

Name of Institute: Indus Institute of Technology and Engineering Name of Faculty: Dr. Nimisha Patel, Ms. Aakansha Saxena, Dr. G. Prabu Kanna

Course code: CE0516

Course name: Design and Analysis of Algorithm

Pre-requisites: Programming C / C++, Data Structure and Algorithm

Credit points: 4

L T P C 3 0 2 4

Offered Semester: V

Course Coordinator (weeks 01 - 15)

Full Name: Dr. Nimisha P. Patel Department with sitting location: B203, 2nd Floor Bhanwar Building Telephone: 9979030162 Email: nimishapatel.ce@indusuni.ac.in Consultation times: 02.25 PM – 05:00 PM (Monday and Tuesday) 09.00 AM – 05.00 PM (Working Saturdays)

Course Lecturer (weeks 01 - 15)

Full Name: Ms. Aakansha Saxena

Department with sitting location: CE – Department, Staff Room - 3th Floor Bhanwar Building

Telephone: 7016668183

Email: aakanshasaxena.ce@indusuni.ac.in

Consultation times: 03.20 PM – 05:00 PM (Wednesday and Friday)



09.00 AM - 05.00 PM (Working Saturdays)

Course Lecturer (weeks 01 - 15)

Full Name: Dr. G. Prabu Khanna

Department with sitting location: CE – Department, Staff Room - 4^{th} Floor Bhanwar Building

Telephone: 9791802829

Email: gprabukanna.ce@indusuni.ac.in

Consultation times: 03.20 PM – 05:00 PM (Wednesday and Friday)

09.00 AM - 05.00 PM (Working Saturdays)

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

Course Objectives

- 1. To be able to analyze algorithms by working out complexity of algorithms.
- 2. To understand alternate methods of writing algorithms under various categories, such as Divide-and-Conquer, Dynamic Programming, Greedy Methods, Backtracking, Branch & Bound, etc.
- **3**. To understand the basics of P, NP, and NP Complete problems.
- 4. To develop skills in problem solving and programming

Course Outcomes (CO)

After successful completion of the course, student will able to:

- 1. Analyze the asymptotic performance of algorithms.
- 2. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
- 3. Find optimal solution by applying various methods.
- 4. Apply pattern matching algorithms to find particular pattern.
- 5. Differentiate polynomial and non-polynomial problems.

6. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate.



Course Outline

Unit-1

Basics of Algorithms and Mathematics:

What is an algorithm? Mathematics for Algorithmic Sets, Functions and Relations, Vectors and Matrices, Linear Inequalities and Linear Equations.

Analysis of Algorithm:

The efficient algorithm, Best, Average and Worst case analysis, Elementary operation, Asymptotic Notation, Analyzing control statement, Amortized analysis, Sorting Algorithm, Binary Tree Search.

Unit-2

Divide and Conquer Algorithm:

Introduction, Multiplying large Integers Problem, Problem Solving using divide and conquer algorithm - Binary Search, Sorting (Merge Sort, Quick Sort), Matrix Multiplication, Exponential.

Greedy Algorithm:

General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Activity selection problem, Elements of Greedy Strategy, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs: Shortest paths, The Knapsack Problem, Job Scheduling Problem.

Unit-3

Dynamic Programming:

Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient, Making Change Problem, Assembly Line-Scheduling, Knapsack problem, Shortest path, Matrix chain multiplication, Longest Common Subsequence.

Exploring Graphs:

An introduction using graphs and games, Undirected Graph, Directed Graph, Depth First Search, Breath First Search, Backtracking and Branch & Bound– The Knapsack Problem, The Eight Queens problem.

Unit-4

String Matching:

Introduction, The naive string matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata.

Introduction to NP-Completeness:

The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems.



Method of delivery

Online Lecture on Google Meet

Study time

Five Hours 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.
- **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.



- **PO10Communication:** 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.
- **PO11Project 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.

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

Mapping of CO with PO's

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)

Practical work:

Week	Class							
No.	Activity	List of Practical						
01	Lab 1	Implementation and Time analysis of linear and binary search algorithm.						
02	Lab 2	Implementation and Time analysis of sorting algorithms : Bubble sort, Selection sort and Quicksort						
03	Lab 3	Implementation and Time analysis of factorial program using iterative and recursive method.						
04	Lab 4	Implement Prim's algorithm						
05	Lab 5	Implement Kruskal's algorithm.						
06	Lab 6	Implementation of a knapsack problem using dynamic programming.						
07	Lab 7	Implementation of matrix chain multiplication using dynamic programming.						
08	Lab 8	Implementation of making a change problem using dynamic programming						
09	Lab 9	Implementation of Graph and Searching (DFS and BFS).						



10	Lab 10	Implement LCS problem.



Lecture/tutorial times

Example	?:
Dr Nimi	sha Patel
5 th CS A	: Tuesday: 10:00-11:00 AM
	Wednesday:9:00-10:00AM
	Friday:11:10-12:10 AM
5 th CS B	: Wednesday: 2:00-3:00 PM
	Thrusday:10:00-11:00AM
	Friday:10:00-11:00AM
Aakansh	na Saxena
5 th IT-A	&B: Monday: 9:00-10:00 AM
	Tuesday:10:00-11:00AM
	Wednesday:11:20-12:10 AM
5 th CE-A	& B: Wednesday: 9:00-10:00 AM
	Thrusday:10:00-11:00AM
	Friday:10:00-11:00AM

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

- 1. Fundamental of Algorithms by Gills Brassard, Paul Bratley.
- 2. Introduction to Design and Analysis of Algorithms, Anany Levitin, Pearson

Text books



1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, PHI.

Additional Materials

Lecture Notes, ppts

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Theory Criteria 60 Marks(Internal) + 40 Marks(External)	Practical Criteria:60 Marks(Internal) + 40 Marks(External)
Attendance: 05 Marks ,	Quiz: 15 Marks
Quiz: 05 Marks	Practical File Submission& Continuous Evaluation: 20 Marks
Assignment(Theory based Assignment): 10 Marks	Attendance: 10 Marks
Mid- Semester Exam :40 Marks	Assignment(Practical based Assignment): 15 Marks
End Semester Exam: 40 Marks	End Semester Practical Exam and Viva : 40 Marks

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 legible format with all information sources correctly referenced. Assignment material handed in throughout the session that is not 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)



Course schedule (subject to change)

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

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Week 1	BasicsofAlgorithmsandMathematics:What is an algorithm? Mathematics forAlgorithmicSets, FunctionsandRelations, Vectors and Matrices,	1,3	Concept Mapping Questioning
Week 2	Linear Inequalities and Linear Equations. Analysis of Algorithm: The efficient algorithm, Best, Average and Worst case analysis	1	
Week 3	Elementary operation, Asymptotic Notation, nalyzing control statement, Amortized analysis,	1,2	
Week 4	Sorting Algorithm, Binary Tree Search.	2,3	
Week 5	Divide and Conquer Algorithm: Introduction, Multiplying large Integers Problem, Problem Solving using divide and conquer algorithm	2,3	
Week 6	Binary Search, Sorting (Merge Sort, Quick Sort)Matrix Multiplication, Exponential.	3	



Week 7	Greedy Algorithm: General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Activity selection problem, Elements of Greedy Strategy,	3	
Week 8	Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs: Shortest paths, The Knapsack Problem, Job Scheduling Problem.	5	
Week 9	Dynamic Programming: Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient, Making Change Problem, Assembly Line- Scheduling	1,3	
Week 10	Knapsack problem, Shortest path, Matrix chain multiplication, Longest Common Subsequence.	3	
Week 11	Exploring Graphs: An introduction using graphs and games, Undirected Graph, Directed Graph, Depth First Search, Breath First Search	5	
Week 12	Backtracking and Branch & Bound– The Knapsack Problem, The Eight Queens problem	3	
Week 13	String Matching: Introduction, The naive string matching algorithm, The Rabin-Karp algorithm	3, 1	
Week 14	String Matching with finite automata. Introduction to NP-Completeness:	4,5	
Week 15	The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems.	5	



Week 16	Revision and Quiz	1,2,3,4	



Program Map for Bachelor of Engineering(CE/CS/IT)



COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART



Name of Institute: Institute of Technology & Engineering Name of Faculty: Asst Prof. Hinal Shah

Course code: CE0517 Course name: Microprocessor & Interfacing

Pre-requisites:

- Digital Electronics
- Microprocessor 8085

Credit points: 04

Offered Semester: V

Course coordinator (weeks 01 - 15)

Full name: Hinal Shah Department with siting location: EL,3rd floor, Bhawar Building Telephone: ext. 3335 Email: hinalshah.el@indusuni.ac.in Consultation times: 9:00 a.m. to 5:00 p.m.

