Name of Institute: **IITE**
Name of Faculty: **Prof. Ronak Patel**

Course code: **MA0312**
Course name: **Basics of Probability, Statistics & Numerical Methods**
Pre-requisites: Calculus, Basic Statistics
Credit points: 04
Offered Semester: 03

Course coordinator (weeks 1 - 15)
Full name: Prof. Ronak Patel
Department with siting location: Mathematics Department, ISHLS,4th floor Bhanwar building, Indus University, Ahmadabad
Telephone: 3424
Email:ronakpatel.ec@indusuni.ac.in
Consultation times: Monday to Friday (4:00 PM to 5:00 PM)

Course lecturer (weeks 1 - 15)
Full name: Prof. Ronak Patel
Department with siting location: Mathematics Department, ISHLS,4th floor Bhanwar building, Indus University, Ahmadabad
Telephone: 3424
Email:ronakpatel.ec@indusuni.ac.in
Consultation times: Monday to Friday (4:00 PM to 5:00 PM)

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives:

By participating in and understanding all facets of this course a student will:

1) To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
2) To provide an ability to apply knowledge of basic science and engineering fundamentals.
3) To provide an ability to undertake problem identification, formulation and solution.
4) To provide an ability to analyze different mathematical models within science and technology and work creatively, systematically and critically.
5) To provide an ability to find strategies for the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.

6) To provide an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.
7) To provide an ability to insight their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

Course Outcomes (CO):

By participating and understanding all facets of this course a student will be able to :

1) To understand the concept of probability, Characteristics of random variable, probability mass function and cumulative distribution function. [BT-2]
2) To learn the concept of discrete distribution : Binomial distribution and Poisson distribution. [BT-4]
3) To develop the awareness about testing of hypothesis, mean, standard deviation, coefficient of variance, F-test and T-test. [BT-5]
4) To learn Numerical Interpolation and its brief information. [BT-6]
5) To understand numerical differentiation and integration. [BT-2]
6) To solve problem of Algebraic, transcendental equations and various numerical method. [BT-3]

Course Outline

	COURSE OUTLINE	
Unit 1	**Basics of Probability:** Introduction to Probability, Characteristics of random variable, Probability mass function, cumulative distribution function, probability density function. **Probability distributions:** Discrete distributions: Binomial distribution, Poisson distribution, Continuous distributions: Normal distribution	**10 hours**
Unit 2	**Statistics:** Introduction and application of statistics, types of statistics, testing of hypothesis**,** Mean, standard deviation, coefficient of variation, F-test , t-test , Chi Square test, Correlation and regression.	**10 hours**
Unit 3	**Interpolation** Finite differences and Interpolation: Finite differences Forward, Backward & Central difference operators and difference tables. Interpolation Formula with equal intervals: Newton's forward, Newton's backward, Central difference interpolation by Stirling's formula Interpolation Formula with unequal intervals: Lagrange's & Newton's divided difference interpolation	**12 hours**

	Numerical differentiation: Using Newton's forward and backward interpolation formula Numerical Integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.	
Unit 4	**Numerical Methods** Basic Errors. Solution of Algebraic and Transcendental Equations: Bisection method, Regula-Falsi method, Newton-Raphson method., Convergence condition for these methods, Numerical methods in Linear Algebra: Gauss-Jacobi, Gauss-seidel method Largest Eigen values and corresponding Eigen vectors: By power method Numerical Solutions of ordinary differential equations: Taylor's Method, Euler's Method, Improved Euler Method (Heun's Method), Runge-Kutta method of order four	**13 hours**

Text Book:

B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill.

Reference Books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics" (8th Edition), Wiley Eastern Ltd., New Delhi.
2. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi
3. Murray Spiegel , "Advanced Mathematics for Engineering & Science: Schaum's Outline Series", Tata McGraw Hill Publication
4. Merel C Potter, J.L. Goldberg, "Advanced Engineering Mathematics" (3rd Edition), Oxford India Publication.
5. Python Programming And Numerical Methods: A Guide For Engineers And Scientists, https://pythonnumericalmethods.berkeley.edu/notebooks/Index.html

List of Practicals:

1. Programs to find roots of transcendental equations (N-R Method, Bisection Method)
2. Programs to find solutions to linear equations (Gauss seidel method)
3. Programs to find largest eigenvalue and corresponding eigenvector (Power Method)
4. Program to solve ODE (Euler's Method)
5. Program for Numerical Differentiation (Forward and backward interpolation)
6. Program for Numerical Integration (Simpson's Rule and Trapezoidal Rule)
7. Program to implement binomial distribution
8. Program to implement Poisson distribution
9. Program to find mean, standard deviation and variance.
10. Develop program for F-test/ T-test/ Chi-square test.

Method of delivery: **Lectures, Self-Study Material**

Study time: **3 hours Lecture + 2 hour Practical every week**

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

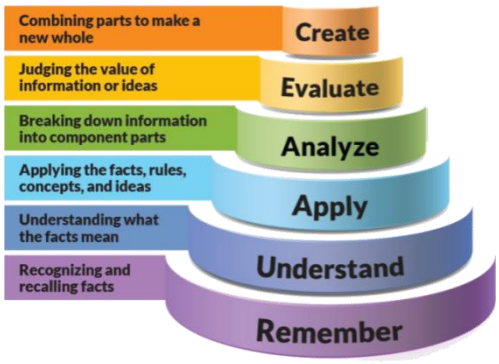

Figure 1: Blooms Taxonomy

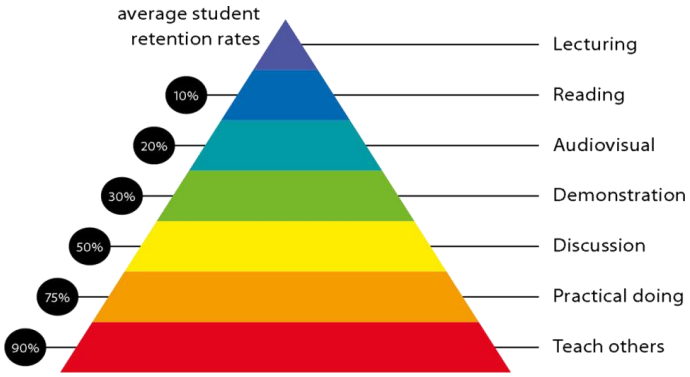

Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**1 Professional knowledge, grounding & awareness**
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing**
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond	**4 Problem solving skills**

effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**5 Written communication** **6 Oral communication** **7 Teamwork**
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	**10 Sustainability, societal & environmental impact**

Practical work:

2 Hrs/week

Lecture/practical times

(Give lecture times in the format below)

Lecture/Tutorial	Day	Time	Class Code (Google Class room)
Lecture	Monday	10.00 AM to 11.00 PM	moj5mua
Lecture	Tuesday	11.10 AM to 12.10 PM	
Lecture	Wednesday	03.10 PM to 4.10 PM	
Practical	Friday	2.00 PM to 4.10 PM	
Link to Google Class Room: https://meet.google.com/xfk-cpmu-qwi			

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for semester examinations.

