

3<sup>rd</sup> Semester



## BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi & Affiliated to Guru Gobind Singh Indraprastha University, Delhi)

(An ISO 9001:2015 Certified Institution)

A-4, Paschim Vihar, Main Rohtak Road, New Delhi – 110 063

### Department of Computer Science and Engineering

**Subject: Computational Methods**

**Paper Code: ES-201**

#### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	To introduce basic concepts of Boolean Algebra and Combinational Logic	<b>L2-Understanding</b>
<b>CO 2</b>	To introduce various sequential circuits, designing with examples	<b>L2-Understanding L3-Applying</b>
<b>CO 3</b>	To relate combination circuit design and sequential circuit design with respect to the design of a computer system	<b>L3-Applying L4-Analyzing</b>
<b>CO 4</b>	To introduce machine learning, computer arithmetic, modes of data transfer with respect to I/O and Memory organization of a computer	<b>L3-Applying L4-Analyzing</b>

#### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	3	2	2	.....	.....	.....	3	2	2	3
<b>CO2</b>	3	2	3	2	2	.....	.....	.....	3	2	2	3
<b>CO3</b>	3	2	3	3	2	.....	.....	.....	3	2	2	3
<b>CO4</b>	3	3	3	3	3	.....	.....	.....	3	2	2	3



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## Department of Computer Science and Engineering

**Subject: Discrete Mathematics**

**Paper Code: CIC-205**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability for constructing mathematical logic to solve problems	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to Analyze/ quantify the efficiency of a developed solution (algorithm) of a computational problem	<b>L3-Applying L4-Analyzing</b>
<b>CO 3</b>	Ability to Understand mathematical preliminaries to be used in the subsequent courses of the curriculum. This includes Boolean algebra, number theory, group theory, and combinatorics.	<b>L2-Understanding L4-Analyzing</b>
<b>CO 4</b>	Ability to Understand diverse relevant topics in discrete mathematics and computation theory with an emphasis on their applicability as mathematical tools in computer science.	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	3	3	2	2	.....	.....	.....	2	2	3	3
<b>CO2</b>	3	3	3	2	2	.....	.....	.....	2	2	3	3
<b>CO3</b>	3	3	3	3	2	.....	.....	.....	2	2	3	3
<b>CO4</b>	3	3	3	3	2	.....	.....	.....	2	2	3	3



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## Department of Computer Science and Engineering

**Subject: Data Structures**

**Paper Code: CIC-209**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Understand the difference between structured data and data structure.	<b>L1-Remembering, L2-Understanding</b>
<b>CO 2</b>	Create common basic data structures and trees	<b>L3-Applying L4-Analyzing</b>
<b>CO 3</b>	Have a knowledge of sets, heaps, and graphs.	<b>L2-Understanding L4-Analyzing L6-Creating</b>
<b>CO 4</b>	Have basic knowledge of sorting and searching algorithms.	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3
<b>CO2</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3
<b>CO3</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3
<b>CO4</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3



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## Department of Computer Science and Engineering

**Subject: Object Oriented Programming Using C++**

**Paper Code: CIC-211**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
CO1	Ability to have an in-depth knowledge of object oriented Programming paradigm	L1-Remembering, L2-Understanding
CO2	To be able to develop basic C++ programming skills	L3-Applying L4-Analyzing
CO3	To be able to apply various object oriented features using C++	L2-Understanding L4-Analyzing L6-Creating
CO4	Ability to have an understanding of generic programming & standard templates	L3-Applying L4-Analyzing

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO10	PO 11	PO 12
CO1	3	2	2	2	3	-	-	-	3	2	2	3
CO2	3	2	2	2	3	-	-	-	3	2	2	3
CO3	3	2	2	2	3	-	-	-	3	2	2	3
CO4	3	2	2	2	3	-	-	-	3	2	2	3





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## Department of Computer Science and Engineering

**Subject: Digital Logic and Computer Design**

**Paper Code: ECC-207**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand Boolean Algebra and Design Combinational Circuits .	<b>L1-Remembering, L2-Understanding</b>
<b>CO 2</b>	Ability to understand and Design Sequential Circuits.	<b>L3-Applying L4-Analyzing</b>
<b>CO 3</b>	Ability to understand Design of a basic computer.	<b>L2-Understanding L4-Analyzing</b>
<b>CO 4</b>	Ability to understand Input-Output and Memory Organization of a Computer.	<b>L3-Applying L4-Analyzing L6-Creating</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	3	2	2	.....	.....	.....	3	2	2	3
<b>CO2</b>	3	2	3	2	2	.....	.....	.....	3	2	2	3
<b>CO3</b>	3	2	3	3	2	.....	.....	.....	3	2	2	3
<b>CO4</b>	3	3	3	3	3	.....	.....	.....	3	2	2	3



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## Department of Computer Science and Engineering

**Subject: Computational Methods Lab**

**Paper Code: ES-251**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	To introduce basic concepts of Boolean Algebra and Combinational Logic	<b>L2-Understanding</b>
<b>CO 2</b>	To introduce various sequential circuits, designing with examples	<b>L2-Understanding L3-Applying</b>
<b>CO 3</b>	To relate combination circuit design and sequential circuit design with respect to the design of a computer system	<b>L3-Applying L4-Analyzing</b>
<b>CO 4</b>	To introduce machine learning, computer arithmetic, modes of data transfer with respect to I/O and Memory organization of a computer	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	3	2	2	.....	.....	.....	3	2	2	3
<b>CO2</b>	3	2	3	2	2	.....	.....	.....	3	2	2	3
<b>CO3</b>	3	2	3	3	2	.....	.....	.....	3	2	2	3
<b>CO4</b>	3	3	3	3	3	.....	.....	.....	3	2	2	3





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## Department of Computer Science and Engineering

**Subject: Data Structures Lab**

**Paper Code: CIC-255**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Understand the difference between structured data and data structure.	<b>L1-Remembering, L2-Understanding</b>
<b>CO 2</b>	Create common basic data structures and trees	<b>L3-Applying L4-Analyzing</b>
<b>CO 3</b>	Have a knowledge of sets, heaps, and graphs.	<b>L2-Understanding L4-Analyzing L6-Creating</b>
<b>CO 4</b>	Have basic knowledge of sorting and searching algorithms.	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3
<b>CO2</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3
<b>CO3</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3
<b>CO4</b>	3	2	2	2	3	.....	.....	.....	2	2	.....	3



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## Department of Computer Science and Engineering

**Subject: Object Oriented Programming Using C++ Lab**

**Paper Code: CIC-257**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO1</b>	Ability to have an in-depth knowledge of object oriented Programming paradigm	<b>L1-Remembering, L2-Understanding</b>
<b>CO2</b>	To be able to develop basic C++ programming skills	<b>L3-Applying L4-Analyzing</b>
<b>CO3</b>	To be able to apply various object oriented features using C++	<b>L2-Understanding L4-Analyzing L6-Creating</b>
<b>CO4</b>	Ability to have an understanding of generic programming & standard templates	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO10	PO 11	PO 12
<b>CO1</b>	3	2	2	2	3	-	-	-	3	2	2	3
<b>CO2</b>	3	2	2	2	3	-	-	-	3	2	2	3
<b>CO3</b>	3	2	2	2	3	-	-	-	3	2	2	3
<b>CO4</b>	3	2	2	2	3	-	-	-	3	2	2	3



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### Department of Computer Science and Engineering