Course lecturer (weeks 01 - 15)

Full name: Hinal Shah Department with siting location: EL,3rd floor, Bhawar Building Telephone: ext. 3335 Email: hinalshah.el@indusuni.ac.in Consultation times: 9:00 a.m. to 5:00 p.m.

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. Student will be able to describe the architecture of 8086 microprocessor.
- 2. Student will be able to understand interfacing of Memory chip with 8086 microprocessors.
- 3. Student will be able to understand interfacing of I/O devices with 8086 microprocessors.
- 4. To introduce MASM assembler for programming of Intel microprocessor.
- 5. Students will be able to understand the multiprocessing and multi programming environment



6. Student will be able to understand the use of various peripheral IC's such as 8255,8254,8237,8259.

Course Outcomes (CO)

- 1. Identify detailed S/W and H/W architecture of the microprocessor.[BT-4]
- 2. Understand and classify the instruction set of the 8086 microprocessor and distinguish the use of different instructions. [BT-2]
- 3. Solve & Compile assembly language programs for 8086 based systems.[BT-3]
- 4. Build system using 8086 microprocessor and peripherals[BT-4]
- 5. Develop a multi-tasking system using interrupt.[BT-5]
- 6. Understand the multiprocessing and multiprogramming environment.[BT-2]

Course Outline

In this course Microprocessor & Micro controller architecture and its application is discussed. In this course assembly and embedded c language are also introduce.

<u>UNIT-I</u>

[10 hours]

Introduction to 8086 Microprocessor

Introduction to 8086 Microprocessor, Bus Interface Unit (BIU), Execution Unit Pin Configuration of 8086, Pin Details of 8086, Memory Organization of 8086

8086 Based System

8086 Minimum Mode Configuration, Demultiplexing of the Multiplexed Buses, Transceiver 8286, Generation of Control Signals, Clock Generator 8284 and Driver, Interfacing of Memory in Minimum Mode, Maximum Mode Configuration of 8086, Bus Controller 8288, Memory Interface of a Maximum-Mode 8086 System, Bus Cycles of 8086, Minimum Mode Bus Cycles, Maximum mode bus cycles



<u>UNIT-II</u>

[10 hours]

Instruction set of 8086

Introduction, Addressing Modes of 8086, Data Addressing Modes, Address Addressing Modes, Instruction Format, Instruction Set of 8086, Data Transfer Instructions, Arithmetic Instructions, Logical Instructions, Shift and Rotate Instructions, String Instructions, Adjustment Instructions, Flag Related Instructions, Control Transfer Instructions, Processor-control Instructions

Assembler Directives

Introduction, Assembly Language, Assembly Language Program Development Tools, Editor, Assembler, Linker, Loader, Debugger, TASM Assembler, MASM Assembler, Assembler Directives, Data Defining Assembler Directives, Segment Defining Directives, Combining Segments, Managing Large Programs, Processor Directives, Initialization of Program Memory Models, Assembly language

<u>UNIT-III</u>

[10 hours]

Interrupts of 8086

Introduction, Advantages of Interrupts, Interrupt Systems, Single Line or Single Level Interrupt System, Multilevel or Multi Line Interrupt System, Classification of Interrupts, Interrupts of 8086, Interrupt Pointer Table, Dedicated Interrupts of 8086, Software Interrupts of 8086, Priority of Interrupts

Memory and I/O Interfacing

Introduction, I/O Devices and their interfacing, I/O addressing, Interfacing of Input Devices, Interfacing of output devices, Memory Interfacing, Address decoding, Interfacing circuit.

Programmable peripheral Interfacing chips

Introduction, Programmable peripheral Interfacing chip 8255, 8254 Programmable Timer

<u>UNIT-IV</u>

[10 hours]

Programmable peripheral Interfacing chips

8237 DMA Controller, 8259 Programmable Interrupt Controller, 8279 Display and Keyboard controller.

Multiprocessing and Multiprogramming



Introduction, 8086 based multiprocessing system, coprocessor configuration, closely coupled configuration, loosely coupled configuration, bus allocation schemes.

Method of delivery

Face to face lectures, Assignments, Quiz

Study time

3-hour lecture and 2-hour laboratory per week

	РО 1	PO 2	РО 3	РО 4	РО 5	РО 6	РО 7	РО 8	РО 9	PO 10	PO 11	PO 12
CO1	1	3	2	-	-	-	-	-	-	-	-	-
CO2	2	2	3	-	1	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	1	3	3	3	2	-	-	-	-	-	-	-
CO5	2	2	3	2	1	-	-	-	-	-	-	-
CO6	-	2	3	2	2	-	-	-	-	-	-	-
EL0517	1.6	2.5	2.8	2.3	1.5	-	-	-	-	-	-	-

CO-PO Mapping (PO: Program Outcomes)

1-Lightly Mapped 2- Moderately Mapped 3- Highly Mapped

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)







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	6 Oral communication
effectively using a range of media.	7 Teamwork
Work collaboratively and engage	/ Teamwork



with people in different settings.	
Recognize how culture can shape	
communication.	
Responsible	10 Sustainability, societal &
Understand how decisions can affect	environmental impact
others and make ethically informed	
choices. Appreciate and respect	
diversity. Act with integrity as part	
of local, national, global and	
professional communities.	
Recognize now culture can shape communication. 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. Introduction to 8086 Simulator, Assembler and debugger.
- 2. Assembly language programming based on data transfer and branch operation.
- 3. Assembly Level Programming based on Arithmetic operation.
- 4. Assembly level programming based on logical operations.
- 5. Assembly level programming based on data transfer & branch operations.
- 6. Simulate program based on code converter.
- 7. Assembly program based on specific operation.
- 8. Simulate the program based on string operation.
- 9. Simulate program based on interrupt operation
- 10. Simulate 8086 Program based interfacing

Lecture/tutorial times

(Give lecture times in the format below)

Lecture

Tuesday 12:20-1:20pm Thursday 9:00-10:00am Friday 9:00-10:00am

Lab

Monday 11:10-1:10pm, A2 Batch Tuesday 2:00 to 3:00 pm, Thursday 3:10-4:10pm, A1 Batch

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. Microprocessor 8086 Architecture, Programming and Interfacing- Sunil Mathur, PHI learning private limited.
- 2. 8086/8088 family: Design Programming and Interfacing: By John Uffenbeck (Pearson Education).
- 3. The 8088 And 8086 Microprocessors: Programming, Interfacing, Software, Hardware and Applications, Pearson Education India, Walter A Tribel, Avtar Singh

Additional Materials

1. 8086 Microprocessor Programming and Interfacing the PC: By Kenneth Ayala

Web Resource

https://nptel.ac.in/courses/108105102/59

MOOCS:

- 1. https://www.edx.org/
- 2. https://www.nptel.ac.in/
- 3. https://www.coursera.org/

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Mid semester (40 marks)Assignment (10 marks)Innovative/Project/Presentation/Attendance (10 marks)Final exam (closed book)(40 marks)Objectives (1-6)

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



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	Introductionto8086MicroprocessorIntroductionto8086Microprocessor,BusInterfaceUnit (BIU),ExecutionUnit PinConfigurationof8086,PinDetailsof8086,MemoryOrganizationof8086	1	BB
Weeks 2	8086 Based System8086MinimumMode8086MinimumModeConfiguration, DemultiplexingDemultiplexingoftheMultiplexedBuses,Transceiver8286,Generation of Control Signals,ClockGenerator8284andDriver,Same Solution	1	BB
Week 3	Interfacing of Memory in Minimum Mode, Maximum Mode Configuration of 8086 , Bus Controller 8288 ,Memory Interface of a Maximum-Mode 8086 System	1,2	BB
Week 4	Bus Cycles of 8086 , Minimum Mode Bus Cycles, Maximum mode bus cycles, Introduction, Addressing Modes of 8086	1,2	BB