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Type of Examination	Weightage	Bifurcation
Internal Examination (CIE-Theory)	60%	¤ 40 Marks - MSE (Mid Semester Examination - Closed book examination) ¤ 05 Marks - Attendance (if > 80%) ¤ 10 Marks - Assignments ¤ 05 Marks - Presentation
External Examination (ESE-Theory)	40%	¤ Closed Book Examination
Internal Examination (CIE-Practical)	60%	¤ 50 Marks - Lab performance / Lab manual work ¤ 10 Marks - Viva
External Examination (ESE- Practical)	40%	¤ 20 Marks - Viva ¤ 20 Marks - Practical exam or quiz

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.
Do not share your work with other students (except where required for a group activity or assessment)

Computer Science (B)
Course schedule (subject to change)
(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Unit-IV	Weeks 1	Basic Errors, convergence conditions for solution of algebraic and transcendental equations, Bisection method and related examples,	CO-6	Online Lecture, Assignment , Tutorial
	Weeks 2	Regula-Falsi method and related examples, Newton Raphson method and related examples	CO-6	Online Lecture, Assignment , Tutorial
	Week 3	Solution of SLE using Gauss-Jacobi Method Solution of SLE using Gauss-Seidel method Largest Eigen value and corresponding eigen vector using power method	CO-6	Online Lecture, Assignment , Tutorial
Unit-III	Week 4	Numerical solution of ODE – Taylor's Method Numerical solution of ODE – Euler's Method Numerical solution of ODE – Improved Euler (Heun's) Method Numerical solution of ODE – RungeKutta Method of order four	CO-5	Online Lecture, Assignment , Tutorial
	Week 5	Understanding interpolation, finite differences (forward and backward), constructing forward, backward and central difference tables Interpolation with equal intervals – Newton forward interpolation Interpolation with equal intervals – Newton backward interpolation Interpolation with equal intervals – Stirling's formulae	CO-4	Online Lecture, Assignment , Tutorial
	Week-6	Interpolation with unequal intervals – Lagrange's interpolation Interpolation with unequal intervals – Newton's divided difference interpolation Numerical differentiation using Newton's forward and backward interpolation Related examples on numerical differentiation	CO-4	Online Lecture, Assignment , Tutorial
	Week-7	Numerical Integration –Trapezoidal rule Numerical Integration –Simpson's 1/3rd rule Numerical Integration –Simpson's 3/8th rule	CO-5	Online Lecture, Assignment , Tutorial

UNIT-I	Week-8	Introduction to Probability, types of Events, axioms, theorem.	CO-1	Online Lecture, Assignment , Tutorial
	Week-9	Conditional probability, characteristics of random variable.	CO-1	Online Lecture, Assignment , Tutorial
	Week-10	Discrete distributions: Binomial distribution, Poisson distribution	CO-2	Online Lecture, Assignment , Tutorial
	Week-11	Continuous distributions: Normal distribution	CO-2	Online Lecture, Assignment , Tutorial
UNIT - II	Week-12	Introduction and application of statistics, types of statistics	CO-3	Online Lecture, Assignment , Tutorial
	Week-13	testing of hypothesis**,** Mean, standard deviation	CO-3	Online Lecture, Assignment , Tutorial
	Week-14	coefficient of variation, F-test , t-test , Chi Square test	CO-3	Online Lecture, Assignment , Tutorial
	Week-15	Correlation and regression.	CO-3	Online Lecture, Assignment , Tutorial

Name of Institute: Institute of Engineering and Technology
Name of Faculty: Dr.(Prof.) Ashwin Patani

Course code: CE0320
Course name: Computer Organization & Architecture
Pre-requisites: Digital Logic and basic computer system
Credit points: 3
Offered Semester: 3

Course coordinator (weeks 01 – 12)
Full name: Ashwin Patani
Department with sitting location: 2nd floor EC lab-1
Email: ashwinpatani.ce@indusuni.ac.in
Consultation times: Monday to Friday, 4 PM to 5 PM

Course lecturer (weeks 01 - 12)
Full name: Ashwin Patani
Department with sitting location: 2nd floor EC lab-1
Email: ashwinpatani.ce@indusuni.ac.in
Consultation times: Monday to Friday, 4 PM to 5 PM

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objective

1. To conceptualize the basics of organizational and architectural issues of a digital computer.
2. To analyze performance issues in processor and memory design of a digital computer.
3. To understand various data transfer techniques in digital computer.
4. To analyze processor performance improvement using parallelism

Course Outcomes (CO)

After successful completion of the course, student will able:

1. To understand and describe the basics of various architectural units of the Computer System
2. To apply the knowledge of combinational and sequential logical circuits to mimic a simple computer architecture
3. To demonstrate the simulations for basic computer operations
4. To recognize the importance of parallelism in computer architecture
5. To undersatnd tha basic working of various memory system.

Course Outline

Introduction
Working Basic block of computer
Pipeline architecture
Various memory system.

Method of delivery:

Lecture and PPT

Study time

Students must attend three lectures per week.

CO-PO Mapping (PO: Program Outcomes)

Engineering Graduates will be able to:

- **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.
- **PO**6. **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 team work**: 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.

Mapping of CO with PO's

CO	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 10	PO1 11	PO1 12
1	√											
2	√		√	√	√							
3		√	√	√	√							
4		√	√	√	√							
5		√	√	√	√							

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

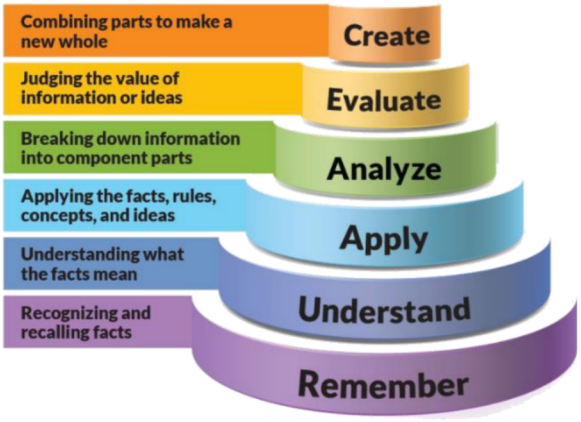

Figure 1: Blooms Taxonomy

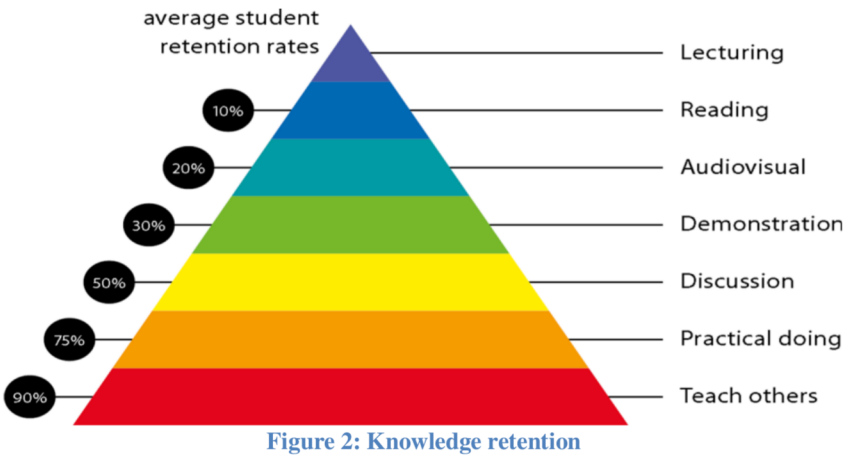

Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**1 Professional knowledge, grounding & awareness**
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, inquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing**
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	**4 Problem-solving skills**
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**5 Written communication** **6 Oral communication** **7 Teamwork**
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	**10 Sustainability, societal & environmental impact**

Practical work:

(Mention what practical work this Course involves)
There is not practical credit assign to the subject.

Lecture/tutorial times

(Give lecture times in the format below)

Example:

Lecture	Tuesday	Room LH 30
Lecture/Tutorial	Wednesday	Room LH 30

Attendance Requirements

The University norms state that it is the responsibility of students to attend all lectures, tutorials, seminars, and practical work as stipulated in the course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for semester examinations.