**Subject: Digital Logic and Computer Design Lab**

**Paper Code: ECC-253**

#### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
CO 1	Ability to understand Boolean Algebra and Design Combinational Circuits .	L1-Remembering, L2-Understanding
CO 2	Ability to understand and Design Sequential Circuits.	L3-Applying L4-Analyzing
CO 3	Ability to understand Design of a basic computer.	L2-Understanding L4-Analyzing
CO 4	Ability to understand Input-Output and Memory Organization of a Computer.	L3-Applying L4-Analyzing L6-Creating

#### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	3	2	2	.....	.....	.....	3	2	2	3
CO2	3	2	3	2	2	.....	.....	.....	3	2	2	3
CO3	3	2	3	3	2	.....	.....	.....	3	2	2	3
CO4	3	3	3	3	3	.....	.....	.....	3	2	2	3

4<sup>th</sup> Semester





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## Department of Computer Science and Engineering

**Subject: Technical Writing**

**Paper Code: HS-204**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to improve grammar and sentence structure and build vocabulary.	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to write different types of writings with clarity.	<b>L3-Applying</b>
<b>CO 3</b>	Ability to write different types of business documents	<b>L3-Applying</b>
<b>CO 4</b>	Ability to apply business ethics and enhance personality.	<b>L3-Applying L6-Creation</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	.....	.....	.....	.....	.....	1	.....	.....	.....	3	.....	.....
<b>CO2</b>	.....	.....	.....	.....	.....	1	.....	.....	.....	3	.....	.....
<b>CO3</b>	.....	.....	.....	.....	.....	1	.....	.....	.....	3	.....	.....
<b>CO4</b>	.....	.....	.....	.....	.....	1	.....	3	.....	3	.....	.....



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## Department of Computer Science and Engineering

**Subject: Theory of Computation**

**Paper Code: CIC-206**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand the design aspects of “abstract models” of computers like finite automata, pushdown automata, and Turing machines.	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to comprehend the recognizability (decidability) of grammar (language) with specific characteristics through these abstract models.	<b>L2-Understanding L3-Applying</b>
<b>CO 3</b>	Ability to decide what makes some problems computationally hard and others easy?	<b>L4-Analyzing</b>
<b>CO 4</b>	Ability to deliberate the problems that can be solved by computers and the ones that cannot?	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	2	2	2	.....	.....	.....	2	1	1	3
<b>CO2</b>	3	2	2	2	2	.....	.....	.....	2	1	1	3
<b>CO3</b>	3	2	2	2	2	.....	.....	.....	2	1	1	3
<b>CO4</b>	3	2	2	2	2	.....	.....	.....	2	1	1	3



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## Department of Computer Science and Engineering

**Subject: Circuit and Systems**

**Paper Code: EEC-208**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand properties of signal and system.	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to determine transient respond of circuit.	<b>L3-Applying</b>
<b>CO 3</b>	Ability to solve AC circuit.	<b>L3-Applying L5-Evaluating</b>
<b>CO 4</b>	Ability to determine two port parameter and transfer function.	<b>L3-Applying L5-Evaluating</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1
<b>CO2</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1
<b>CO3</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1
<b>CO4</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1





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## Department of Computer Science and Engineering

**Subject: Database Management System**

**Paper Code: CIC-210**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand advantages of database systems	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to use SQL as DDL, DCL and DML	<b>L3-Applying</b>
<b>CO 3</b>	Ability to design database and manage transaction processing	<b>L3-Applying</b>
<b>CO 4</b>	Understand object oriented & distributed databases systems and use them	<b>L2-Understanding L3-Applying</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	3	2	2	2	.....	.....	.....	3	2	2	3
<b>CO2</b>	3	3	2	2	2	.....	.....	.....	3	2	2	3
<b>CO3</b>	3	3	2	3	3	.....	.....	.....	3	2	2	3
<b>CO4</b>	3	3	2	3	3	.....	.....	.....	3	2	2	3



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## Department of Computer Science and Engineering

**Subject: Programming in Java**

**Paper Code: CIC-212**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand the compilation process of Java, role of JVM as an emulator and various types of instructions.	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to learn and apply concepts of Java programming, exceptional handling and inheritance.	<b>L3-Applying</b>
<b>CO 3</b>	Ability to understand the use of multi-threading, AWT components and event handling mechanism in Java.	<b>L2-Understanding L3-Applying</b>
<b>CO 4</b>	Ability to understand the concepts of I/O streams, JDBC, object serialization, sockets, RMI, JNI, Collection API interfaces, Vector, Stack, Hash table classes, list etc.	<b>L2-Understanding L3-Applying</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3
<b>CO2</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3
<b>CO3</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3
<b>CO4</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3





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## Department of Computer Science and Engineering

**Subject: Circuit and Systems Lab**

**Paper Code: EEC-254**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand properties of signal and system.	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to determine transient respond of circuit.	<b>L3-Applying</b>
<b>CO 3</b>	Ability to solve AC circuit.	<b>L3-Applying L5-Evaluating</b>
<b>CO 4</b>	Ability to determine two port parameter and transfer function.	<b>L3-Applying L5-Evaluating</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1
<b>CO2</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1
<b>CO3</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1
<b>CO4</b>	3	3	3	3	2	.....	.....	.....	1	1	1	1



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## Department of Computer Science and Engineering

**Subject: Database Management System Lab**

**Paper Code: CIC-256**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand advantages of database systems	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to use SQL as DDL, DCL and DML	<b>L3-Applying</b>
<b>CO 3</b>	Ability to design database and manage transaction processing	<b>L3-Applying</b>
<b>CO 4</b>	Understand object oriented & distributed databases systems and use them	<b>L2-Understanding L3-Applying</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	3	2	2	2	.....	.....	.....	3	2	2	3
<b>CO2</b>	3	3	2	2	2	.....	.....	.....	3	2	2	3
<b>CO3</b>	3	3	2	3	3	.....	.....	.....	3	2	2	3
<b>CO4</b>	3	3	2	3	3	.....	.....	.....	3	2	2	3



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## Department of Computer Science and Engineering

**Subject: Programming in Java Lab**

**Paper Code: CIC-258**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Ability to understand the compilation process of Java, role of JVM as an emulator and various types of instructions.	<b>L2-Understanding</b>
<b>CO 2</b>	Ability to learn and apply concepts of Java programming, exceptional handling and inheritance.	<b>L3-Applying</b>
<b>CO 3</b>	Ability to understand the use of multi-threading, AWT components and event handling mechanism in Java.	<b>L2-Understanding L3-Applying</b>
<b>CO 4</b>	Ability to understand the concepts of I/O streams, JDBC, object serialization, sockets, RMI, JNI, Collection API interfaces, Vector, Stack, Hash table classes, list etc.	<b>L2-Understanding L3-Applying</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3
<b>CO2</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3
<b>CO3</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3
<b>CO4</b>	3	2	2	2	3	.....	.....	.....	3	2	2	3

5<sup>th</sup> Semester



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## Department of Computer Science and Engineering