			ज्ञानेन प्रकाशते जगत् INDUS UNIVERSITY
Week 5	Data Addressing Modes, Address Addressing Modes, Instruction Format, Instruction Set of 8086, Data Transfer Instructions, Arithmetic Instructions	2,3	BB
I			
Week 6	Logical Instructions, Shift and Rotate Instructions, String Instructions, Adjustment Instructions	2,3	BB
Week 7	Flag Related Instructions, Control Transfer Instructions, Processor-control Instructions Assembler Directives Introduction,Assembly Language,Assembly Language Program Development Tools, Editor, Assembler, Linker, Loader, Debugger	2,3	BB
Week 8	TASMAssembler,MASMAssembler,Assembler,AssemblerDirectives,DataDefiningAssemblerDirectives,SegmentDefiningDirectives,CombiningSegments,ManagingLargePrograms,ProcessorDirectives,InitializationofProgramMemoryModelsAssemblylanguageDirectives	1,2,3	BB
Week 9	Interrupts of 8086 Introduction, Advantages of Interrupts, Interrupt Systems, Single Line or Single Level Interrupt System, Multilevel or Multi Line Interrupt System	3,4	BB
Week 10	Classification of Interrupts, Interrupts of 8086, Interrupt Pointer Table, Dedicated Interrupts of 8086, Software	3,4	BB

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	Interrupts of 8086, Priority of Interrupts		
Week 11	Memory and I/O Interfacing Introduction, I/O Devices and their interfacing, I/O addressing, Interfacing of Input Devices, Interfacing of output devices, Memory Interfacing, Address decoding, Interfacing circuit.	4	BB
Week 12	Programmable peripheral Interfacing chips Introduction, Programmable peripheral Interfacing chip 8255, 8254 Programmable Timer	4	BB
Week 13	Programmable Interfacing chips8237DMAController,8259ProgrammableInterruptController,8279DisplayandKeyboardcontroller.	4	BB
Week 14	MultiprocessingandMultiprogrammingIntroduction, 8086 basedmultiprocessing system, co-	5,6	BB
	closely coupled configuration,		





COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART



Name of Institute: Indus Institute of Technology & Engineering Name of Faculty: Roshni Patel

Course code: CE0518

Course name: Computer Networks Pre-requisites: - Data Structure,Operating System Credit points: 4 Offered Semester: V

Course coordinator

Full name: Roshni Patel Department with siting location: Computer Engineering Dept.-4th Floor Bhawar Building faculty room Telephone: +91 8511109249 Email: roshnipatel.ce@indusuni.ac.in Consultation times: **Monday 9.30 am to 11:00 am**

Course lecturer

Full name: Madhvi Bera Department with siting location: Computer Engineering Dept.-4th Floor Bhawar Building Telephone: 9898891167 Email: madhvibera.ce@indusuni.ac.in Consultation times: Monday 3.30pm to 5:00pm Friday 03.30pm to 5.00pm

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

Course Objectives

- 1. Understands the significance and concepts of the layered model for computer networking.
- 2. Provides knowledge about computer network related hardware and software using a layered architecture.
- 3. Identify basic protocols and design issues for layered model.
- 4. Seeking employment that will allow use of troubleshooting and analysis skills.
- 5. The emphasis of the course will be developing skills in the concepts and the engineering trade-offs involved in the working of the network protocols.

Course Outcomes (CO)



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

- 1) Independently understand basic computer network technology.
- 2) Understand and explain Data Communications System and its components.
- 3) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- 4) Identify the different types of network devices and their functions within a network
- 5) Understand and building the skills of subnetting and routing mechanisms.
- 6) Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Outline

UNIT-I

[8 hours]

Introduction to Computer Networks

Basics of Data Communication System and its components, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless networks, Transmission media, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model

Data Link Layer:

Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data link protocols for noisy and noiseless channels, Sliding Window Protocols: Stop & Wait ARQ, Go-back-N ARQ, Selective repeat ARQ.

UNIT-II

[8 hours]

Medium Access Sub-Layer:

Static and dynamic channel allocation, Random Access: ALOHA, CSMA protocols, Controlled Access: Polling, Token Passing, IEEE 802.3 frame format, Manchester encoding, collision detection in 802.3, Binary exponential back off algorithm.

UNIT-III [8 hours] Network Layer:

Design issues, IPv4 classful and classless addressing, sub netting, Protocols: IP, ARP, RARP, ICMP, Routing algorithms: distance vector and link state routing , shortest path algorithm, Routing protocols :IGMP, OSPF, RIP, BGP, flooding

[8 hours]

Transport Layer:

Elements of transport protocols, introduction to TCP/UDP protocols and their comparison. The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms.

Application Layer:

Hyper Text Transfer Protocol (HTTP), Domain Name System (DNS), File Transfer Protocol (FTP), Dynamic Host Configure Protocol (DHCP)



Method of delivery

Chalk and Board, PowerPoint presentation, Model generation, demonstration of devices, cables

Study time

3 hrs theory, 2 Hrs practical

CO-PO Mapping (PO: Program Outcomes)

Cours e Outco	Program Outcomes								Program Specific Outcomes						
me	PO 1	PO 2	PO 3	PO 4	РО 5	РО 6	РО 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	\checkmark			\checkmark	\checkmark								\checkmark		\checkmark
2	\checkmark	\checkmark		\checkmark	\checkmark									\checkmark	\checkmark
3	\checkmark						\checkmark							\checkmark	\checkmark
4	\checkmark	\checkmark		\checkmark			\checkmark								
5	\checkmark		\checkmark				\checkmark								
6	\checkmark			\checkmark										\checkmark	\checkmark

Blooms Taxonomy and Knowledge retention (For reference) (Blooms taxonomy has been given for reference)



Figure 1: Blooms Taxonomy





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. 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.	1 Professional knowledge, grounding & awareness 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
effectively using a range of media.	7 Teamwork
Work collaboratively and engage	



Practical work:

1	To study different types of topologies.	Basic knowledge of different topologies
2	To study and implement different categories of networks.	Basic of knowledge of categories of network
3	To study different types of transmission media.	Basic knowledge of various medium
4	To compare OSI and TCP/IP protocol Model.	Compare Models
5	To demonstrate Networking and Internetworking devices (NIC, Switch, Hub, Router, Gateway, Repeater, Bridges, Cables)	Able to distinguish between different devices.
6	Write a program which demonstrates the concept of bit stuffing.	To implement bit stuffing
7	Write a program which demonstrates the concept of byte stuffing.	To implement byte stuffing
8	Write a program to demonstrate the concept of PARITY CHECKING.	To determine error in transmission
9	Write a program to demonstrate the concept of Error Detection Methods LRC,VRC.	To implement and find error.
10	Write a program to demonstrate the concept of Error Detection Method CRC.	To implement and find error.
11	Configuration of router in packet tracer using command line.	To configure router.
12	Configuration of router in packet tracer using Configuration terminal.	To configure router.
13	Simulation of RIP protocol in packet tracer.	To simulate protocols
14	Simulation of ARQ and RARQ protocol in packet tracer.	To simulate protocols



Lecture/tutorial times

(Online sessions)

CS-A		CS-B		
Lecture	Lab	Lecture	Lab	
Tue - 12:20 pm	E1-Wed - 2:00	Mon- 12:20 pm	E1- Mon - 2:00	
Thur - 9:00 am	pm E2-Fri- 2:00	Tue- 10:00 am	pm E2 - Wed-	
Fri - 10:00 am	pm	Wed - 10:00 am	11:10 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.

Text books

- 1. Data Communications and Networking, Fourth Edition by Behrouza A. Forouzan,TMH.
- 2. Computer Networks, A.S.Tanenbaum, 4th edition, Pearson education.

Reference Books:

- 1. Computer Network, Natalia Olifer, Victor Olifer, Wiley-India edition.
- 2. Data and computer communication, William Stallings, Pearson
- 3. Local area Networks by Peter Hudson

Additional Materials

Web Resource https://nptel.ac.in/courses/106105082/ https://nptel.ac.in/downloads/106105080/ https://www.youtube.com/watch?v=UXMIxCYZu8o https://youtu.be/pVI1L1jrbFE https://youtu.be/AmIOSGYkKXc



ASSESSMENT GUIDELINES

CIE-Theory (60 Marks)	CIE-Practical (60 Marks)
Midsem Marks- 40 Marks	Continuous Evaluation – 20
Attendance: 05 Marks	Marks
Assignment– 05 Marks	PracticalTest/Quiz/Viva- 20
Quiz/Presentation: 10 Marks	Marks
	Practical File: 20 Marks
ESE-Theory- 40 Marks	ESE-Practical-40 Marks
Total: 200 Marks	

Your final course mark will be calculated from the following:

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.