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Activity	Marks
Mid Sem Exam	20
Seminar	20
Assignment	20

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

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Do not copy the work of other students.
Do not share your work with other students (except where required for a group activity or assessment)

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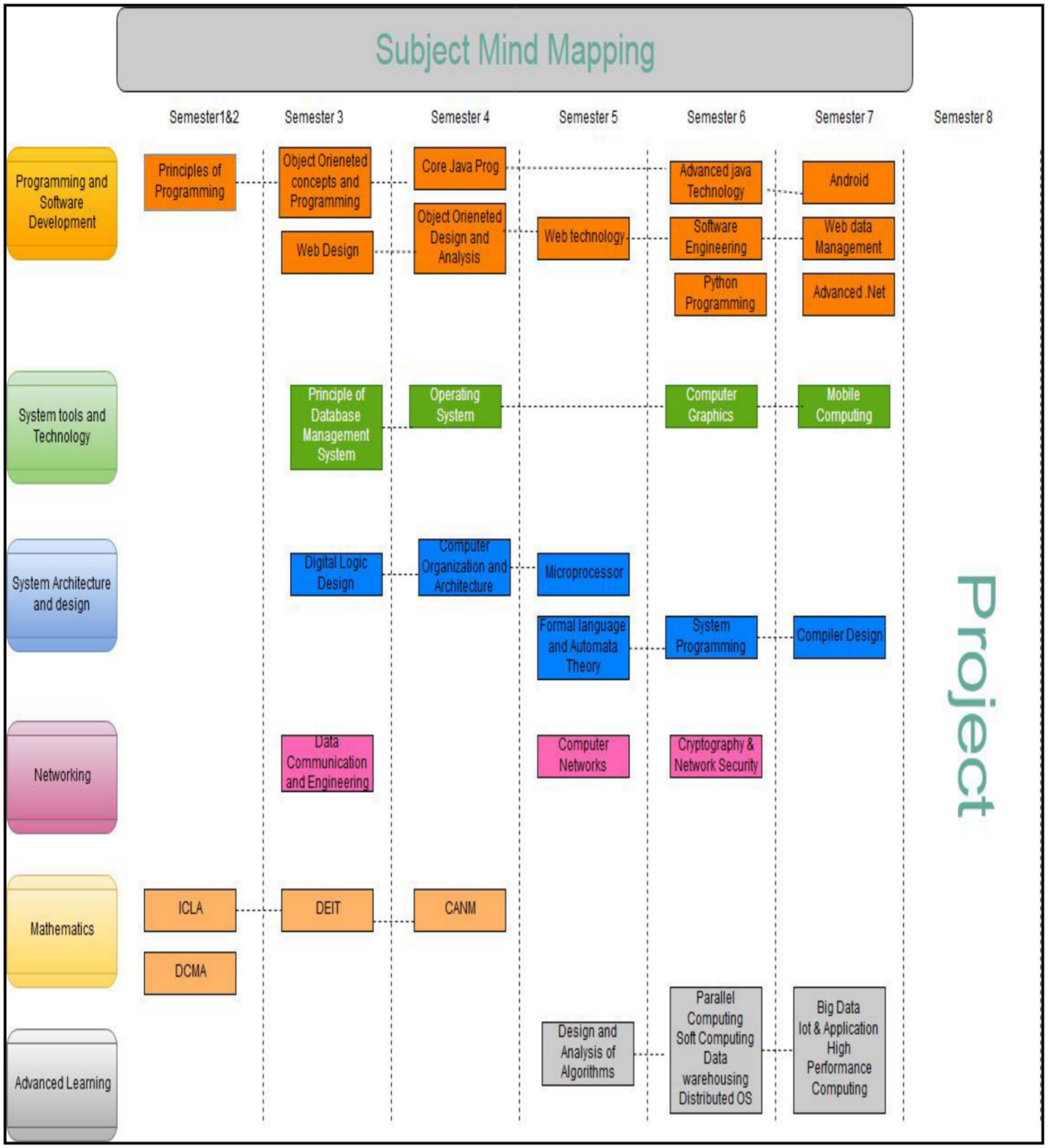
Course schedule(subject to change)

(Mention quiz, assignment submission, breaksetcas well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Overview of computer organization,CPU organization components, classification of computer architecture	1	Lectures
	Weeks 2	Register, types of register,Bus,types of bus,quantitative techniques in computer design,	1	Lectures
	Week 3	measuring and reporting performance,Amdahl's Law, number system,fixed point representation,floating point representation	*1*	Lectures
	Week 4	Instruction, instructionformat,instruction execution cycle, ISA, ISA design issue,types of ISA	1,2	Lectures,ppt
	Week 5	addressing mode,RISC, CISC	1,2	Lectures,Assignment,Case study
	Week 6	8085 microprocessors, Architecture, Operations of 8085,Instruction Set for 8085, Addressing Modes of 8085	*1,2*	Lectures, Case study
	Week 7	What is pipeline, Flynn's taxonomy for Parallel Processing,types of pipeline,	4	Lectures
	Week 8	measuring performance of pipeline,types of hazard, structuralhazard, datahazard, controlhazard	3,4	Lectures
	Week 9	method for avoiding hazard, Vector Processing, Array Processors	*3,4*	Lectures
	Week 10	Memory Hierarchy, types of memory, Main Memory, Auxiliary Memory,Inclusion, Coherence and locality properties	5	Lectures,ppt
	Week 11	Cache Memory	3,5	Lectures
	Week 12	Virtual Memory	3,5	Lectures, Assignment,Case study


Subject Mind Mapping
Semester1&2
Semester 3
Semester 4
Semester 5
Semester 6
Semester 7
Semester 8
Programming and Software Development
Principles of Programming
Object Orieneted concepts and Programming
Web Design
Core Java Prog
Object Orieneted Design and Analysis
Web technology
Advanced java Technology
Software Engineering
Python Programming
Android
Web data Management
Advanced .Net
System tools and Technology
Principle of Database Management System
Operating System
Computer Graphics
Mobile Computing
System Architecture and design
Digital Logic Design
Computer Organization and Architecture
Microprocessor
Formal language and Automata Theory
System Programming
Compiler Design
Networking
Data Communication and Engineering
Computer Networks
Cryptography & Network Security
Mathematics
ICLA
DCMA
DEIT
CANM
Advanced Learning
Design and Analysis of Algorithms
Parallel Computing
Soft Computing
Data warehousing
Distributed OS
Big Data
Iot & Application
High Performance Computing
Project

Name of Institute: Indus Institute of Technology and Engineering.

Name of Faculty: Prof. Ankur Changela

Course code: EC0319

Course name: Digital Electronics

Pre-requisites: Decimal, Binary Number, Mathematical Analysis
Credit points: 4
Offered Semester: 3

Course coordinator (weeks 01 - 15)
Full name: Prof. Ankur Changela
Department with siting location: C.E. –Instrument & Control Lab -1st Floor, Bhanwar Building
Telephone: 9662310133
Email: ankurchangela.ec@indusuni.ac.in
Consultation times: 2nd & 4th Saturday

Course lecturer (weeks 01 - 15)
Full name: Prof. Ankur Changela
Department with siting location: C.E. –Instrument & Control Lab -1st Floor, Bhanwar Building
Telephone: 9662310133
Email: ankurchangela.ce@indusuni.ac.in
Consultation times: 2nd & 4th Saturday

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives

By participating in and understanding all facets of this course a student will:

1) To prepare students to perform the analysis and design of various digital electronic circuits.
2) To explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra, Combinational & Sequential logic, state elements and finite state machine (FSMs).

Course Outcomes (CO)

After successful completion of this course, students will be able to

1) To recognize the various number systems to represent the given information in digital systems. [BT 2]
2) To apply the basic postulates and simplification techniques of Boolean algebra to simplify the complex Boolean expression. [BT 3]
3) To analyze and design the combinational circuits like code converters and adders using different gates. [BT-4,6]
4) To design the combinational circuit using programmable logic devices (PLDs). [BT 6]
5) To discuss the procedure to analyze clocked sequential circuits. [BT 2]
6) To analyze and design the various sequential circuit components like shift registers, counters, and FSMs. [BT 4,6]

Course Outline

UNIT-I

Number System:
Decimal, Binary, Octal, Hexadecimal number system, Conversion of numbers from one number system to other, complement method of addition, subtraction using 9's and 10's compliment method & 1's and 2's complement method.

Binary Codes:
Weighted and Non-weighted code, 8421 BCD code, XS-3 code, Gray code, Binary to Gray conversion, Gray to Binary conversion

Logic Gates & Boolean Algebra: AND, OR, NOT, NAND, NOR, X-OR, X-NOR, BUFFER, Axioms and laws of Boolean algebra, D'morgans theorem, Duality, Reduction of Boolean expression.