**Subject: Economics for Engineers**

**Paper Code: HS-301**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Analyze the theories of demand, supply, elasticity and consumer choice in the market.	<b>L4-Analyzing</b>
<b>CO 2</b>	Analyze the theories of production, cost, profit and break even analysis .	<b>L4-Analyzing</b>
<b>CO 3</b>	Evaluate the different market structures and their implications for the behavior of the firm.	<b>L5-Evaluating</b>
<b>CO 4</b>	Apply the basics of national income accounting and business cycles to Indian economy.	<b>L3-Applying</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	1	2	3	1	2	1	1	2	2	3	1	1
<b>CO2</b>	2	1	3	2	1	2	3	1	3	2	1	2
<b>CO3</b>	3	1	2	3	2	1	2	3	1	3	2	1
<b>CO4</b>	1	3	2	1	3	2	3	1	2	1	3	2





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## Department of Computer Science and Engineering

**Subject: Compiler Design**

**Paper Code: CIC-303**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Able to apply the knowledge of LEX tool and YACC tool to develop a scanner and Parser.	<b>L2-Understanding L3-Applying L6-Creating</b>
<b>CO 2</b>	Able to design and implement a software system for backend of the compiler.	<b>L1-Remembering L2-Understanding L3-Applying</b>
<b>CO 3</b>	Able to design syntax tree and intermediate code generator.	<b>L1-Remembering L2-Understanding L3-Applying</b>
<b>CO 4</b>	To understand the concept of symbol table and to use various code optimization techniques	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3
<b>CO2</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3
<b>CO3</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3
<b>CO4</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3



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### Department of Computer Science and Engineering

**Subject: Operating System**

**Paper Code: CIC-305**

#### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
CO 1	Understand the role of operating system in a computing device, and ability to understand paging and segmentation methods of memory binding and their pros. & cons.	L2-Understanding
CO 2	Understand scheduling of process over a processor. Ability to use concepts of semaphore and its usage in process synchronization.	L2-Understanding L3-Applying
CO 3	Ability to synchronize programs and make the system deadlock free.	L3-Applying L6-Creating
CO 4	Ability to understand file systems like file access methods, directory structures, file space allocation in disk and free space management in disk. Ability to understand disk scheduling and disk recovery procedure.	L2-Understanding

#### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	-	3	-	-	-	-	-	-	-
CO2	3	3	-	-	2	-	-	-	-	-	-	-
CO3	3	2	3	-	2	-	-	-	-	-	-	-
CO4	3	3	-	-	2	-	-	-	-	-	-	-



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### **Department of Computer Science and Engineering**

**Subject: Computer Networks**

**Paper Code: CIC-307**

#### **Course Outcomes**

<b>At the end of the course, students will be able to:</b>		<b>Bloom Level</b>
<b>CO 1</b>	Understand basic computer network technology.	<b>L2-Understanding</b>
<b>CO 2</b>	Understand and explain Data Communications System and its components.	<b>L2-Understanding</b>
<b>CO 3</b>	Implements various network topologies and IP addressing, subnetting.	<b>L3-Applying</b>
<b>CO 4</b>	Enumerate the layers of the OSI model and TCP/IP.	<b>L2-Understanding</b>

#### **Mapping Course Outcomes (CO) and Program Outcomes (PO)**

<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>
<b>CO 1</b>	3	2	1	1	3	1	-	-	-	-	-	3
<b>CO 2</b>	3	2	1	1	3	1	-	-	-	-	-	3
<b>CO 3</b>	3	2	1	1	3	1	-	-	-	-	-	3
<b>CO 4</b>	3	2	1	1	3	1	-	-	-	-	-	3



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### **Department of Computer Science and Engineering**

**Subject: Software Engineering**

**Paper Code: CIC-309**

#### **Course Outcomes**

<b>At the end of the course, students will be able to:</b>		<b>Bloom Level</b>
<b>CO 1</b>	Ability to have an understanding of SDLC Models, Techniques for Requirement Elicitation, and SRS Document.	<b>L2-Understanding</b>
<b>CO 2</b>	To be able to explain Software Project Planning and various methods for software design	<b>L2-Understanding</b>
<b>CO 3</b>	To Understand Software Metrics, Software Reliability, and Quality assurance	<b>L2-Understanding</b>
<b>CO 4</b>	Ability to have an understanding of Software testing, documentation and maintenance.	<b>L2-Understanding</b>

#### **Mapping Course Outcomes (CO) and Program Outcomes (PO)**

<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>
<b>CO 1</b>	3	2	2	2	3	1	-	-	3	2	2	3
<b>CO 2</b>	3	2	2	2	3	1	-	-	3	2	2	3
<b>CO 3</b>	3	2	2	2	3	1	-	-	3	2	2	3
<b>CO 4</b>	3	2	2	2	3	1	-	-	3	2	2	3



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### Department of Computer Science and Engineering

**Subject: Design and Analysis of Algorithm**

**Paper Code: CIC-311**

#### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Analyse asymptotic runtime complexity of algorithms including formulating recurrence relations and divide and conquer designing method.	<b>L4-Analyzing</b>
<b>CO 2</b>	Describe the greedy paradigm and apply Greedy strategy for solving various problems.	<b>L3-Applying</b>
<b>CO 3</b>	Apply dynamic programming and Branch & Bound approach to solve suitable problems	<b>L3-Applying</b>
<b>CO 4</b>	Understand the concept of NP problems and string matching algorithm and various flow & sorting networks	<b>L2-Understanding</b>

#### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO 1</b>	1	1	1	1	1	2	2	2	2	1	1	1
<b>CO 2</b>	2	2	3	1	2	3	1	2	3	1	2	2
<b>CO 3</b>	2	2	1	1	2	3	3	2	1	3	1	2
<b>CO 4</b>	3	2	2	3	2	1	3	2	1	1	2	3



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## Department of Computer Science and Engineering

**Subject: Compiler Design Lab**

**Paper Code: CIC-351**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Able to apply the knowledge of LEX tool and YACC tool to develop a scanner and Parser.	<b>L2-Understanding L3-Applying L6-Creating</b>
<b>CO 2</b>	Able to design and implement a software system for backend of the compiler.	<b>L1-Remembering L2-Understanding L3-Applying</b>
<b>CO 3</b>	Able to design syntax tree and intermediate code generator.	<b>L1-Remembering L2-Understanding L3-Applying</b>
<b>CO 4</b>	To understand the concept of symbol table and to use various code optimization techniques	<b>L3-Applying L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3
<b>CO2</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3
<b>CO3</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3
<b>CO4</b>	3	2	.....	2	3	2	.....	.....	.....	.....	.....	3



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## Department of Computer Science and Engineering

**Subject: Operating System Lab**

**Paper Code: CIC-353**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Understand the role of operating system in a computing device, and ability to understand paging and segmentation methods of memory binding and their pros. & cons.	<b>L2-Understanding</b>
<b>CO 2</b>	Understand scheduling of process over a processor. Ability to use concepts of semaphore and its usage in process synchronization.	<b>L2-Understanding L3-Applying</b>
<b>CO 3</b>	Ability to synchronize programs and make the system deadlock free.	<b>L3-Applying L6-Creating</b>
<b>CO 4</b>	Ability to understand file systems like file access methods, directory structures, file space allocation in disk and free space management in disk. Ability to understand disk scheduling and disk recovery procedure.	<b>L2-Understanding</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	3	3	2	-	3	-	-	-	-	-	-	-
<b>CO2</b>	3	3	-	-	2	-	-	-	-	-	-	-
<b>CO3</b>	3	2	3	-	2	-	-	-	-	-	-	-
<b>CO4</b>	3	3	-	-	2	-	-	-	-	-	-	-



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### Department of Computer Science and Engineering

