AND 50% credits earned out of total credits of current year (Third Year) of study.

In case of student does not meet either of the above conditions, s/he will be required to re-register in any of the following two categories:

a) **Full Fee student:** In this case by depositing the full fee s/he will attend entire year OR entire semester as a fresh student.

b) **Only appear for End Term Examination** by paying fees of examinations for the courses for which s/he wishes to take the examination. In this case, all internal assessment marks will be retained of previous time.

Important contact details

IT help regarding log in, mobile application, kiosk, etc.	**it-helpdesk@bennett.edu.in**
All mess or administration related matters.	Admin helpdesk at admin-helpdesk@bennett.edu.in
All maintenance related issues @hostel or in campus infrastructure.	operations helpdesk at ops-helpdesk@bennett.edu.in
Fee-related issues, balances, payment methods, fee payment receipts etc.	Raise a ticket on below link: https://helpdesk.bennett.edu.in/open.php Finance Department finance@bennett.edu.in
Student activity, welfare related, grievance related, discipline, ragging issues etc.	Dean Student affairs dsa@bennett.edu.in
Registration, Scholarship related Issues	Raise a ticket on below link: https://helpdesk.bennett.edu.in/open.php Registrar helpdesk@bennett.edu.in You may reach to below email ID in case of any escalations: Registry.comm@bennett.edu.in
All questions related to examinations including supplementary, date sheet, registration for examinations, payment policy for examination fee, procedures, eligibility, examination results, UFM cases and queries etc.	• coeoffice@bennett.edu.in • In case payment of fee is involved, CC the mail to finance@bennett.edu.in.
All questions related to academics, extension of registration dates, late reporting sanctions, academic calendar, progression rules, and academic requests, attendance related etc.	Dean AA office deanaa.office@bennett.edu.in Cc to Dean Academic Affairs (DAA) dean.academic@bennett.edu.in
Any hostel related matters including out pass, and routine hostel functioning/reports etc.	hostelwarden@bennett.edu.in You may reach to below email ID in case of any escalations: dsa@bennett.edu.in