UNIT-II

Boolean Algebra - II & Simplification of Boolean Functions: Converting AND/OR/INVERT logic to NAND/NOR logic, POS and SOP expressions, Simplification of Boolean expression using Karnaugh Map for 2 to 5 variables, Don't care conditions and Tabulation method

Combinational Logic: Introduction, Design Procedure, Code Conversion, Multilevel NAND and NOR circuit

UNIT-III

Combinational Circuits with MSI & LSI

The Half-adder, The Full-adder, The Half-subtractor, The Full-Subtractor, Parallel Binary Adders, Binary Subtractor, Adder- Subtractor, BCD adder, Code converters, Parity bit Generators/Checkers, Comparators, Decoders, BCD to 7-Segment Decoders, Encoders, ,

Multiplexers, Applications of Multiplexer, De-multiplexers , Circuit implementation using PLDs (PLA, PAL)

Flip Flop:
S-R Flip-flop, JK Flip-flop, D Flip-flop, T Flip-flop, Master-slave Flip-flop, Conversion of Flip flop

UNIT-IV

Shift Registers, Counters & FSM Design

Shift Registers: Serial-in Serial-out Shift register, Serial-in Parallel-out Shift register, Parallel-in Serial-out Shift register, Parallel-in Parallel-out Shift register

Counters: Asynchronous counter, Design of Asynchronous counter, Synchronous counters, Design of Synchronous counter

FSM Design: State Diagram, State Table, State Assignment, Moore and Mealy Model

Method of delivery

Lectures, Power Point Slides, Tutorial, Quiz, Test, and Understanding of design techniques using simulations.

Study time

5 hours per week.

CO-PO Mapping (PO: Program Outcomes)

Program Outcomes (POs)

Engineering Graduates will be able to:

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 team work**: 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.

CO-PO Mapping (PO: Program Outcomes)

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

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

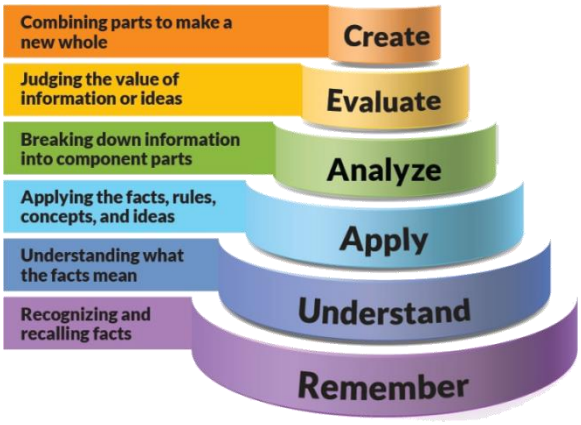


Figure 1: Blooms Taxonomy

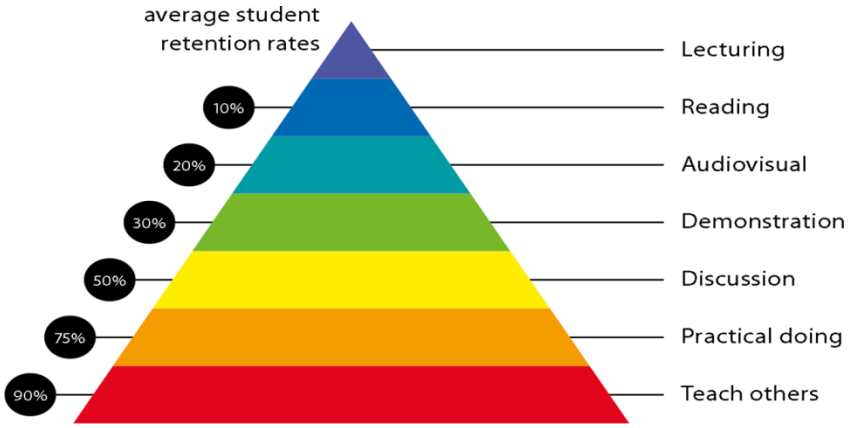


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____Graduate Capabilities
Informed	**1 Professional knowledge, grounding &**

Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**awareness**
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing**
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	**4 Problem solving skills**
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**5 Written communication** **6 Oral communication** **7 Teamwork**
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	**10 Sustainability, societal & environmental impact**

Practical work:

Lab Experiments & Outcome of Digital Logic Design Lab:

Outcome:

Upon successful completion of this course students should be able to:

1. Implementation for basic logic gates & digital Circuits using ICs.
2. Implementation & Analyze the operation of medium & high complexity standard combinational circuits like the encoder, decoder, multiplexer, de-multiplexer, adder, subtractor
3. Implementation &Analyze the operation of a flip-flop and examine relevant timing diagrams

4. Implementation & Analyze the operation of counters and shift registers
5. Design and operate practical digital logic circuits
6. Report findings and evaluate results.

List of Lab Experiment:

1. To Verify the Behavior of Logic Gates using Truth Table and Familiarization with Digital Integrated Circuits
2. Familiarization with the Different Portions of the Datasheet for a Digital IC and Using the Datasheet to Gather Relevant Information to Utilize the IC as a Component in another Digital Logic Circuit
3. Realization of basic gates using Universal Gates.
4. Verification of Demorgan's Theorem.
5. Implementation of Half Adder & Full Adder Circuits.
6. Implementation of Half Subtractor & Full Subtractor Circuits
7. Implementation of Code Converters using Basic Gates
8. Implementation of Multiplexes (4-1 MUX/8-1 MUX)
9. Implementation of Decoders (3-8 Decoder/4-16 decoder)
10. Realization of Flip-Flop using Gates.
11. Implementation of Shift Registers using Flip Flop. (Serial-in Serial-out Shift register, Serial-in Parallel-out Shift register, Parallel-in Serial-out Shift register, Parallel-in Parallel-out Shift register)
12. Implementation of Asynchronous Counters (4 bit Up/down)
13. Implementation of Synchronous Counters (4 bit Up/down)

Lecture/tutorial times

(Give lecture times in the format below)

Lecture	Tuesday	9:55 AM to10:50 AM
Lecture	Wednesday	9:00 AM to 9:55 AM
Lecture	Friday	1:30 PM to 2:25 PM
Lab (B1)	Monday	9:00 AM to10:50 AM
Lab (B2)	Friday	9:00 AM to10:50 AM

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the course outline. Minimum

attendance requirement as per university norms is compulsory for being eligible for semester examinations.

Details of referencing system to be used in written work

Text Books:

1) Morris Mano, "Digital Logic and Computer Design", Pearson , ISBN 13: 9788177584097

Reference Books:

1) Ronald J. Tocci, Gregory L. Moss, "Digital Systems", 10 Ed, Pearson, ISBN 9780135103821

2) D.C.Green, "Digital Electronics"5th Ed., Pearson, 2005, ISBN-9788177580686

Web Resources:

1) Digital Circuits & Systems (http://nptel.ac.in/courses/117106086/1)
2) Circuits and Electronics (https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/index.htm)

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Theory:
Assignment-1 (15 Marks)
Assignment-2 (15 Marks)
Mid Term (30 Marks)
ESE (40 Marks)

Practical:
Practical Performance + Lab manual (40 Marks)
Viva (20 Marks)
ESE (40 Marks)

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

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Do not copy the work of other students.
Do not share your work with other students (except where required for a group activity or assessment)

.