**Subject: Computer Networks Lab**

**Paper Code: CIC-355**

#### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
CO 1	Understand basic computer network technology.	L2-Understanding
CO 2	Understand and explain Data Communications System and its components.	L2-Understanding
CO 3	Implements various network topologies and IP addressing, subnetting.	L3-Applying
CO 4	Enumerate the layers of the OSI model and TCP/IP.	L2-Understanding

#### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	2	1	1	3	1	-	-	-	-	-	3
CO 2	3	2	1	1	3	1	-	-	-	-	-	3
CO 3	3	2	1	1	3	1	-	-	-	-	-	3
CO 4	3	2	1	1	3	1	-	-	-	-	-	3





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### Department of Computer Science and Engineering

Subject: Software Engineering Lab

Paper Code: CIC-357

#### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
CO 1	Ability to have an understanding of SDLC Models, Techniques for Requirement Elicitation, and SRS Document.	L2-Understanding
CO 2	To be able to explain Software Project Planning and various methods for software design	L2-Understanding
CO 3	To Understand Software Metrics, Software Reliability, and Quality assurance	L2-Understanding
CO 4	Ability to have an understanding of Software testing, documentation and maintenance.	L2-Understanding

#### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	2	2	2	3	1	-	-	3	2	2	3
CO 2	3	2	2	2	3	1	-	-	3	2	2	3
CO 3	3	2	2	2	3	1	-	-	3	2	2	3
CO 4	3	2	2	2	3	1	-	-	3	2	2	3



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## Department of Computer Science and Engineering

**Subject: Design and Analysis of Algorithm Lab**

**Paper Code: CIC-359**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Analyse asymptotic runtime complexity of algorithms including formulating recurrence relations and divide and conquer designing method.	<b>L4-Analyzing</b>
<b>CO 2</b>	Describe the greedy paradigm and apply Greedy strategy for solving various problems.	<b>L3-Applying</b>
<b>CO 3</b>	Apply dynamic programming and Branch & Bound approach to solve suitable problems	<b>L3-Applying</b>
<b>CO 4</b>	Understand the concept of NP problems and string matching algorithm and various flow & sorting networks	<b>L2-Understanding</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO 1</b>	1	1	1	1	1	2	2	2	2	1	1	1
<b>CO 2</b>	2	2	3	1	2	3	1	2	3	1	2	2
<b>CO 3</b>	2	2	1	1	2	3	3	2	1	3	1	2
<b>CO 4</b>	3	2	2	3	2	1	3	2	1	1	2	3

6<sup>th</sup> Semester



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## Department of Computer Science and Engineering

**Subject: Principle of Management for Engineers**

**Paper Code: MS-302**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Examine the relevance of the political, legal, ethical, economic and cultural environments in global business	<b>L2-Understanding</b>
<b>CO 2</b>	Evaluate approaches to goal setting, planning and organizing in a variety of circumstances.	<b>L5- Evaluating</b>
<b>CO 3</b>	Evaluate contemporary approaches for staffing and leading in an organization	<b>L5- Evaluating</b>
<b>CO 4</b>	Analyze contemporary issues in controlling for measuring organizational performance.	<b>L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO 1</b>	2	2	1	2	-	2	-	-	1	2	3	2
<b>CO 2</b>	2	2	1	2	-	2	-	-	1	2	3	2
<b>CO 3</b>	2	2	1	2	-	2	-	-	1	2	3	2
<b>CO 4</b>	2	2	1	2	-	2	-	-	1	2	3	2



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## Department of Computer Science and Engineering

**Subject: Universal Human Values**

**Paper Code: HS-304**

### Course Outcomes

At the end of the course, students will be able to:		Bloom Level
<b>CO 1</b>	Evaluate the significance of value inputs in formal education and start applying them in their life and profession	<b>L2-Understanding</b>
<b>CO 2</b>	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.	<b>L5- Evaluating</b>
<b>CO 3</b>	Examine the role of a human being in ensuring harmony in society and nature.	<b>L5- Evaluating</b>
<b>CO 4</b>	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.	<b>L4-Analyzing</b>

### Mapping Course Outcomes (CO) and Program Outcomes (PO)

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO1</b>	-	-	-	-	-	3	-	3	1	1	-	1
<b>CO 2</b>	-	-	-	-	-	3	-	3	1	1	-	1
<b>CO 3</b>	-	-	-	-	-	3	-	3	1	1	-	1
<b>CO 4</b>	-	-	-	-	-	3	-	3	1	1	-	1

7<sup>th</sup> Semester



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## Department of Computer Science and Engineering

**Subject: Information Security**

**Subject Code: ETCS401**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS401.1	Understand the concept of basic cryptographic techniques.	PO1, PO12, PSO1	L2-Understanding
ETCS401.2	Analyze authentication requirements and forensics techniques for information security.	PO2, PO4, PSO1	L4-Analyzing
ETCS401.3	Compare cryptanalysis techniques with key management in various encryption algorithms.	PO2, PO4, PSO1	L5-Evaluating
ETCS401.4	Apply the concept of cryptography for securing mobile devices.	PO5, PO12, PSO2	L3-Applying
ETCS401.5	Evaluate various types of attacks and prevent them using real life security applications.	PO3, PO4, PO5, PSO1	L5-Evaluating
ETCS401.6	Investigate system security standards through various authentication strategies.	PO2, PO4, PO12, PSO1	L6- Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2					1						3	
CO2		3		2									3	
CO3		3				2	1						3	
CO4						3							3	
CO5							3				2		3	2
CO6			3				2					1	3	

1=low, 2=medium, 3=high



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## Department of Computer Science and Engineering

**Subject: Software Testing and Quality Assurance**

**Subject Code: ETCS403**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS403.1	Define and understand the basic concepts and strategies of software testing	PO1, PO5, PSO1	L1-Remembering, L2-Understanding
ETCS403.2	Apply and identify various test cases and perform testing techniques.	PO1, PO2, PO3, PSO1, PSO2	L2-Understanding, L3-Apply
ETCS403.3	Analyse the Software Testing issues and design solutions in software unit, integration, system and regression testing	PO2, PSO1	L4-Analyzing
ETCS403.4	Analyse principles of planning a test project, test data and conduct testing operations by identifying defects, and generating testing report.	PO1, PO2, PO4, PSO1, PSO2	L4-Analyzing
ETCS403.5	Compare various software testing methods to practice project oriented systems.	PO4, PSO1	L5-Evaluating
ETCS403.6	Demonstrate and identify advanced software testing topics viz: (object-oriented software testing, and component-based software testing methods challenges, and solutions).	PO1, PO3, PO4, PO9, PSO1, PSO2	L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3				2							2	2	
CO2	3	3	2										3	2
CO3	3	3		1									2	
CO4	2	3	1	3								2	2	2
CO5	3		1	3								2	2	2
CO6	3		3	2				2	2			2	3	2

1=low, 2=medium, 3=high





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**Department of Computer Science and Engineering**