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	Basics of Data Communication System and its components, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, ,	Understand basic computer network technology.	
Weeks 2	Wireless networks, Transmission media, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model.	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.	
Week 3	Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data link protocols for noisy and noiseless channels,	Understand and explain Data Communicatio ns System	Quiz-1

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			and its	
			components.	
	Week 4	k 4 Static and dynamic channel allocation, Random Access:	Identify the	
			different	
		Controlled Access: Polling,	types of	
		Token Passing,	network	
			topologies	
			and protocols.	
	Week 5	IEEE 802.3 frame format,	Understand	Assignment-
		Manchester encoding, collision	and explain	1
		exponential back off algorithm.	Data	
			Communicatio	
			ns System	
		and its		
			components.	
	Week 6	Design issues, IPv4 classful and	Identify the	
	clas nett RAR	classless addressing, sub netting, Protocols: IP, ARP, RARP, ICMP	different	
			types of	
			network	
			devices and	
			their functions	
			within a	
			Network.	
	Week 7	Routing algorithms: distance	Identify the	
		shortest path algorithm,	different	
		Routing protocols :IGMP, OSPF,	types of	
		Kir, bar, nooung.	network	
			topologies	
			and protocols.	
	Week 8	Elements of transport	Enumerate	
		TCP/UDP protocols and their	the layers of	
		comparison. The TCP Service	the TCP/IP	
		Header, The Connection		

		i	ज्ञानेन प्रकाशते जगत् INDUS UNIVERSITY
	Establishment, The TCP Connection Release, The TCP Connection Management Modeling		
Week 9	The TCP Sliding Window Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms.	Enumerate the layers of the OSI model TCP/IP.	
Week 10	Hyper Text Transfer Protocol (HTTP),	Identify the different types of network protocols.	Quiz-2
Week 11	Domain Name System (DNS), File Transfer Protocol (FTP),	Identify the different types of network protocols.	
Week 12	Dynamic Host Configure Protocol (DHCP)	Identify the different types of network protocols.	


COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART

SEM 1	SEM 2	SEM 3 SEN	14 SEM 5		SEM 6		SEM 7	SEM 8		<u>Job Opportunities in</u> <u>CE/CSE/IT</u>
Calculus 🕂	Differential Equations and Linear Algebra	Probability, Statistics & Numerical Methods Methods	ent for sers Advance Microprocesso	• & E)	Software Engineering (CE) Software Eng. & Project Mngt.	-+ -+	Data Warehouse & Mining (CE) Machine Learning (CSE) Artificial Intelligence	Project		WEB DEVELOPER
Engineering Chemistry	Engineering Physics	Digital Electronics	ols and Computer Graphics (IT		(CSE) Software Testing & Quality Assurance (IT)	•	(TT) Advance Computer Architecture/Advance Operating System (CE/CSE/IT)		# 	SOFTWARE DEVELOPER
Technical Communication	Workshop Practice	Computer Organization & Algorit Architecture	ture & Design and Anal hms of Algorithm	ysis	Theory of Computation (CE)	•	Compiler Design (CE)			FULL STACK DEVELOPER
Environmental Science	Programming for Problem Solving	Object Oriented Core J	ava uning — Web Technolo	gy	Data Preparation & Analysis (CSE)	•	Automata Theory (CSE)			
Parkauka	Business		*Programming	for		-	Resource Planning (IT) Computer Vision			DATA SCIENTIST BIGDATA/MACHINE LEARNING ENGINEER
Engineering Graphics	Communication & Presentation skills	Management System	System Scientific Compu (Python)	ting ⁻ L	Advance .net Framework Advance Java		and Applications		,	COMPUTER INFORMATION & RSEARCH SCIENTIST
Open Elective-1 & Open Elective 2	Open Elective-3	Human Values and Professional Ethics	Computer Netw	orks	*Mobile Application Development	+	*Natural Language processing *Human Computer Interface	»		
Indian Knowledge System0	Indian Science Technology	Internship Credit Open Elec	tive-4 & III Internship Cro	dit H	*Cryptography &	-	Soft Computing		·	COMPUTER HARDWARE ENGINEER
					Distributed System	* *	Block Chaining Embedded System			SYSTEM ANALYST
			Open Elective	-6	Internet of Things *Data Compression		*Cyber Security	*	L.	
Vor	rique Domain	ng in Computer Enginee			*Data Science	+	*Extra Credit Professional Elective			DATABASE ADMINISTRATOR
<u>V (11</u>	Database Managen	nent and Networking and information	ing	t	Retrieval Web Data	╞╸	*Software Project Practice	 	>	NETWORK
Computer hardware related subjects	Basic and advar Computer program languages related s	nced ming and subjects	Open Electives and subjects from other domains		Research Guided Seminar		Internship Credit			ADMINISTRATOR
Data Structure & Algorithms related subjects	Emerging trend technology related	is and Internship in Industry	Software Project/Seminar		Open Elective-7		Open Elective-8 Elective 9			IT PROJECT MANAGER



Name of Institute: Indus Institute of Technology & Engineering Name of Faculty: Zalak Trivedi

Course code: CE0525 Course name: Programming for Scientific Computing (Python)

Pre-requisites: -Knowledge of Object Oriented language will be useful.

Credit points: 4 Offered Semester: V

Course coordinator

Full name: Zalak Trivedi
Department with sitting location: CE dept, 4th floor Bhanwar Building.
Telephone: Email: zalaktrivedi.ce@indusuni.ac.in
Consultation times:
Monday 11.55am to 2:00pm
Friday 01.30pm to 2.30pm

Course lecturer

Full name: Zalak Trivedi Department with sitting location: CE dept, 4th floor Bhanwar Building. Telephone: Email: zalaktrivedi.ce@indusuni.ac.in Consultation times: **Monday 11.55am to 2:00pm** Friday 01.30pm to 2.30pm

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

Course Objectives:

- 1. Importance of Python as scientific computing tool which directly leads to employability .
- 2. To learn how to design and develop Python applications.
- 3. Skill development to apply mutable and immutable types.
- 4. To learn how to design object-oriented concepts in python.
- 5. Development of GUI based applications for entrepreneurship.
- 6. To learn how to build and package Python modules for re usability.



Course Outcomes (CO)

At the end of this subject, students should be able to:

- 1. Work with the Python standard libraries
- 2. Implement mutability for various elements of python
- 3. Develop GUI based projects
- 4. Design Networking configuration for chatting applications
- 5. Implement Scientific Computing
- 6. Solve Real world problems using python programming

Course Outline

Basic elements of python, Branching, looping, Strings and Input, Iteration, Europians, Recursion, Clobal variables, Modules, Files, Structured Objects

UNIT-I

Functions, Recursion, Global variables, Modules, Files, Structured Objects, Mutability: Strings, Tuples, Lists, Sets, Dictionaries, ,Functions as Objects, Mutability and Higher-Order Functions.

UNIT-II

Object-Oriented Programming, Abstract Data Types and Classes, Encapsulation and Information Hiding, Simple Algorithms and Data structures, Regular Expressions – REs ,Networking, Multithreading in Python.

UNIT-III

[12 hours]

[12 hours]

[12 hours]

Array computing and curve plotting, vectors and higher-dimensional arrays, matrices, numPy, sciPy and Matplotlib, Plotting using PyLab, Chat Application, Graphics and GUI Programming – Drawing using Turtle, Tkinter.

UNIT-IV

[12 hours]

Python Pandas - Data alignment, aggregation, summarization, computation and analysis with Pandas. Scientific computation using python - Statistical data analysis, image processing, Basics of Web development(Introduction to frameworks flask, tensor flow).