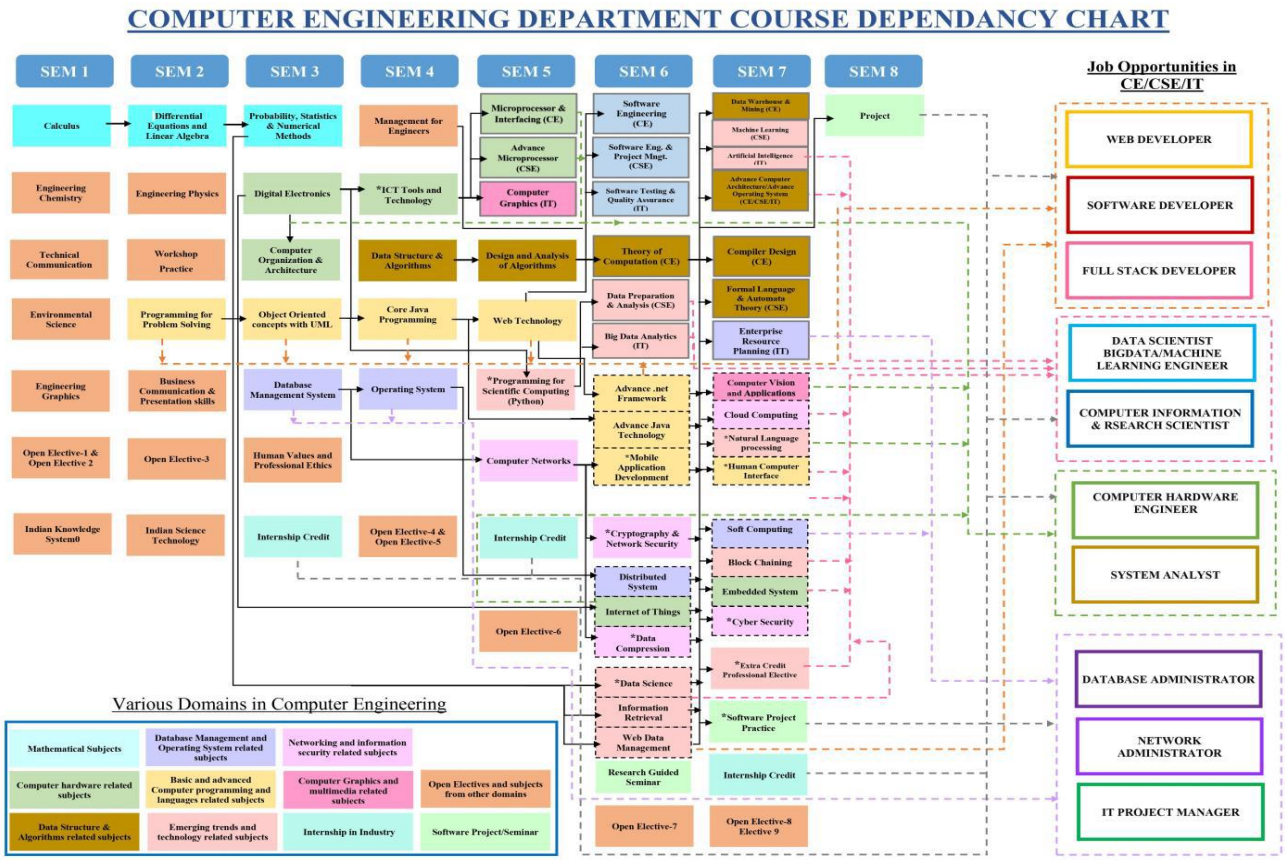
Course schedule (subject to change)

(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	**Number System:** Decimal, Binary, Octal, Hexadecimal number system, Conversion of numbers from one number system to oth	1,2	BB,PPT
	Weeks 2	complement method of addition ,subtraction using 9's and 10's compliment method & 1's and 2's complement method	1,2	BB,PPT
	Week 3	**Binary Codes:** Weighted and Non-weighted code, 8421 BCD code, XS-3 code, Gray code, Binary to Gray conversion, Gray to Binary conversion	1,2	BB,PPT
	Week 4	**Logic Gates & Boolean Algebra:** AND, OR, NOT, NAND, NOR, X-OR, X-NOR, BUFFER, Axioms and laws of Boolean algebra, D'morgans theorem, Duality, Reduction of Boolean expression.	1,2	BB,PPT
	Week 5	**Boolean Algebra - II & Simplification of Boolean Functions:** Converting AND/OR/INVERT logic to NAND/NOR logic , POS and SOP expressions	1,2,3	BB,PPT Quiz-1
	Week 6	Simplification of Boolean expression using Karnaugh Map for 2 to 5 variables, Don't care conditions and Tabulation method	2,3	BB,PPT Assignment-1 Submission
	Week 7	**Combinational Logic**: Introduction, Design Procedure, Code Conversion, Multilevel NAND and NOR circuit	3,4	BB,PPT
	Week 8	**Combinational Circuits with MSI & LSI** The Half-adder, The Full-adder, The	3,4	BB,PPT Assignment-2 Submission

		Half-subtractor, The Full-Subtractor, Parallel Binary Adders, Binary Subtractor, Adder- Subtractor, BCD adder, Code converters, Parity bit Generators/Checkers		
	Week 9	Comparators, Decoders, BCD to 7-Segment Decoders, Encoders, , Multiplexers, Applications of Multiplexer, Demultiplexers , Circuit implementation using PLDs (PLA, PAL)	2,3,4	BB,PPT
	Week 10	**Flip Flop :** S-R Flip-flop, JK Flip-flop, D Flip-flop, T Flip-flop, Master-slave Flip-flop,	3,4	BB,PPT
	Week 11	Conversion of Flip flop	3,4	BB,PPT
	Week 12	**Shift Registers:** Serial-in Serial-out Shift register, Serial-in Parallel-out Shift register, Parallel-in Serial-out Shift register, Parallel-in Parallel-out Shift register	4,5	BB,PPT
	Week 13	**Counters:** Asynchronous counter, Design of Asynchronous counter,	4,5	BB,PPT
	Week 14	Synchronous counters, Design of Synchronous counter	4,5	BB,PPT Assignment-3Submission
	Week 15	**FSM Design:** State Diagram, State Table, State Assignment, Moore and Mealy Model	4,5	BB,PPT

Program map for B.Tech (CE/CSE/IT)



Course code: CE0316

Course name: Object Oriented Programming with UML

Pre-requisites: -

Knowledge of C language will be useful.

Credit points: 4

Offered Semester: III

Course coordinator

Full name: Dhaval Patel

Department with sitting location: CE dept, 4th floor Bhanwar Building.

Telephone:

Email: dhavalpatel.ce@indusuni.ac.in

Consultation times: **Wednesday 4:00 PM to 5:00 PM**

Course Faculty

Full name: Dr. Seema Mahajan

Department with sitting location: CE dept, 3rd floor Bhanwar Building HOD Cabin.

Email: ce.hod@indusuni.ac.in

Consultation times: **Wednesday 4:00 PM to 5:00 PM**

Full name: Jignesh Patel

Department with sitting location: CE dept, 4th floor Bhanwar Building.

Email: jigneshpatel.ce@indusuni.ac.in

Consultation times: **Wednesday 4:00 PM to 5:00 PM**

Full name: Hiren Mer

Department with sitting location: CE dept, 4th floor Bhanwar Building.

Email: hirenmer.ce@indusuni.ac.in

Consultation times: **Wednesday 4:00 PM to 5:00 PM**

Full name: Dr. Yogesh Kumar

Department with sitting location: CE dept, 4th floor Bhanwar Building.

Email: yogeshkumar.ce@indusuni.ac.in

Consultation times: **Wednesday 4:00 PM to 5:00 PM**

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives

1. To learn the fundamental programming concepts and methodologies which are essential to building good C/C++ programs.
2. To write reusable modules,functions and classes as per Object Oriented Concepts.
3. To enhance employment of students, making good use of the object-oriented programming paradigm to simplify the design and implementation process
4. To encourage the practical problem solving skills.
5. To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language.

Course Outcomes (CO)

By participating and understanding all facets of this course a student will be able to:

1. Understand the difference between the top-down and bottom-up approach.
2. Describe the object-oriented programming approach in connection with C++.
3. Illustrate the process of data file manipulations using C++.
4. Apply the concepts of object-oriented programming.
5. Apply virtual and pure virtual function & complex programming situations.
6. Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates.

Course Outline

UNIT-I **[8 hours]**

INTRODUCTION TO C++

Concepts of OOP: Introduction OOP, Procedural Vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP C++Basics: Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures C++ Functions: Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments, friend functions

UNIT-II **[8 hours]**

Objects and classes

Basics of object and class in C++, Private, protected and public Members, static data and static function,

Constructors and their types, Destructors, Arrays & Strings: A standard C++ string class**.**

Operator Overloading: Overloading unary and binary operators, Operator Overloading with friend function, Data Conversion, type conversion, class to class, basic to class, class to basic

UNIT-III **[8 hours]**

Concept of Inheritance

Types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class, constructor in derived classes

Polymorphism: Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, implementing polymorphism

I/O management: Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators

UNIT-IV **[8 hours]**

File management:

File stream, C++ File stream classes, File management functions, File modes, Binary and random files

Object-oriented Design

Object modeling using UML, Three models, Class Model (Object and Class Diagram), State model (state Diagram) and Interaction model (Use case diagrams, Activity diagrams, Interaction diagrams).