**Subject: Wireless Communication**

**Subject Code: ETEC405**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETEC405.1	Ability to define, understand and explain the concepts of various communication technologies	PO1, PO6, PSO1, PSO2	Remember, Understand
ETEC405.2	Ability to apply cellular concepts to obtain optimized network performance in a cellular systems like GSM.	PO2, PO3, PO7, PO10, PSO1, PSO2	Understand, Apply
ETEC405.3	Ability to analyze the performance of a wireless communication systems with reference to various wireless technologies like 2.5G, 3G, WLAN, Mobile IP etc.	PO2-PO7, PSO1, PSO2	Apply, Analyze
ETEC405.4	Ability to design a cellular system for given bandwidth, cluster size, Number of channels etc.	PO3- PO5, PO7, PO8, PSO1, PSO2	Create
ETEC405.5	Ability to investigate the performance of various technologies like Bluetooth, WiMax, satellite systems – Globalstar, IRIDIUM etc.	PO4, PO7, PSO1, PSO2	Understand, Analyze
ETEC405.6	Ability to conduct experiments to simulate MANETs in different scenarios using modern tools like Qualnet.	PO2- PO7, PO9, PSO1, PSO2	Understand, Analyze

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3					2							3	3
CO2		2	3				2			1			3	3
CO3		3	2	2	2	1	1						3	2
CO4			3	2	2		2	1					3	3
CO5				3			2						3	3
CO6		3	3	3	3	2	2		2				3	3

1=low, 2=medium, 3=high



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## Department of Computer Science and Engineering

**Subject: Data Mining and Business Intelligence Subject Code: ETCS413**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS413.1	Understand the need for data warehousing and study the architecture and operations	PO1,PO5,PO6,PO8, PO12, PSO1	L2-Understanding
ETCS413.2	Design a data warehouse using different schemas and apply the concept of OLAP	PO1,PO2,PO3,PO5, PO7,PO8,PO9,PO10,PO11,P O12 PSO1,PSO2	L3-Applying
ETCS413.3	Study the basics of Data Mining and its techniques and applications.	PO1,PO2,PO5,PO12,PSO1	L2-Understanding
ETCS413.4	Analyze and implement different data mining technique such as clustering, classification etc.	PO1, PO2, PO3, PO4, PO5,PO6,PO7,PO8, PO9,PO10,PO12,PSO1,PSO2	L4-Analyzing
ETCS413.5	Compare different Data mining techniques and their algorithms	PO1,PO2,PO4,PO5, PO9,PO10,PO12, PSO1, PSO2	L5-Evaluating
ETCS413.6	Develop a data mining model based on real world applications.	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10,PO11,PO12, PSO1, PSO2	L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3				2	2						1	3	
CO2	3	2	3		2		1	2	2	2	3	2	1	1
CO3	3	3	2		3		2	2	2	2	2	3	3	
CO4	3	3	3	3	3	3	2	2	2	2		2	3	3
CO5	3	3		2	3				2	2		3	3	3
CO6	3	3	3	3	3	2	2	2	2	2	3	2	3	3

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## Department of Computer Science and Engineering

**Subject: Advanced Database Management System Subject Code: ETCS423**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS423.1	Define terms related to database design and management, understand the concept of PL/SQL.	PO1, PO3, PO6, PO12, PSO2	Understand
ETCS423.2	Understand the architecture of distributed database and other existing different databases.	PO1- PO4, PO6, PO12, PSO2	Understand
ETCS423.3	Apply relational algebra and integrity constraints over relations.	PO1, PO2, PO4, PO6, PO12, PSO2	Apply
ETCS423.4	Create database and involve queries and transactions, explain how these impact database operation and design.	PO1- PO6, PO12, PSO2	Create
ETCS423.5	Remember SQL standards and standards for integration.	PO1, PO3, PO5, PO6, PO12, PSO2	Remember
ETCS423.6	Evaluate XML and understand its applications.	PO1, PO3, PO6, PO12, PSO2	Evaluate

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3		3			3						3		2
CO2	3	2	1	3		3						3		2
CO3	3	3		2		3						3		2
CO4	3	3	3	3	3	3						3		2
CO5	3		1		3	3						3		2
CO6	3		1			3						3		2

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## Department of Computer Science and Engineering

**Subject: Information Security Lab**

**Subject Code: ETCS451**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS451.1	Understand the concept of information security protocols.	PO1, PO3, PO9, PO12, PSO1	L2-Understanding
ETCS451.2	Implement security mechanisms on real world applications	PO1, PO4, PO12, PSO1	L3-Applying
ETCS451.3	Analyze various encryption and decryption techniques using ciphers.	PO2, PO4, PO5, PO12 PSO1	L4- Analyzing
ETCS451.4	Study and Compare various security Algorithms.	PO1, PO4, PO12 PSO1	L5-Evaluating
ETCS451.5	Evaluate key exchange algorithm in designing various applications	PO1, PO4, PO12 PSO1	L5-Evaluating
ETCS451.6	Build program to depict network security programs.	PO3, PO7, PO8, PO12, PSO1	L6- Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3		2						2			2	3	
CO2	2			2								2	3	
CO3	2			2								2	2	
CO4	2			2								2	2	
CO5	2			2								2	2	
CO6			3				2	1				2	2	

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## Department of Computer Science and Engineering

**Subject: Software Testing and Quality Assurance Lab      Subject Code: ETCS453**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS453.1	Understand and explain fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.	PO1, PO2, PO5, PO12, PSO1, PSO2	L1-Remembering, L2-Understanding
ETCS453.2	Design Test plan and Test cases using different testing techniques.	PO1, PO2, PO3, PO12, PSO1, PSO2	L1-Remembering, L2-Understanding, L3-Apply
ETCS453.3	Analyse the design of Test cases for different testing techniques and Bugs using Bug tracking tool (Bugzilla etc.)	PO1, PO2, PO4, PO5, PO12, PSO1	L4-Analyzing,
ETCS453.4	Apply various testing techniques and Automation testing using testing tools and test management tools	PO1- PO4, PSO1, PSO2	L3-Apply
ETCS453.5	Compare various testing techniques and tools	PO1, PO3, PO4, PO12, PSO1, PSO2	L5-Evaluating
ETCS453.6	Create test strategies and plan, prioritize and execute them on real time applications	PO1, PO3, PO4, PO9, PO12, PSO1, PSO2	L1-Remembering, L2-Understanding L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2		1								2	2	2
CO2	3	3	3									1	3	2
CO3	3	3		2	1							1	1	
CO4	3	3	1	3									2	2
CO5	3		2	2								2	2	1
CO6	3		3	2					2			2	3	2

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## Department of Computer Science and Engineering

**Subject: Wireless Communication Lab**

**Subject Code: ETEC463**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETEC463.1	State the basic concepts of wireless communication technologies used to explain, experiments based on kits of GSM and CDMA.	PO1, PO12, PSO1	L1-Remembering, L2-Understanding
ETEC463.2	Understand wireless network with and without infrastructure.	PO1, PO3, PO12, PSO2	L1-Remembering, L2-Understanding, L3-Apply
ETEC463.3	Implementation of wireless network with and without with the help of switch.	PO1, PO2, PSO1, PSO2	L1-Remembering, L2-Understanding, L4-Analyzing
ETEC463.4	Analysis of different types network to understand access points, routing and security in the network.	PO3, PSO1, PSO2	L1-Remembering, L2-Understanding, L4-Analyzing
ETEC463.5	To evaluate static and dynamic routing networks using simulation experiments.	PO3, PO4, PO5, PSO1, PSO2	L2-Understanding L3-Applying, L5-Evaluating
ETEC463.6	To design various types of networks VLAN and topologies BUS,MESH,HYBRID,STAR.	PO1, PO2, PSO1, PSO2	L3-Apply L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	-			2				2		3	-	
CO2	3	1	2									3		3
CO3	3	1			2					2		3	1	1
CO4	3	1	3		3								2	2
CO5	3	1	3	2	3								1	1
CO6	3	3	2	1	3	2							1	1