Method of delivery

Chalk and Board, PowerPoint presentation

Study time

3 hrs theory, 2 Hrs practical



CO-PO Mapping (PO: Program Outcomes)

	PO	ΡΟ	PO1	PO1	PO1							
	1	2	3	4	5	6	7	8	9	0	1	2
CO 1	2	-	-	-	-	-	-	-	-	-	-	-
CO 2	3	1	1	-	-	-	-	-	-	-	-	-
CO 3	3	3	2	-	-	-	-	-	-	-	-	-
CO 4	2	1	-	-	-	-	-	-	-	-	-	-
CO 5	3	3	2	-	-	-	-	-	-	-	-	-
CO 6	3	3	2	-	-	-	-	-	-	-	-	-

Blooms Taxonomy and Knowledge retention (For reference) (Blooms taxonomy has been given for reference)





Graduate Qualities and Capabilities covered (Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of
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



1	Develop programs to understand the control structures of python Write a Python program to print the calendar of a given month and year. Write a Python program to calculate number of days between two dates. Write a Python program to check whether a specified value is contained in a group of values. <i>Test Data</i> : $3 \rightarrow [1, 5, 8, 3] : True$ $-1 \rightarrow [1, 5, 8, 3] : False$ Write a Python program to get OS name, platform and release information.	Basic knowledge of python Programming
2	<pre>Develop programs to learn different types of structures (list, dictionary, tuples) in python Write a Python program which accepts a sequence of comma-separated numbers from user and generate a list and a tuple with those numbers. Write a Python program to display the first and last colors from the following list.[orange, purple, red,yellow,blue] Write a Python program to concatenate all elements in a list into a string and return it. Write a Python program to print out a set containing all the colors from color_list_1 which are not present in color_list_2. Test Data : color_list_1 = set(["White", "Black", "Red"]) color_list_2 = set(["Red", "Green"]) Expected Output : {'Black', 'White'}</pre>	Basic knowledge of strings and operation on strings in python.
3	Write a Python script to print a dictionary where the keys are numbers between 1	Basic knowledge of Dictionaries
	and 15 (both included) and the values are	
	square of keys.	



	Sample Dictionary {1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64, 9: 81, 10: 100, 11: 121, 12: 144, 13: 169, 14: 196, 15: 225}	
4	Develop programs to learn concept of functions scoping, recursion and list mutability	Basic knowledge function
5	Develop programs to understand working of exception handling and assertions	Basic knowledge of exception and assertions
6	Develop programs for data structure algorithms using python – searching, sorting and hash tables	Basic knowledge of data structure
7	Develop programs to learn regular expressions using python	Basic principle of Regular Expressions
8	Develop chat room application using multithreading.	Basic knowledge of multithreading
9	Implement classical ciphers using python	Basic knowledge of encryption decryption.
10	Demonstration of Database Connectivity	Knowledge of database connectivity and basic framework
11	Practicals based on Numpy statistical analysis.	Knowledge of Numpy
12	Practicals based on Pandas.	Knowledge of Pandas

Lecture/Tutorial times

(Give lecture times in the format below)

Lecture	Monday	11.10 AM to 12.10 PM
Lecture	Tuesday	9.00 AM to 10.00 AM
Lecture	Wednesday	11.10 AM to 12.10 PM
Practical (A1)	Monday	2.00 PM to 4.10 PM
Practical (A2)	Tuesday	2.00 PM to 4.10 PM

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.

Reference Books:

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India

2. R. Nageswara Rao, "Core Python Programming", dreamtech

3. Wesley J. Chun. "Core Python Programming - Second Edition", Prentice Hall

4. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Pyhon", Wiley

5. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication



6. Luke Sneeringer, "Professional Python", Wrox7. "Hacking Secret Ciphers with Python", Al Sweigart, URLhttps://inventwithpython.com/hacking/chapters

Online Courses:

https://www.youtube.com/watch?v=N4mEzFDjqtA https://www.youtube.com/watch?v=hnxIRVZ0EyU https://www.youtube.com/watch?v=tKTZoB2Vjuk

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

CIE - Theory (60 Marks) Class Regularity- 05 Marks Class Test- 40 Marks Quiz/Assignment:15 Marks	CIE - Practical (60 Marks) Class Regularity - 05 Marks Lab Performance/Submission- 20 Marks Minor Project: 35 Marks
ESE-Theory- 40 Marks	ESE-Practical-40 Marks
Total: 200 Marks	Total: 200 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

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.

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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)
Week 1	Basic elements of python, Branching, looping, Strings and Input, Iteration	I	Chalk & Board, Discussion
Week 2	Functions, Recursion, Global variables	I	Presentation, Chalk & Board
Week 3	Modules, Files	I	Presentation, Chalk & Board
Week 4	Structured Objects, Mutability: Strings, Tuples, Lists, Sets, Dictionaries	II	Presentation, Chalk & Board
Week 5	Functions as Objects, Mutability and Higher-Order Functions	II	Presentation, Chalk & Board
Week 6	Object-Oriented Programming		Model presentation
Week 7	Abstract Data Types and Classes, Encapsulation and Information Hiding	II	Presentation, Chalk & Board, Demonstratio n

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Week 8	Simple Algorithms and Data structures	II	Presentation, Chalk & Board, Demonstratio n
Week 9	Regular Expressions – REs ,Networking, Multithreading in Python	11	Presentation, Chalk & Board
Week 10	Array computing and curve plotting	11	Presentation, Chalk & Board
Week 11	Vectors and higher-dimensional arrays, matrices, numPy, sciPy and Matplotlib, Plotting using PyLab	111	Presentation, Chalk & Board
Week 12	Chat Application, Graphics and GUI Programming – Drawing using Turtle, Tkinter	111	Presentation, Chalk & Board
Week 13	Python Pandas - Data alignment, aggregation, summarization, computation and analysis with Pandas	IV	Presentation, Chalk & Board
Week 14	Scientific computation using python - Statistical data analysis, image processing	VI	Presentation, Chalk & Board
Week 15	Basics of Web development(Introduction to frameworks flask, tensor flow)	VI	Presentation, Chalk & Board



Job Opportunities in <u>CE/CSE/IT</u> SEM 1 SEM 2 SEM 3 Software Engineering (CE) Microprocessor & Interfacing (CE) Project Management fo Engineers Differential Equations and Linear Algebra Calculus & N Machine Learnin (CSE) WEB DEVELOPER Software Eng. & Project Mngt. (CSE) Artificial Intelli *ICT Tools at Technology Engineering ngineering Physics Digital Electronics Software Testing & Quality Assurance Computer Graphics (IT) SOFTWARE DEVELOPER ----Technical Communication Workshop Practice Computer Organization & Architecture Compiler Des (CE) FULL STACK DEVELOPER IT. Data Preparation & Analysis (CSE) Environme Science Programming for Problem Solving Object Oriented concepts with UMI Web Technology Enterprise Resource Planning (IT) DATA SCIENTIST BIGDATA/MACHINE LEARNING ENGINEER Big Data Analytics (II) ŧ ŧ..... Computer Vision and Applications *Prog Scientif Business Communication & Presentation skills Database nagement System Engineering Graphics atific Con (Pythe Advance .net Framework eating Syste Ma Cloud Computing COMPUTER INFORMATION & RSEARCH SCIENTIST Advance Java Technology *Natural Langu processing Open Elective-1 & Open Elective 2 Open Elective-3 Human Values and Professional Ethics *Mobile Application Development Interface 1 COMPUTER HARDWARE ENGINEER *Cryptography & Network Scorify Distributed System Internet of Thing *Data Open Elective-4 & Open Elective-5 Indian Knowledge System0 Indian Science Technology Internship Credit Internship Cred L___ SYSTEM ANALYST *Cyber Security *Data Compression DATABASE ADMINISTRATOR Various Domains in Computer Engineering Information Retrieval Web Data Software Project Practice Database Management and Operating System related subjects Networking and information security related subjects Web Data Management NETWORK ADMINISTRATOR Research Guided Seminar Int hip Cro Basic and advanced Computer programming and languages related subjects Computer Graphics and multimedia related subjects Open Electives and subj from other domains r hardwa IT PROJECT MANAGER Open Elective-8 Elective 9 Emerging trends and technology related subjects Open Elective-7 Internship in Industry Software Pr

COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART



Name of Institute: Institute of Technology and Engineering

Name of Faculty: Mr.Jignesh Patel

Course code: CE0522

Course name: Web Technologies

Pre-requisites: Basics of HTML and computer functionalities Credit points: 4 Offered Semester: 5th

Course coordinator

Full name: Mr.Jignesh S Patel Department with sitting location: Computer Engineering Telephone: 3427 Email: <u>Jigneshpatel.ce@indusuni.ac.in</u> Consultation times: Monday to Thursday 3.10pm to 4.10pm Friday 3.00pm to 4.10pm