Method of delivery

Chalk and Board, PowerPoint presentation

Study time

3 Hours theory, 2 Hours practical

CO-PO Mapping (PO: Program Outcomes)

	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO1 0	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	3	1	1	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-
CO6	3	3	2	-	-	-	-	-	-	-	-	-

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

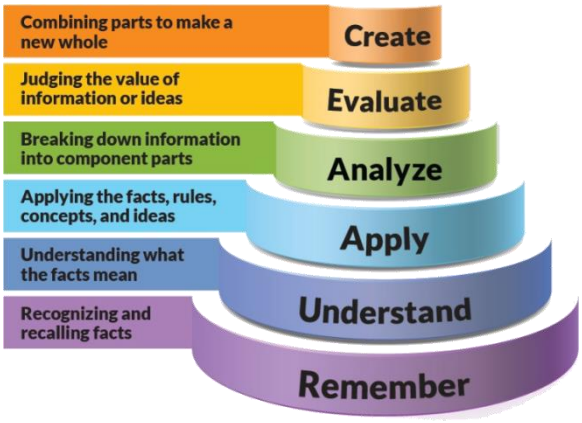


Figure 1: Blooms Taxonomy

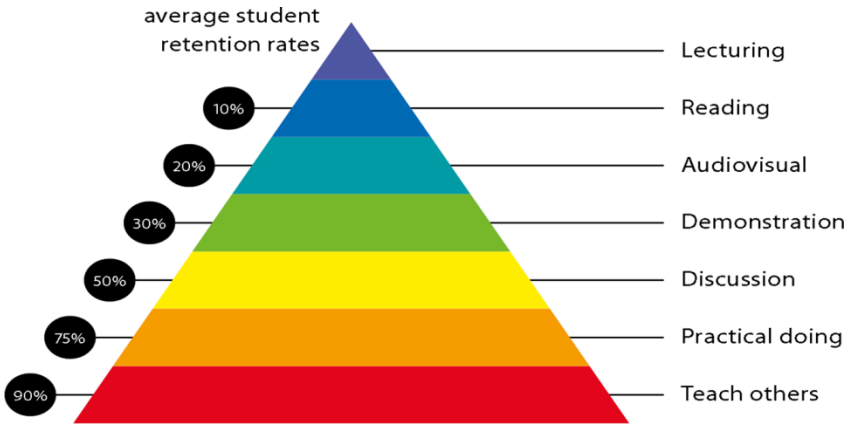


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**1 Professional knowledge, grounding & awareness**
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing**
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	**4 Problem solving skills**
Effective communicators	**5 Written communication**

Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**6 Oral communication** **7 Teamwork**
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	**10 Sustainability, societal & environmental impact**

Practical work:

1	Basics of programming	To understand how C++ improves C with object-oriented features.
2	2.1 Write a program to calculate the area of circle, rectangle and square using function overloading. 2.2 Write a program to demonstrate the use of default arguments in function overloading. 2.3 Write a program to demonstrate the use of returning a reference variable.	To learn how to overload functions and operators in C++.
3	3.1 Create a class student which stores the detail about roll no, name, marks of 5 subjects, i.e. science, Mathematics, English, C++. The class must have the following:• Get function to accept value of the data members.• Display function to display values of data members.• Total function to add marks of all 5 subjects and store it in the data members named total.	To learn how to design C++ classes for code reuse.

	3.2 Create a function power() to raise a number m to power n. the function takes a double value for m and int value for n, and returns the result correctly. Use the default value of 2 for n to make the function calculate squares when this argument is omitted. Write a main that gets the values of m and n from the user to test the function. 3.3 Write a basic program which shows the use of scope resolution operator. 3.4 Write a C++ program to swap the value of private data members from 2 different classes.	
4	4.1 Write a program to illustrate the use of this pointer. 4.2 An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case a number is read outside the range of 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballots. 4.3 Write a program to call member functions of class in the main function using pointer to object and pointer to member function.	To learn how to design C++ pointers
5	5.1 Using friend function find the maximum number from given two numbers from two different classes. Write all necessary functions and constructors for the program. 5.2 Using a friend function, find the average of three numbers from three different classes. Write all necessary member functions and constructor for the classes. 5.3 Define currency class which contains rupees and paisa as data members. Write a friend function named AddCurrency ( ) which add 2 different Currency objects and returns a Currency object. Write parameterized constructor to initialize the values and use appropriate functions to get the details from the user and display it. 5.4 Create Calendar class with day, month and year as data members. Include default and parameterized constructors to initialize a Calendar object with a valid date value. Define a function AddDays to add days to the Calendar object. Define a display function to show data in "dd/mm/yyyy" format.	To learn how to implement constructors and class member functions.

6	6.1 Create a class named 'String' with one data member of type char *, which stores a string. Include default, parameterized and copy constructor to initialize the data member. Write a program to test this class. 6.2 Write a base class named Employee and derive classes Male employee and Female Employee from it. Every employee has an id, name and a scale of salary. Make a function ComputePay (in hours) to compute the weekly payment of every employee. A male employee is paid on the number of days and hours he works. The female employee gets paid the wages for 40 hours a week, no matter what the actual hours are. Test this program to calculate the pay of employee. 6.3 Create a class called scheme with scheme_id, scheme_name, outgoing_rate, and message charge. Derive customer class form scheme and include cust_id, name and mobile_no data.Define necessary functions to read and display data. Create a menu driven program to read call and message information for a customer and display the detail bill.	To learn how to implement copy constructors and class member functions.
7	7.1 Write a program with use of inheritance: Define a class publisher that stores the name of the title. Derive twoclasses book and tape, which inherit publisher. Book class contains member data called page no and tape class contain time for playing. Define functions in the appropriate classes to get and print the details. 7.2 Create a class account that stores customer name, account no, types of account. From this derive classes cur_acc and sav_acc to include necessary member function to do the following:• Accepts deposit from customer and update balance• Compute and Deposit interest• Permit withdrawal and Update balance. 7.3 Write a base class named Employee and derive classes Male employee and Female Employee from it. Every employee has an id, name and a scale of salary. Make a function ComputePay (in hours) to compute the weekly payment of every employee. A male employee is paid on the number of days and hours he works. The female employee gets paid the wages for 40 hours a week, no matter what the actual hours are. Test this program to calculate the pay of employee.	To learn how containment and inheritance promote code reuse in C++.
8	8.1 Create a class vehicle which stores the vehicleno and chassisno as a member. Define another class for scooter, which inherits the data members of the class vehicle and has a data member for a storing wheels and company. Define another class for which inherits the data member of the	To learn how inheritance and virtual functions

	class vehicle and hasa data member for storing price and company. Display the data from derived class. Use virtual function. 8.2 Create a base class shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data() to initialize the base class data members and another member function display_area() to compute and display the area of figures. Make display_area() as a virtual function and redefine this function in the derived class to suit their requirements. 8.3 Write a program to demonstrate the use of pure virtual function. 8.4 For multiple inheritance, write a program to show the invocation of constructor and destructor. 8.5 Create a class string with character array as a data member and write a program to add two strings with use of operator overloading concept. 8.6 Create a class distance which contains feet and inch as a data member. Overhead = =, <and> operator for the same class. Create necessary functions and constructors too.	implement dynamic binding with polymorphism.
9	9.1 Create a class MARIX of size mxn. Overload + and –operators for addition and subtraction of the MATRIX. 9.2 Define a class Coord, which has x and y coordinates as its data members. Overload ++and –operators for the Coord class. Create both its prefix and postfix forms. 9.3 Create one class called Rupees, which has one member data to store amount in rupee and create another class called Paise which has member data to store amount in paise. Write a program to convert one amount to another amount with use of type conversion. 9.4 Create two classes Celsius and Fahrenheit to store temperature in terms of Celsius and Fahrenheit respectively. Include necessary functions to read and display the values. Define conversion mechanism to convert Celsius object to Fahrenheit object and vice versa. Show both types of conversions in main function.	To learn how to overload functions and operators in C++.
10	10.1 Write a program to create a function template for finding maximum value contained in an array.	To learn how to design and implement

	10.2 Write a program to create a class template for the 'Array' class. 10.3 Create a template for the bubble sort function. 10.4 Write a program to illustrate the use of insertion and extraction operators for Text mode Input/Output.	generic classes with C++ templates.
11	11.1 Write a program to illustrate the use of put(), get() and getline() functions for Text mode Input/Output. 11.2 Write a program to illustrate the use of read() and write() functions for Binary mode Input/Output. 11.3 Write a program to illustrate the use of manipulators in file handling.8.Write a program to illustrate the use of file pointer manipulation functions. 11.4 Write down a program to Copy source file 'source.txt' to destination file. 11.5 A file contains a list of telephone numbers in the following format: a) Ram 47890 b) Krishna 878787 c) ---------- d) ---------- The names contain only one word and the names and telephone numbers are separated by white space. Write a Program to read the tel.dat file and display the content. The names should be left justified and the number right-justified.	To learn how to design and implement files with C++.