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## Department of Computer Science and Engineering

**Subject: Data Mining and Business Intelligence Lab Subject Code: ETCS457**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS457.1	Define and understand the business requirements, ETL process, dimensional analysis and Information flow.	PO1,PO2, PO3,PO5,PSO1,PSO2	L1-Remembering, L2-Understanding
ETCS457.2	Ability to apply cleansing process using Weka tool.	PO1,PO2,PO3,PO4 PSO1,PSO2	L3-Apply
ETCS457.3	To analyse the Data Mining Techniques including clustering and classification techniques.	PO1,PO2,PO3, PSO1	L4-Analyzing
ETCS457.4	To examine the association rule and visualization techniques in data clustering as well as classification problems	PO1,PO2,PO3,PO4, PSO1,PSO2	L4-Analyzing
ETCS457.5	Comparative analysis of various classification Algorithms using knowledge flow and generate ROC curve.	PO4, PSO1	L5-Evaluating
ETCS457.6	Demonstrate knowledge of data mining process including data preparation, modelling and evaluation.	PO1,PO3,PO4, PO9, PSO1, PSO2	L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2		2								2	
CO2	3		2	2					1				3	2
CO3	3		2										1	
CO4	2	3	3	3									2	2
CO5				3								2	2	1
CO6	3		3		3								3	2

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## Department of Computer Science and Engineering

**Subject: Summer Training / Industrial Workshop**

**Subject Code: ETCS459**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS459.1	Understand the basic concepts related to the assigned project work during industrial training/certification course.	PO1, PO2, PO12, PSO1, PSO2	L2-Understand
ETCS459.2	Analyze the assigned problem by considering its impact on society and environment.	PO1, PO2, PO4, PO6, PO9, PO10, PO12, PSO1	L4-Analyze
ETCS459.3	Develop and discuss the design solution for the problem.	PO1, PO2, PO3, PO5, PO10, PO11, PO12, PSO1, PSO2	L6-Create, L5-Evaluate
ETCS459.4	Demonstrate the ability to work effectively in team with commitments to professional ethics.	PO8, PO9, PO10, PO11, PSO1, PSO2	L3-Apply
ETCS459.5	Compile the project work through proper documentation in the form of project report.	PO2, PO6, PO7, PO8, PO9, PO10, PO11, PSO1	L6-Create
ETCS459.6	Summarize the project work through individual power point presentations.	PO2, PO5, PO9, PO10, PO11, PO12, PSO1, PSO2	L6-Create

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2										1	1	1
CO2	1	3		3		2			2	1		1	3	
CO3	1	2	3		2					1	2	1	3	2
CO4								3	3	2	2		2	1
CO5		2				2	1	2	3	3	2		2	
CO6		3			1				2	3	1	2	2	2

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## Department of Computer Science and Engineering

**Subject: Minor Project**

**Subject Code: ETCS461**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS461.1	Acquire awareness on latest technology and current trends in the area of interest.	PO1, PO5, PO8, PO12, PSO1, PSO2	L1-Remember, L2-Understand
ETCS461.2	Study the prior-art/existing inventions in the selected area of interest, with a comprehensive and systematic approach.	PO1, PO2, PO4, PO8, PO12, PSO1, PSO2	L2-Understand, L4-Analyze
ETCS461.3	Identify and analyze the existing problems in the selected area.	PO2, PO4, PO8, PO12, PSO1, PSO2	L2-Understand, L4-Analyze
ETCS461.4	Learn a modern engineering/programming tool(s) used for implementing and comparing the performance of existing solutions to the identified problem in the area of interest.	PO1, PO2, PO3, PO4, PO6, PO7, PO9, PO12, PSO1, PSO2	L1-Remember, L3-Apply, L4-Analyze
ETCS461.5	Implement an existing technique, prepare a project report and presentation, as per the prescribed format.	PO2, PO6, PO7, PO8, PO9, PO10, PO11, PSO1	L6-Create, L5-Evaluate
ETCS461.6	Write a review paper and communicate to a reputed conference/refereed journal.	PO2, PO4, PO6, PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2	L6-Create

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1				2			1				2	1	
CO2	2	2		2				1				2	2	1
CO3		2		2				1				2	2	1
CO4	1	1	2	3	3	2	1		2			1	2	2
CO5		2				2	1	2	3	3	2		3	3
CO6		3		2		2	2	2	3	3	1	2		2

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8<sup>th</sup> Semester



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**Department of Computer Science and Engineering**

**Subject: Mobile Computing**

**Subject Code: ETIT402**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETIT402.1	Able to remember the concept of mobile computing paradigm and architecture, its novel applications and limitations, various technologies.	PO1,PO2, PO5,PO10, PO12,PSO1,PSO2	L1- Remembering, L2- Understanding
ETIT402.2	To understand and implement the algorithm/protocols, environments and communication systems in mobile computing.	PO1, PO2, PO3, PO4, PO12, PSO1, PSO2	L2- Understanding, L3- Apply
ETIT402.3	Able to understand the working of mobile data layer	PO2,PO3, PO4, PO12 PSO1,PSO2	L2- Understanding, L3- Apply
ETIT402.4	Analysis of Mobile IP protocol for wireless environment	PO2,PO3, PO4,PO5, PSO1,PSO2	L4-Analyzing, L5-Evaluating
ETIT402.5	Able to apply the concept of TCP protocols in Wireless Networks.	PO2,PO3, PO4,PO5, PO10, PSO1,PSO2	L2- Understanding, L3- Apply
ETIT402.6	Enables the students to examine the important aspects of Mobile Adhoc Networks protocol	PO2,PO5,PO12, PSO1,PSO2	L2- Understanding, L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2			1					1		2	3	3
CO2	3	3	2	2								2	3	3
CO3		3	3	3								1	3	3
CO4		3	3	3	2								3	3
CO5		3	3	3	2					1			3	3
CO6		2			1							3	3	2

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**Department of Computer Science and Engineering**

**Subject: Machine Learning**

**Subject Code: ETCS402**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS402.1	Understand the basic principles of machine learning including classification, regression, clustering problems and reinforcement learning.	PO1, PO7, PO12, PSO1	L2-Understanding
ETCS402.2	Identify suitable learning methods such as supervised, unsupervised, etc. for real-world problems.	PO1, PO2, PO3, PO4, PO5, PO12, PSO1	L4-Analyzing
ETCS402.3	Design and outline the needs and application of various types of machine learning methodologies.	PO1, PO2, PO3, PO5, PSO1, PSO2	L3-Applying
ETCS402.4	Analyze various machine learning techniques for solving complex problems.	PO1, PO2, PO3, PO5, PO8, PO10, PO12, PSO2	L4-Analyzing
ETCS402.5	Compare and evaluate machine learning techniques with multi-disciplinary domains.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO12, PSO1, PSO2	L5-Evaluating
ETCS402.6	Create real-time applications using the knowledge of machine learning techniques.	PO1, PO3, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12, PSO2	L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2						1					3	2	
CO2	3	3	2	2	2							3	3	
CO3	3	3	3		2								2	3
CO4	3	3	3		3			1		1		2		2
CO5	2	3	2	2	2	1	1	3	2	2		1	2	2
CO6	2		3		2	1	1	2	2	3	2	3		2

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## Department of Computer Science and Engineering