Course lecturer

Full name: Mr.Hiren V Mer and Mr.Jignesh s Patel Department with siting location: Computer Engineering Telephone: 3427 Email: <u>hirenmer.ce@indusuni.ac.in</u> jigneshpatel.ce@indusuni.ac.in

Consultation times: Monday to Thursday 3.10pm to 4.10pm Friday 11.10am to 4.10pm

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 and enrich students with knowledge, skills and practical experience on Client side scripting and mark up languages.
- 2. To introduce the concepts and techniques of problem solving through structured modular approaches.
- 3. To develop the ability to logically plan and develop web pages.
- 4. To empower members to create web applications that depends on the Model-View-Controller Architecture.
- 5. To enhance the skills of good programming style and discipline

Course Outcomes (CO)

After successful completion of the course, student will able to:

- 1. Gain the knowledge of www including browser and HTTP protocol.
- 2. Create dynamic web pages using a combination of HTML, CSS, and JavaScript, apply essential programming language concepts when creating HTML forms
- 3. Select an appropriate web hosting service, and publish your WebPages for the world to see
- 4. To build dynamic web pages with usage of server-side scripting PHP and MySQL
- 5. Apply the knowledge of JavaScript/jQuery Programming for interactive front-end web development
- 6. To provide employability skills such as write, test, and debug web pages using HTML and JavaScript.

Course Outline

(Key in topics to be dealt)

UNIT-I

Introduction:

Concept of WWW, Internet and WWW, URL, HTTP Protocol, Web browser and Web servers **HTML**:

Basics of HTML and Tags, Introduction to HTML5, Evolution of HTML5, HTML 5: Deprecated Tags and New Tags, Events, Forms, SVG, Web Storage, Canvas, Audio and Video

UNIT-II

CSS:

Basics of CSS, Introduction to CSS 3, CSS 3: Borders, Background, Text Effects, Fonts, Transformation, Transitions, Animations, Multiple Columns, User Interface, Introduction to Boot Strap with CSS.

Java Script:

Introduction of Java Script, Variables, Conditions, Looping, functions, Events, Cookies. Advance Java Script: Java Script Objects, Error Handling, Validation, Animation and Multimedia.

UNIT-III

Angular JS:

Introduction , MVC Architecture , Directives , Expression , Controllers , Filters , Tables, HTML DOM , Modules , Forms ,AJAX , Scope and Services

Node JS:

Introduction, Callback Concept, Event Driven Programming, Buffers, Streams, File System, Object, Modules and RESTFul API.

UNIT-IV

PHP:

Introduction, Basic Syntax, Variables, Constants, Decision Making, Looping, Arrays, Strings, Functions, Web Concepts, GET & POST, Cookies, Sessions. Advance Concept: Regular Expression, Exception Handling, Forms, Object Oriented Programming with PHP. **MY SQL :**

Introduction to PHP MyAdmin, Connection to MySQL server from PHP, execution of MySQL queries from PHP, receiving data from database server and processing it on web server using PHP. Web Hosting.

Subject-Web Technologies- CE0522, Semester: 5th (2021)



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Method of delivery

(Face to face lectures, self study material, Active Learning Techniques)

-Live screen sharing of practical

 $-\mathsf{PPT}$

-Project implementation

-Online Zoom/webex/Google meet Learning



Lecture	Tutorial	Practical	Credits		
3	0	2	4		

CO-PO Mapping (PO: Program Outcomes)

<u>CO</u>															
	P01	P02	P03	P04	P05	P06	POZ	P08	60d	P010	P011	P012	PS01	PS02	PSO3
1	$\overline{\checkmark}$	_ √	 √		$\overline{}$								 √	$\overline{\checkmark}$	
2	\checkmark	\checkmark			\checkmark								\checkmark	\checkmark	
<u>3</u>	\checkmark	\checkmark	\checkmark	\checkmark					\checkmark	\checkmark			\checkmark	\checkmark	
<u>4</u>		\checkmark	\checkmark		\checkmark				\checkmark		\checkmark			\checkmark	\checkmark
<u>5</u>			\checkmark	\checkmark	\checkmark				\checkmark		\checkmark			\checkmark	\checkmark
<u>6</u>	\checkmark	\checkmark	\checkmark	\checkmark					\checkmark	\checkmark			\checkmark	\checkmark	

Blooms Taxonomyand Knowledge retention(For reference)

(Blooms taxonomy has been given for reference)



Figure 1: Blooms Taxonomy





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:

(Mention what practical work this Course involves)

Experi	Title	Learning Outcomes
ment.		
No.		
	Introduction to web 3.0, website, web portal,	Learn the concepts of
1.1	domain name, networking concepts. Introduction	vved.
	to internet, hosting of website, server	
	configurations and maintenance	
1.2	Create a website layout using table structure	To study
	which consist of space/locations for Logo, Search,	implementation oftags
	News, Events, Content area, etc.	
1.3	Make resume with the help of Basic HTML Tags	To know various
		HTMLtags and its
		use.
1.4	Write HTML Code to display student registration form.	To learn
		HTML
		functionalitie
2.1	Use CSS in resume which was made using only HTMI	S Know the concents of
2.1	tags.	CSS
2.2	Write the following styles in separate CSS file and also	To study the link
	show how tolink this CSS file in HTML file.	between CSS and
		HTMI
	(a) The headings should have normal font style and	
	font size should be120%.	
	(b) Apply a background image "abcd ing" Write a	
	naragraph about it and define a class arial for	
	paragraph which defines font family	
	Write a Javascript code to build a calculator	To learn Javascrint
3.1		coding concepts and
3.2	Write a lavascript program to calculate area of triangle	To learn lavaccrint
5.2	and rectangle.	coding concepts and
		coungconcepts and

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		usages
3.3.	Write a Javascript to take 2 digit number and then	To learn Javascript
	separate this two digits then multiply first digit by itself	coding concepts and
	for second digit times.(Exa: 23,Output: 2 is multiply 3	usages
	times answer is: 8)	
4.1	Create a basic Book Directory Project using Nodejs and	To study
	APIS.	concepts of
		Nodejs and APIs
4.2	Using Angular JS features make a shopping list/To-do	To study
	list where you can add or remove items.	concepts of
		Angular JS
5.1	PHP based web application to understand data retrieval	To study concepts of
	on server side	serverside
		programming
5.2	Include, require, date functions in php.	To learn use of php
5.3	Develop PHP web application using session and cookie.	To learn use of php
5.4	Understand PHP MyAdmin.	To learn use of php
5.5	Implement php application to store employee	To learn use of php
	records in MySQLdatabase	with database

Text books

- 1. Developing Web Application, Ralph Moseley, Wiley India
- 2. Head First HTML with CSS & XHTML By Eric T Freeman, Elisabeth Freeman, Elisabeth Robson
- 3. Developing Web Applications in PHP and AJAX by Harwani, McGrawHill

Additional Materials

Class notes and assignment will be given to student in class room.



ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Theory [Total -100]	Practical [Total -100]
CIE Total :60	CIE Total 60
Mid Semester Exam: 40 Marks	Project with Viva :40
Attendance: 05 Marks	Marks Attendance:10
Quiz: 05 Marks	Marks Practical file :10
Assignment:10 Marks	Marks
ESE total: 40 Marks	ESE total 40 Marks



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)