Lecture/tutorial times

(Give lecture times in the format below)

Lecture	**3CS(A)**	**10:00 to 11:00**	**Tuesday**
Lecture	**3CS(A)**	**1:10 to 12:10**	**Monday**
Lecture	**3CS(A)**	**02:00 to 03:00**	**Tuesday**
Lab	**3CS(A1)**	**02:00 to 04:00**	**Monday**
Lab	**3CS(A2)**	**02:00 to 04:00**	**Wednesday**

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Text books

1. Object oriented Programming with C++ ,Balaguruswamy, Tata Mcgraw Hill Publication Co. Ltd 2000.
2. Object oriented programming in turbo C++ ,RobbetLofre, Galgotia Publication Pvt Ltd. 1994.

Reference Books:

1. The Complete Reference C++ , Fourth Edition , Herbert Schildt , Tata Mcgraw Hill Publication.
2. The C++ programming language , BjarneStroustrup ,Addison

Additional Materials

Web Resource

https://nptel.ac.in/courses/106105082/

https://nptel.ac.in/downloads/106105080/

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

CIE-Theory (60 Marks)	CIE-Practical (60 Marks)
M.S.E: 40 Marks	**Quiz : 20 Marks**
Assignment: 10 Marks	**Practical File: 20 Marks**
Class Regularity: 10 Marks	**Viva / Class Regularity/Attendance: 20 Marks**

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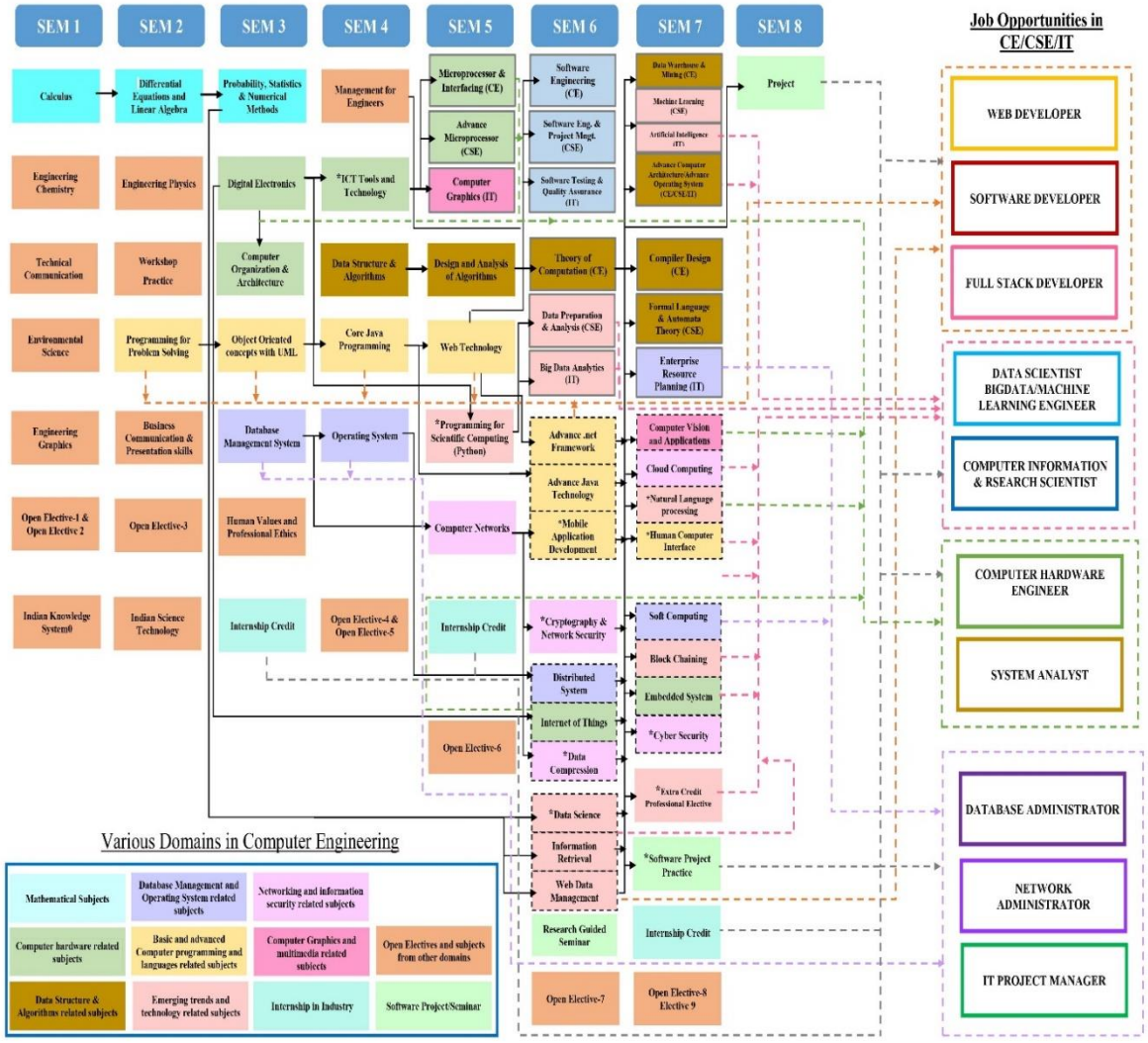
(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Week 1	Concepts of OOP: Introduction OOP, Procedural Vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP	**I**	Chalk & Board, Discussion
	Week 2	C++Basics: Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures C++ Functions: Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions	**I**	Presentation, Chalk & Board

	Week 3	Overloading of functions, default arguments, friend functions	**I**	Presentation, Chalk & Board
	Week 4	**Objects and classes:** Basics of object and class in C++, Private, protected and public Members,	**II**	Presentation, Chalk & Board
	Week 5	static data and static function, **Constructors and their types**, Destructors, Arrays & Strings: A standard C++ string class**.**	**II**	Presentation, Chalk & Board
	Week 6	**Operator Overloading**: Overloading unary and binary operators, Operator Overloading with friend function,	**II**	***Model presentation***
	Week 7	Data Conversion, type conversion, class to class, basic to class, class to basic	**II**	Presentation, Chalk & Board, Demonstration
	Week 8	Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members,	**II**	Presentation, Chalk & Board, Demonstration
	Week 9	overriding, virtual base class, constructor in derived classes	***III,V***	Presentation, Chalk & Board
	Week 10	**Polymorphism:** Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, implementing polymorphism	***III,V***	Presentation, Chalk & Board
	Week 11	**I/O management**: Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators	***IV,VI***	Presentation, Chalk & Board
	Week 12	**File management**: File stream, C++ File stream classes, File management functions, File modes, Binary and random files	III,V	Presentation, Chalk & Board
	Week 13	**Object-oriented Design**	IV	Presentation, Chalk & Board

		Object modeling using UML, Three models		
	Week 14	Class Model (Object and Class Diagram), State model (state Diagram) and Interaction model (Use case diagrams, Activity diagrams, Interaction diagrams).	IV	Presentation, Chalk & Board
	Week 15	Revision	IV	Presentation, Chalk & Board

COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART



Name of Institute: **INSTITUTE OF TECHNOLOGY & ENGINEERING**
Name of Faculty: **Prof. Sejal Thakkar.**

Course code: CE0317
Course name: **Database Management System**
Pre-requisites: NIL
Credit points: 4
Offered Semester: III

Course Coordinator
Full Name: Sejal Thakkar
Department with siting location: Computer Engineering (4rd floor,Faculty room, Bhanwar building)
Telephone: 9033380982,7990552332
Email: sejalthakkar.ce@indusuni.ac.in
Consultation times: Wednesday (4:00 PM to 5:00 PM)

Course Lecturer
Full Name: Prof. Roshni Patel
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Telephone: 8511109249
Email: roshnipatel.ce@indusuni.ac.in
Consultation times: Wednesday (4:00 PM to 5:00 PM)

Full name: Prof. Dhaval Patel (Dr.Yogesh Kumar)
Department with siting location: Computer Engineering (4th floor ,Faculty room, Bhanwar building)
Telephone:9429047579
Email: dhavalpatel.ce@indusuni.ac.in
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Full name: Prof. Gaurav Ameta
Department with siting location: Computer Engineering (4th floor ,Faculty room, Bhanwar building)
Telephone:9413664420
Email: gauravameta.ce@indusuni.ac.in
Consultation times: Wednesday (4:00 PM to 5:00 PM)

Full name: Prof. Devyani Jigyashu
Department with siting location: Computer Engineering (3rd floor ,Faculty room, Bhanwar building)
Telephone:9460154836
Email: divyanijigyasu.ce@indusuni.ac.in

Consultation times: Wednesday (4:00 PM to 5:00 PM)

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Objectives

By participating in and understanding all facets of this Course a student will:

1. To understand the overall structure and design of DBMS
2. To provide students with the background to design, implement, and use database Management systems.