**Subject: Human Values Professional Ethics II**

**Subject Code: ETHS402**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETHS402.1	Define the aspect of diversity and the role of a human being in respecting it.	PO6, PO8, PO9	Remember
ETHS402.2	Understand the importance of trust, mutually satisfying human behavior and enriching interaction with nature.	PO6, PO7, PO8, PO9	Understand
ETHS402.3	Apply the wisdom to discriminate the superficial success with actual.	PO2, PO8	Apply
ETHS402.4	Analyze the compartment through which a professional can experience happiness.	PO8, PO12	Analyze
ETHS402.5	Evaluate the professional practices so as to achieve results that are beneficial for the organization and to the society at large.	PO2, PO6, PO7, PO8, PO11, PO12	Evaluate
ETHS402.6	Create harmony in professional and personal life by developing appropriate technologies and management patterns.	PO8-P12	Create

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1						1		3	2					
CO2						2	2	3	2					
CO3		2						3						
CO4								3				1		
CO5		2				2	2	3			2	1		
CO6								3	1	1	2	1		

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## Department of Computer Science and Engineering

**Subject: Object Oriented Software Engineering**

**Subject Code: ETCS412**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS412.1	To study object oriented (OO) principles for good software design options and modeling our code around objects. This makes it useful to understand the objects as real-world entity in the problem space.	PO1,PO7, PSO1	L2- Understanding
ETCS412.2	To analyze how to place behavior & structure responsibility in an OO design required for making actual implementation in projects.	PO2,PO3, PSO1	L1-Remembering, L4-Analyzing, L3-Apply
ETCS412.3	To emphasize on creating work products that captures the desired requirements and specifications of the proposed software by the customers.	PO1,PO3,PSO 4,PO10,PSO1, PSO2	L2- Understanding, L6- Creating
ETCS412.4	To understand how to design software that is expected to continuously evolve to meet an ever-changing list of requirements.	PO2,PO3,PO9, PSO1,PSO2	L4-Analyzing, L2-Understanding
ETCS412.5	To illustrate effective solutions which can be commonly used in many places throughout an application design	PO3,PO4,PSO 1	L5-Evaluating, L6- Creating
ETCS412.6	To design UML diagrams at all levels of design this greatly facilitates object-oriented/architecture-centric design.	PO3,PO4,PSO 1	L3-Designing, L2-Understanding

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2						2						2	
CO2		3	2										2	
CO3	2		2	2						3			1	2
CO4		2	2						3				2	1
CO5			3	2									2	
CO6			2	2									1	

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 (An ISO 9001:2015 Certified Institution)  
 A-4, Paschim Vihar, Main Rohtak Road, New Delhi – 110 063

**Department of Computer Science and Engineering**

**Subject: Web Intelligence and Big Data**

**Subject Code: ETCS418**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS418.1	Describing the evolution of data and recognising the challenges involved in web intelligence and big data.	PO1, PO2, PO3, PO4, PO5, PO11, PO12, PSO1	L1-Remembering,
ETCS418.2	Discovering and categorising data through various searching techniques and learning techniques such as classification and clustering.	PO1, PO2, PO3, PO4, PO5,	L2-Understanding,
ETCS418.3	Apply predictive analytics and forecasting using advanced learning models, reasoning and logic.	PO1, PO2, PO3, PO4, PO5,	L3-Apply
ETCS418.4	Analyze sentiment and intent by correlating information and language.	PO1, PO2, PO3, PO4, PO5, PO11, PO12, PSO1, PSO2	L4-Analyze
ETCS418.5	Persuading quality research in Big Data field and experimenting with upcoming technologies such as deep learning.	PO1, PO2, PO3, PO4, PO5, PO11, PO12, PSO1, PSO2	L5-Evaluating
ETCS418.6	Build web-intelligent applications using new big-data platforms based on the 'map-reduce' parallel programming paradigm.	PO1, PO2, PO3, PO4, PO5, PO11, PO12, PSO1, PSO2	L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	3	3	2	2	-	-	-	-	-	2	1	3	-
CO2	2	3	3	2	3	-	-	-	-	-	2	1	3	-
CO3	3	3	3	3	3	-	-	-	-	-	2	2		3
CO4	3	3	3	3	2			-	-	-	2	2	3	3
CO5	3	3	3	3	3		-	-	-	-	3	3	3	3
CO6	3	3	3	3	3				-	-	3	3	3	3

1=low, 2=medium, 3=high



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## Department of Computer Science and Engineering

**Subject: Principle Of Programming Languages**

**Subject Code: ETCS424**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS-424.1	Able to understand the fundamental concepts of most programming languages and the tradeoff between language design and implementation.	PO1, PO3, PSO1	L1-Remembering, L2-Understanding, L3: Apply ,L4- Analyzing
ETCS-424.2	Able to compare programming languages, assess programming languages critically and scientifically	PO1,PO2, PSO1 PSO2	L1-Remembering,L2-Understanding, L3-APPLY
ETCS-424.3	Able to understand the use of formal description for a programming language and the essence of program execution by evaluators: interpreter, compiler	PO1,PO2, PSO1 ,PSO2	L1-Remembering, L2-Understanding, L4-Analyzing
ETCS424.4	Able to understand different programming paradigms: analyze the principles of imperative, object oriented, functional and logic programming	PO1,PO2, PO3,PSO1, PSO2	L1-Remembering, L2-Understanding, L5-Evaluating
ETCS424.5	Able to design a new programming language in principle	PO2-PO5, PO10,PO11, PO12,PSO1, PSO2	L3-Applying, L5-Evaluating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	---	3	---	---	---	---	---	---	---	---	---	2	---
CO2	3	2	---	---	---	---	---	---	---	---	---	---	2	2
CO3	2	2	---	---	---	---	---	---	--	---	---	---	3	3
CO4	3	3	3	---	---	---	---	---	---	---	---	---	3	3
CO5		3	3	3	3	---	---	---	--	3	3	3	3	3

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## Department of Computer Science and Engineering

**Subject: Mobile Computing Lab**

**Subject Code: ETIT452**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETIT 452.1	Ability to define, understand and explain the concepts of Mobile Computing	PO2- PO4, PO12	L1-Remembering, L2-Understanding
ETIT 452.2	Ability to apply concepts of WML to design web pages for mobile devices	PO1-PO3, PO12	L2-Understanding, L3- Apply
ETIT 452.3	To gain knowledge of WML script and learn to develop various applications using WML script.	PO1-PO4, PO12	L2-Understanding, L3- Apply
ETIT 452.4	Apply the fundamental design paradigms and technologies to mobile computing applications	PO1-PO4, PO12	L4-Analyzing, L5-Evaluating
ETIT 452.5	Work with Wireless application Protocols to develop mobile content application and to appreciate the social and ethical issues of mobile computing privacy	PO1-PO4, PO12	L2-Understanding, L3- Apply
ETIT 452.6	Make use of WML and WML script in developing mobile applications	PO1-PO4, PO12	L2-Understanding, L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		2	1	1								3		
CO2	3	2	2									3		
CO3	3	3	3	1								3		
CO4	3	3	2	2								3		
CO5	3	3	2	2								3		
CO6	3	3	3	1								3		

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**Department of Computer Science and Engineering**

**Subject: Machine Learning Lab**

**Subject Code: ETCS454**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS454.1	To understand classification techniques and implement them on various data sets.	PO1, PO5, PO10,PO12,PSO1	L2-Understanding
ETCS454.2	To identify decision based classifier on real-world datasets.	PO1, PO3, PO4, PO5, PO12,PSO1,PSO2	L3-Applying
ETCS454.3	Analyse various classification techniques based on provided data sets.	PO1,PO2, PO4, PO5,PSO1	L4-Analyzing
ETCS454.4	To evaluate given datasets using various machine learning algorithms.	PO1, PO2, PO3, PO4, PO5, PO7, PO12, PSO1, PSO2	L5-Evaluating
ETCS454.5	To compare various clustering algorithms for performance measures.	PO1, PO2, PO4, PO5,PSO1	L5-Evaluating
ETCS454.6	To create new Machine learning model(s) for classification of random datasets available for real world problems.	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2	L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3				3							2	2	
CO2	3		3										3	2
CO3				3									1	
CO4		3	3										2	2
CO5	3			3									2	1
CO6	3		2										3	2

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## Department of Computer Science and Engineering

**Subject: Object Oriented Software Engineering Lab**

**Subject Code: ETCS456**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS456.1	Students learn to evaluate feasibility of the project. This determines whether the solution considered to accomplish the requirements is practical and workable in the software.	PO2,PO9,PSO1	L2- Understanding, L6-Creating
ETCS456.2	To learn to document detailed description of a software system to be developed with its functional and non-functional requirements.	PO4,PO8,PO11, PSO1,PSO2	L1-Remembering, L2-Understanding, L3-Apply
ETCS456.3	To be able to create work products that captures the desired requirements and specifications of the proposed software by the stakeholders.	PO4,P10, PSO1	L2-Understanding, L6- Creating
ETCS456.4	To understand how to design software that is expected to continuously evolve to meet an ever-changing list of requirements.	PO1,PO2,PO03, PSO1, PSO2	L4-Analyzing, L6- Creating
ETCS456.5	To design UML diagrams at all levels of design this greatly facilitates object-oriented/architecture-centric design.	PO2,PO3,PO4,P O5,PSO1	L5-Evaluating L6- Creating
ETCS456.6	Various diagrams are designed to analyze and depict the structure of a system or process like Class Diagram, Use Case Diagram, Activity Diagram, State Chart Diagram, Component Diagram, Deployment Diagram etc	PO2,PO3,PO5,P O9,PSO1	L1-Remembering L2-Understanding L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		2							2				2	
CO2				2				2			1		1	1
CO3				3						2			2	
CO4	2	2	2										2	1
CO5		2	3	2	1								3	
CO6		2	2		1				2				2	

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## Department of Computer Science and Engineering

**Subject: Web Intelligence and Big Data Lab**

**Subject Code: ETCS458**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS458.1	Demonstrate an understanding of the importance of different data analysis tools and the principles of big data.	PO1, PO2, PO3, PO5, PO9, PO11, PO12, PSO1	L1-Remembering, L2-Understanding
ETCS458.2	Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications.	PO1, PO2, PO3, PO4, PO5, PO9, PO11, PO12, PSO1	L2-Understanding,
ETCS458.3	Analyze the problem domain using the data collected from web.	PO1, PO2, PO3, PO4, PO5, PO9, PO11, PO12, PSO1	L4-Analyzing
ETCS458.4	Visualize and depict the results of clustering, classification and association mining on large data sets.	PO1, PO2, PO3, PO4, PO5, PO9, PO11, PO12, PSO2	L5-Evaluating L6-Creating
ETCS458.5	Ability to use and integrate machine learning libraries with mathematical and statistical tools.	PO1, PO2, PO3, PO4, PO5, PO9, PO11, PO12, PSO2	L3-Apply L6-Creating
ETCS458.6	Apply web intelligence in an appropriate manner by selecting suitable model parameters for different machine learning techniques and computing environment.	PO1, PO2, PO3, PO4, PO5, PO9, PO11, PO12, PSO2	L3-Apply, L5-Evaluating L6-Creating

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	2	-	3	-	-	-	2	-	2	2	3	-
CO2	3	3	2	2	3	-	-	-	2	-	2	2	3	-
CO3	3	3	2	2	3	-	-	-	2	-	2	2	3	
CO4	3	2	2	2	3	-	-	-	2	-	2	2		3
CO5	3	3	2	2	3	-	-	-	2	-	2	3		3
CO6	3	3	2	2	3	-	-	-	2	-	2	2		3

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## Department of Computer Science and Engineering

**Subject: Principle Of Programming Languages Lab**

**Subject Code: ETCS458**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS458.1	Learn and understand the basics of functions in the programming language	PO1,PO2, PO3, PO12, PSO1,PSO2	L1-Remember, L2-Understand
ETCS458.2	Ability to apply the concept of object-oriented programming language to design and develop the application	PO1, PO2,PO3, PO4,PSO1,PSO2	L3-Apply
ETCS458.3	Analyze problems and subtasks, and implement them as functions/procedures.	PO1,PO3, PO12,PSO1,PSO2	L4-Analyze
ETCS458.4	Execute all the parallel operations in JAVA using a simple multi-threaded server.	PO1,PO2,PO3, PO5,PSO1, PSO2	L4-Apply
ETCS458.5	Evaluate multithreading techniques and process scheduling using Java.	PO4,PO5, PSO1,PSO2	L5-Evaluate
ETCS458.6	Demonstrate the knowledge of java programming to create multithreaded servers.	PO1, PO3, PO5, PO12, PSO1, PSO2	L6-Create

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2									2	3	2
CO2	3	2	2	2									3	3
CO3	3		3									2	3	3
CO4	2	3	3		3								2	3
CO5				2	3								3	3
CO6	3		3		2								2	3

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## Department of Computer Science and Engineering

**Subject: Major Project**

**Subject Code: ETCS460**

At the end of the course, students shall be able to:

CO	Statement	PO/ PSO	Bloom Level
ETCS460.1	Identify the research problem(s) and select the problem(s) of interest in the field of engineering.	PO2, PO4, PO8, PO12, PSO1, PSO2	L2-Understand
ETCS460.2	Comprehensively discuss and examine the possible solution(s) to the selected problem(s).	PO1, PO2, PO4, PO7, PO8, PO12, PSO1, PSO2	L2-Understand, L4-Analyze
ETCS460.3	Design and implement the solution methodology(s), using modern engineering tool(s).	PO1, PO2, PO3, PO5, PO9, PO12, PSO1, PSO2	L6-Create, L3-Apply
ETCS460.4	Compare and evaluate the performance of the designed solution methodology(s) with the existing methodologies.	PO1, PO2, PO4, PO6, PO7, PO9, PO12, PSO1, PSO2	L4-Analyze, L5-Evaluate
ETCS460.5	Perform a group-demonstration and document the detailed analysis and results in the Project Report, as per the prescribed format.	PO2, PO6, PO7, PO8, PO9, PO10, PO11, PSO1	L5-Evaluate, L6-Create
ETCS460.6	Formulate, document and submit a research paper based on the completed performance analysis, with strict adherence to professional ethics.	PO2, PO4, PO6, PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2	L5-Evaluate, L6-Create

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		2		2				1				2	3	2
CO2	1	2		2			1					1	2	1
CO3	1	2	3		3				2			2	2	2
CO4	1	1		3		2	1		2			1	1	1
CO5		2				2	1	2	3	3	2		2	
CO6		3		2		2	2	3	3	3	1	2	3	2

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