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	Teaching Learning Activity (TLA)
Weeks 1	Concept of WWW, Internet and WWW, URL, HTTP Protocol, Web browser and Web servers	Chalk ,PPT,Onlinetool
Weeks 2	Basics of HTML and Tags, Table tag, list tags, form tags	Chalk ,PPT,Onlinetool
Week 3	Introduction to HTML5, Evolution of HTML5, HTML 5: Deprecated Tags and New Tags, Events, Forms, SVG, Web Storage, Canvas, Audio and Video	Chalk ,PPT,Onlinetool
Week 4	Basics of CSS, Introduction to CSS 3, CSS 3: Borders, Background, Text Effects, Fonts, Transformation,	Chalk ,PPT,Onlinetool
Week 5	Transitions , Animations , Multiple Columns , User Interface, Introduction to Boot Strap with CSS.	Chalk ,PPT,Onlinetool
Week 6	Introduction of Java Script, Variables, Conditions, Looping, functions, Events, Cookies.	Chalk ,PPT,Onlinetool
Week 7	Advance Java Script: Java Script Objects, Error Handling, Validation, Animation and Multimedia	Chalk ,PPT,Onlinetool
Week 8	Introduction , MVC Architecture , Directives , Expression , Controllers	Chalk ,PPT,Onlinetool
Week 9	Filters, Tables, HTML DOM, Modules, Forms, AJAX, Scope and Services	Chalk ,PPT,Onlinetool
Week 10	Introduction, Callback Concept, Event Driven Programming, Buffers, Streams	Chalk ,PPT,Onlinetool
Week 11	File System, Object, Modules and RESTFul API.	Chalk ,PPT,Onlinetool
Week 12	Introduction, Basic Syntax, Variables, Constants, Decision Making, Looping, Arrays, Strings,Functions, Web Concepts, GET & POST, Cookies, Sessions	Chalk ,PPT,Onlinetool
Week 13	Advance Concept: Regular Expression, Exception Handling, Forms, Object Oriented Programming with PHP.	Chalk ,PPT,Onlinetool
Week 14	Introduction to PHP MyAdmin, Connection to MySQL server from PHP, execution of MySQL queries from PHP, receiving data from database server and processing it on web server using PHP. Web Hosting.	Chalk ,PPT,Onlinetool



COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART





Name of Institute: IITE, Indus University Ahmedabad Name of Faculty: Dr. Gaurav Kumar Ameta

Course code: IT0501

Course name: Computer Graphics

Pre-requisites: Basic Programming Knowledge Credit points: 4 Offered Semester: 5th

Course Coordinator (weeks 12)

Full Name: Dr. Gaurav Kumar Ameta Department with sitting location: 4th floor Bhanvar Building Telephone: 9413664420 Email: gauravameta.ce@indusuni.ac.in Consultation times: 04:00PM to 05:00PM

Course Lecturer (weeks 12)

Full Name: Dr. Gaurav Kumar Ameta Department with sitting location: 4th floor Bhanvar Building Telephone: 9413664420 Email: gauravameta.ce@indusuni.ac.in Consultation times: 04:00PM to 05:00PM

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

Course Objectives

- 1. To understand various aspects of computer graphics for the student skill development.
- 2. To apply the working of basic drawing and rendering algorithms in 2D & 3D
- 3. To design and create various components in 2D and 3D.
- 4. To understand various aspects of computer visualization.
- 5. To understand and apply fundamental concepts within information visualization.
- 6. To understand and apply current trends of computer graphics in real scenarios for employability and entrepreneurship.

Course Outcomes (CO)

At the end of this subject, students should be able to:

- 1. List the basic concepts used in computer graphics.
- 2. Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.



- 3. Describe the importance of viewing and projections
- 4. Learn about surface detection in computer graphics.
- 5. Learn about how to render and create 2D and 3D objects.
- 6. Apply knowledge of computer graphics in real time scenarios.

Course Outline

This course will provide the insights to the various display techniques and display devices up till date. Both hardware and software techniques are included. Software techniques to put and paint of any shape is explained. Also all transformation techniques and advance topics of graphics are taught.

Method of delivery

Face to face lectures, Online Teaching, Study material, Active Learning Techniques

Study Time

3 Hours Theory+2 Hours Practical/Week

CO-PO Mapping (PO: Program Outcomes)

1 Program Outcomes (PO's)

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 modelling 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.

2. Programme Specific Outcome

Computer Engineering

- 1. To understand the principles and working of computer systems.
- 2. To Design and develop computer programs in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics.
- 3. Should able to understand the structure and development methodologies of software systems with the use of a various programming languages and open source platforms

<u>C</u>	<u>PO</u>	<u>PO</u>	<u>PO</u>	<u>PO4</u>	<u>PO</u>	<u>PO</u>	<u>PO</u>	<u>PO</u>	<u>PO</u>	<u>PO1</u>	<u>PO1</u>	<u>PO1</u>	<u>PSO</u>	<u>PSO</u>	<u>PSO</u>
<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>		<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>1</u>	<u>2</u>	<u>3</u>
<u>1</u>															
<u>2</u>		\checkmark											\checkmark	\checkmark	
<u>3</u>			\checkmark	\checkmark						\checkmark			\checkmark	\checkmark	
<u>4</u>		\checkmark													\checkmark
<u>5</u>				\checkmark											\checkmark
<u>6</u>															\checkmark

Blooms Taxonomyand Knowledge retention (For reference) (Blooms taxonomy has been given for reference)





Practical work:

Wk	Class	
No.	Activity	List of Practical
01	Lab 1	To study the various graphics commands in 'C' language.
02	Lab 2	Develop a drawing using various graphics commands in 'C' language
03	Lab 3	Develop the DDA Line drawing algorithm using 'C' language
04	Lab 4	Develop the Bresenham's Line drawing algorithm using 'C' language
05	Lab 5	Develop the Bresenham's Circle drawing algorithm using 'C' language
06	Lab 6	Implement Boundary-Fill algorithm to fill a polygon.
07	Lab 7	Implement Flood-Fill algorithm to fill a polygon.
08	Lab 8	Implement algorithm for Character generation
09	Lab 9	Implement Cohen-Sutherland line clipping algorithm.
10	Lab 10	Introduction to OpenGL
10	Lab 10	Basics of OpenGL



11	Lab 11	Generate a small graphical application based program in 'C' Language.						
	Practical Beyond syllabus							
12	Lab 12	Write a program for Character Generation using 'C' Language.						
12	Lab 12	Write a program for moving object using 'C' Language						

Lecture/tutorial times

Tuesday: 09:00AM to 10:00AM Thursday: 10:00AM to 11:00AM Friday: 09:00AM to 10:00AM Wednesday: 02:00PM to 04:10PM (Lab A2 Batch) Friday: 02:00PM to 04:10PM (Lab A1 Batch)

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 Books

1. Donald Hearn and M. Pauline Baker, Computer Graphics- C Version, PHI/Pearson Education

Reference Books

1. J. D. Foley, S. K Feiner, A Van Dam F. H John, Computer Graphics: Principles & Practice in C, Pearson Education

Additional Materials

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Theory:	Practical:
Mid Sem [40 Marks]	Practical performance +regularity in Lab+ Manual [30 Marks]
MCQ based Quiz/ Assignment [5 Marks]	Quiz [10 Marks]
Attendance, Class Attention ,Regularity & Discipline	
[15Marks]	Practical Test + Viva[20 marks]

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)



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)
Week 1	Basic of Computer Graphics, Applications of computer graphics,	1	Chalk & BB/ Online Teaching
Week 2	Display devices, Random and Raster scan systems	1	Chalk & BB/ Online Teaching
Week 3	Graphics input devices, Graphics software and standards, Points, lines drawing	1	Chalk & BB/ Online Teaching
Week 4	Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill	1,2	Chalk & BB/ Online Teaching
Week 5	Character generation, line attributes, area-fill attributes, character attributes, Transformations (translation, rotation, scaling).	1,2	Chalk & BB/ Online Teaching
Week 6	Matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to- viewport transformation	2,3	Chalk & BB/ Online Teaching
Week 7	Clipping including Point clipping, Line clipping (Cohen-Sutherland, Liang- Barsky, NLN), Polygon clipping	2,3	Chalk & BB/ Online Teaching
Week 8	3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations	2,3,5	Chalk & BB/ Online Teaching
Week 9	3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces,	5,6	Chalk & BB/ Online Teaching
Week 10	Spline representation, cubic spline interpolation methods, Bezier curves and surfaces, B-spline curves and surfaces	5,6	Chalk & BB/ Online Teaching

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Week 11	Visible surface detection concepts, back- face detection, depth buffer method, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection),	4	Chalk & BB/ Online Teaching
Week 12	Color models: properties of light, XYZ, RGB, YIQ and CMY color models. The OpenGL API, Primitives and attributes	6	Chalk & BB



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



COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART



Name of Institute: Indus Institute of Technology & Engineering Name of Faculty: Mr. Abhishek N Vaghela

Course code: CS0501 Course name: Advance Microprocessor Pre-requisites: Computer Organization

Credit points: 4 Offered Semester: 5

Course Coordinator (weeks 12)

Full Name: Abhishek N Vaghela Department with siting location: B-225 Signal Processing and Simulation Lab , 2nd Floor Telephone: 3204 Email: abhishekvaghela.ec@indusuni.ac.in Consultation times: 4:00 PM to 5:00 PM

Course Lecturer (weeks 12)

Full Name: Abhishek N Vaghela Department with siting location: B-225 Signal Processing and Simulation Lab, 2nd Floor Telephone: 3204 Email: abhishekvaghela.ec@indusuni.ac.in Consultation times: 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 basic architecture of 16 bit and 32 bit microprocessors.
- 2) To understand the interfacing of a 16-bit microprocessor with memory and peripheral chips involving system design.
- 3) To introduce MASM assembler for programming of Intel microprocessor.
- 4) To learn the architectural features of the 80286/386/486 processors.
- 5) The technical overview of the Pentium family,
- 6) Student will be able to understand the concept of interrupt and polling.

Course Outcomes (CO)

At the end of the course, students should be able to

- 1) Explain the hardware architecture of 8088/86 microprocessors and treat these microprocessors as a component for an electronic system rather than as the basis of a personal computer.
- 2) Explain how each assembly language instruction functions with the Intel family of microprocessors.
- 3) Write Assembly language programs using MASM assembler.
- 4) Student will be able to interface 8086 with memory and I/O devices
- 5) Understand the architecture of Pentium processors.
- 6) Able to write multitasking programs for 8086 microprocessor.

Course Outline

Introduction to 8086

Introduction, The 8086 Microprocessor, Real Mode Memory Addressing, Memory organization of 8086

Instruction set of 8086

Addressing modes, Instruction format, and Instruction set

<u>UNIT-II</u>

CONTENTS UNIT-I

Assembly Language

Assembly Language, Assembly Language Program Development tools, MASM Assembler, Assembler Directives, Programming of 8086

8086 Hardware Specification

8086 Pin Descriptions, Clock Generator, Minimum mode and Maximum Mode operations, Memory Interfacing with 8086 Address decoding, Introduction to basic I/O Interface, I/O port address decoding

UNIT-III

Interrupts of 8086

Advantage of Interrupts, Interrupt Systems, Classification of Interrupts, Interrupts of 8086, Interrupt Pointer Table

80186 and 80286 Microprocessor

Intel 80186 Microprocessor, Internal Block diagram of 80186, Pin configuration of 80186, Microprocessor 80286, Architecture of 80286, Pin description of 80286, Registers of 80286, Memory organization and segmentation, Memory operating modes Protected Virtual address mode, Local and Global descriptor table, Multitasking in 80286, Privilege level

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[12 hours]

[12 hours]

[12 hours]



<u>UNIT-IV</u>

80386 and 80486 Microprocessor

Microprocessor 80386, Architecture of 80386, Signal Descriptions of 80386, Modes of Operation, Register Organization of 80386, Addressing modes, Memory Organization and memory Management unit of 80386, Global and Local Descriptors table, Paging, Virtual 8086 mode of 80386, Memory Protection, Microprocessor 80486, Pin Configuration of 80486, Eflag Register of 80486, Memory organization of 80486, Memory Management of 80486, Interrupt and Exceptions of 80386 and 80486

Pentium, Pentium Pro, Pentium II, Pentium III, Pentium IV and Core2 microprocessors:

Introduction to Pentium microprocessor, Special Pentium registers, Basic and additional features of Pentium Pro Pentium II, Pentium III, Pentium IV and Core2 microprocessors.

Text Books:

- 1. The 8088 and 8086 Microprocessors, Programming, Interfacing, Software, Hardware and Applications, Fourth Edition, By Walter A Triebel and Avtar Singh, Pearson Education, ISBN 13: 9780130930811
- 2. Microprocessor 8086: Architecture, Programming and Interfacing, PHI Publication 2011, BY Sunil Mathur, ISBN: 9788120340879

Reference Books:

- 1. The x86 Microprocessors: 8086 to Pentium, Multicores, Atom and the 8051 Microcontroller: Architecture, Programming and Interfacing, 2/e, Pearson Education, Lyla B Das, ISBN 13: 9789332536821
- The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit Extensions, 8th Edition, Barry B. Brey, Pearson Education, ISBN 13: 9780139954085
- 3. Microprocessors and Interfacing by Douglas V Hall Revised Second Edition, McGraw Hill Publication, ISBN 13: 9781259006159

Web Resources

Microprocessors & Microcontrollers (http://nptel.ac.in/downloads/106108100/)

Method of delivery

Online Lectures, PPT, Presentations

Study time

3 Hour's theory and 2 Hour's Practical session per week

CO-PO Mapping (PO: Program Outcomes)

Program Outcomes (POs)

Engineering Graduates will be able to:

[12 hours]



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	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C0 1	3	2	1	2	1	-	-	-	-	-	-	-
C0 2	2	3	2	2	2	-	-	-	-	-	-	-
C0 3	3	2	3	2	1	1	-	-	-	-	-	-
C0 4	2	3	2	2	2	1	-	-	-	-	-	-
C0 5	1	2	3	2	2	2	-	-	-	-	-	1
C0 6	3	1	2	1	2	2	-	-	-	-	-	2



Blooms Taxonomy and Knowledge retention (For reference) (Blooms taxonomy has been given for reference)



Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of CSE 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.	2 Information literacy, gathering & processing


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

Practical work:

LIST OF EXPERIMENTS

No.	Title	Learning Outcomes	
1	Introduction to MASM.	Understand the MASM software	
2	Programming based on block data transfer.	Able to use data transfer instructions in programs.	
3	Programming based on Arithmetic and Logical operations.	Able to use Arithmetic and logical instructions in programs.	
4	Programming based on Code Conversion.	Able to convert data in one code format to another. (BCD to ASCII)	
5	Programming based on Sorting of An Array of Numbers.	Able to write sorting program.	
6	Programming based on Bit Manipulations.	Able to use bit manipulation instructions in program.	
7	Programming based on String Operations.	Able to use string related instructions in program.	
8	Programming Based on Displaying string on Console using DOS interrupts.	Able to use DOS console to display program output.	



Lecture/tutorial times (Give lecture times in the format below)

<i>Example:</i> Lecture Lecture Lecture	Monday Thursday Friday	12.20 PM – 01.20 PM 10:00 AM – 11:00 AM 09:00 AM – 10:00 AM	Online Online Online
Practical's	Monday	2:00 PM – 4:10 PM (A2 Batch)	Online
	Thursday	2:00 PM – 4:10 PM (A1 Batch)	Online

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

1. The 8088 and 8086 Microprocessors, Programming, Interfacing, Software, Hardware and Applications, Fourth Edition, By Walter A Triebel and Avtar Singh, Pearson Education, ISBN13:9780130930811

2. Microprocessor 8086: Architecture, Programming and Interfacing, PHI Publication 2011, BY Sunil Mathur, ISBN: 9788120340879

Additional Materials

1. Microprocoessors and Microcontrollers https://nptel.ac.in/courses/108107029/



ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Example:

Quiz 1 Seminar/Assignment Mid semester Final exam

 10% (week 4)
 Objective (1-3)

 10% (Week 5-6)
 Objective(1-4)

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

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

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)



Course schedule (subject to change)

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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)
	Weeks 1	Introduction to 8086 Microprocessor, Real mode Addressing	1	PPT
	Weeks 2	8086 Internal architecture, programming model	2,4	PPT
	Week 3	Pin functions of 8086, Minimum mode and Maximum mode	2,4	PPT
	Week 4	Timing diagram of minimum mode and maximum mode, Memory banks in 8086	1,2	PPT
	Week 5	Addressing modes of 8086, Data Transfer Instructions, Arithmetic Instructions	2,3	PPT
	Week 6	Branching Instructions, String Instructions, MASM directives	3	PPT
	Week 7	Memory Interfacing and I/O Interfacing	3	PPT
	Week 8	Interrupts of 8086, Intel 80186 architecture, Pin Configuration	1,2,3	PPT
	Week 9	80286 block diagram, Pin Functions, Registers, Memory Organization and Segmentation.	3,4	PPT
	Week 10	80386 and 80486 microprocessor	2,3.5	PPT
	Week 11	Pentium, Pentium pro processors	2,3.5	PPT
	Week 12	Pentium II,III,IV, Core 2 processors	2,3.5	PPT



COMPUTER ENGINEERING DEPARTMENT COURSE DEPENDANCY CHART