Course Outcomes (CO)

After successful completion of the course, student will able:

1. Understand and evaluate the role of database management systems in information technology applications within organizations;
2. Recognize and use contemporary logical design methods and tools for databases;
3. Derive a physical design for a database from its logical design;
4. Implement a database solution to an information technology problem;
5. Understand the SQL data definition and SQL query languages;
6. Have been introduced to the alternative design techniques utilized for Management Reporting applications.
7. Develop sophisticated queries to extract information from large datasets.

Course Outline

Entity-Relationship model, SQL ,Transactions, Recovery

Method of delivery

1. Chalk & Talk
2. PPT presentation

Study time

3 lectures per week

2 hour labs per week

CO-PO Mapping (PO: Program Outcomes)

Course Outcome	Program Outcomes												Program Specific Outcomes		
	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	PSO 3
CO1	√			√							√		√		√
CO2	√	√		√							√			√	√
CO3	√	√			√		√							√	√
CO4	√	√		√	√		√								
CO5	√		√				√								
CO6						√							√		
CO7			√						√						

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

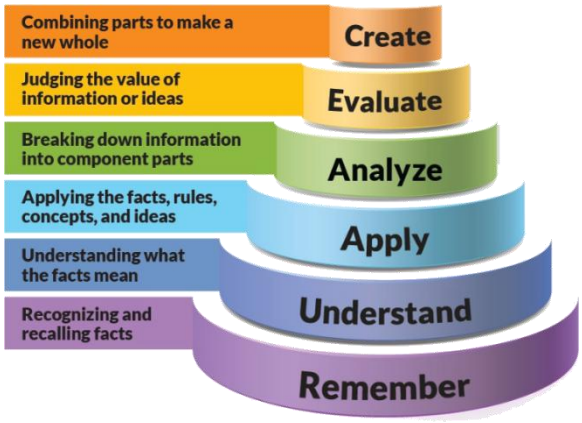

Figure 1: Blooms Taxonomy

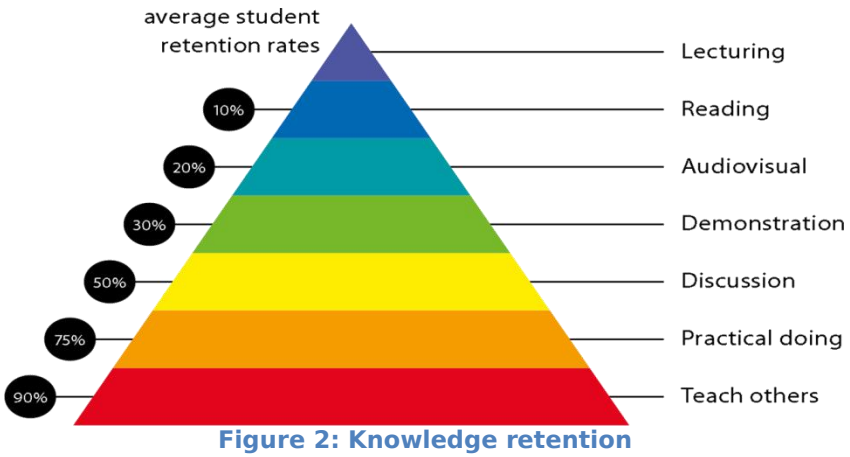

Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**1 Professional knowledge, grounding & awareness**
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing**
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	**4 Problem solving skills**
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**5 Written communication** **6 Oral communication** **7 Teamwork**
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	**10 Sustainability, societal & environmental impact**

Practical work:

(Mention what practical work this Course involves)
As a part of practical, student have to perform various database relevant activities like creating, updating, deleting and querying using the DBMS tools.

Lecture/tutorial times

(Give lecture times in the format below)

For 3 Sem IT A and B

Monday: 11 AM to 12 PM: Lecture
Monday: 2 PM to 4: 10 PM: Laboratory
Tuesday: 11:10 AM to 12:10 PM: Lecture
Wednesday: 11:10 AM to 12:10 PM: Lecture
Friday: 2 PM to 4:10 PM: Laboratory

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the Course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for mid and end semester examinations.

Details of referencing system to be used in written work

Text books

Text Book :

1. Database System Concepts, Abraham Silberschatz, Henry F. Korth & S.
Sudarshan, McGraw Hill.
2. SQL- PL/SQL by Ivan bayross

Additional Materials

Reference Book:

1. An introduction to Database Systems, C J Date, Addition-Wesley.
2. Understanding SQL by Martin Gruber, BPB

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Example:

Theory:

Internal evaluation 20% Objective (1-3-4)

05 marks as attendance bonus for all students having attendance > 80%

05 marks for presentation

10 marks for assignment or case studies, limited to minimum 02 assignments per course

Mid semester 40% (due week 10) Objectives (2-5)

Final exam (closed book) 40% Objectives (1-5)

Practical:

20% for performance/quiz

20% practical test +viva

20% for lab file, regularly and discipline

40% end semester practical exam +Viva

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in mid semester or end semester will be considered for supplementary assessment in the respective components (i.e mid semester or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (mid semester or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.
Do not share your work with other students (except where required for a group activity or assessment)

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Course schedule (subject to change)

(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Introduction: data, database, database management, database management system, application of database, why database, Data independence.	CO1	Chalk, Board & PPT
	Weeks 2	Architecture: The three levels of architecture-Levels, Mapping, Database users and DBA Brief overview of different types of model.	CO2	Chalk, Board & PPT
	Week 3	Entity-Relationship Model: Introduction, An overview of the E/R model, E/R diagrams, Database design with the E/R model, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema	CO4	Chalk, Board & PPT
	Week 4	Relational Model:Structure of relational databases, relational model, relations, relational integrity, Domains, Relational Algebra(fundamental and extended) and query.	CO3	Chalk, Board & PPT
	Week 5	Relation database design: Functional Dependency – definition, trivial and non-trivial FD, closure of FDset, closure of attributes, irreducible set of FD, Normalization – 1Nf, 2NF.	CO4	Chalk, Board & PPT

	Week 6	3NF, composition using FD-dependency preservation, BCNF, Multivalued dependency, 4NF, Join dependency and 5NF.	CO4	Chalk, Board & PPT
	Week 7	Transaction Management and Security: Transaction concepts, properties of transactions. Serializability of transactions, testing for serializability , System recovery.	CO5	Chalk, Board & PPT
	Week 8	Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems.	CO5	Chalk, Board & PPT
	Week 9	Locking mechanism, solution to concurrency related problems, deadlock, , two-phase locking protocol, Isolation, Intent locking.	CO5	Chalk, Board & PPT
	Week 10	Security: Introduction, Discretionary access control, Mandatory Access Control, Data Encryption.	CO5	Chalk, Board & PPT
	Week 11	SQL: Basics of SQL, DDL,DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries.	CO2	Chalk, Board & PPT
	Week 12	Join, Exist, Any, All , view and its types., transaction control commands. PL/SQL: Cursors, Stored Procedures, Stored Function, Database Triggers.	CO2	Chalk, Board & PPT

PROGRAM MAP for Bachelor of Engineering (CE / CSE / IT)

COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART