

University of Engineering and Technology Lahore

Course Outline Report

Subject:MA-123 Calculus

Department: Department of Mathematics

Printed Date: 22/11/2018

Course Description

The students taking this course are expected to have a working knowledge of the basic elements: limits and continuity, differentiation, rules of differentiation, differentiation of algebraic, trigonometric, inverse trigonometric, exponential, and logarithmic functions, differentiation of implicit functions, integration, basic techniques of integration.

Course Outline:

A review of differentiation: Geometrical interpretation of a derivative; Infinitesimal; Differential coefficient; Derivatives of higher order; Indeterminate forms and L. Hopital's rule; Asymptotes; Curvature; Approximation and error estimates.

Further techniques of Integration; Integration by reduction formula; Fundamental Theorem of Integral Calculus; Definite integral and its properties ; Area enclosed between curves; Arc length; Volume of a solid; Volume of a solid of revolution; Area of surface of revolution; Moments; Centroids. Improper Integrals; Infinite series.

Course Detail

Faculty	Muhammad Naeem
Contact	naeemuetlahore@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply derivatives to find tangents and normals, carry out optimization and graphical analysis, concavity of a function, curvature of a function, and asymptotes of functions.	PLO2	Cognitive	3. Apply
CLO2	Compute integrals by substitutions, tabular form, reduction formulae, improper forms, and definite integrals and then compute area, volume, arc length, surface area, moments, centre of mass.	PLO2	Cognitive	5. Evaluate

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	limit of a function: limit by factorizing, rationalization, limit of a piecewise defined function, limit at infinity, delta- epsilon definition of limit of a function. Exercise 1.2 Q.No. 3-32, 37-40 Exercise 1.3 Q.No. 9 - 40 Exercise 1.4 Q.No. 9-26, 43-49, 51-56, 65-70	CLO1
2	derivative, product rule, quotient rule, and chain rule. Derivatives of logarithmic, exponential, inverse trigonometric functions, L'Hopital Rule, Indeterminate form	CLO1
3	Derivatives of logarithmic, exponential, inverse trigonometric functions, L'Hopital Rule, Indeterminate form. increasing decreasing functions, concavity, convexity, maxima and minima,	CLO1
4	Optimization; Application of maxima and minima.	CLO1

University of Engineering and Technology Lahore

Course Outline Report

Subject:PHY-121 Mechanics & Wave Motion

Department: Department of Physics

Printed Date: 22/11/2018

Course Description

The main objectives of this course are to give understanding of Motion, Position and Displacement, Velocity, Acceleration, Average acceleration, Vectors and laws of Physics, multiplying vectors, Projectile Motion, Analysis of projectile motion, uniform circular motion, Laws of Motion, Particular Forces, Applications of laws of motion, Kinetic energy and work, Work done by weight, Work done by variable forces, Work Done by Spring Forces, Conservation of Energy, Potential Energy, Path Independence of Conservative Forces, Work and Rotational Kinetic Energy, Newton's law of Gravitation, Gravitation and Principle of Superposition, Gravitation near Earth Surface, Gravitational Potential Energy, Kepler's Laws, Simple Harmonic Motion, Types of Waves, Transverse and Longitudinal Waves, Wavelength and Frequency, Principal of Superposition, Interference of Waves, Standing Waves and Resonance. The fundamentals of mechanics and wave motion will be discussed so that computer engineering graduates will be able to do system analysis, design and programming related to motion and waves.

Course Detail

Faculty	Dr Abdul Waheed Anwar
Contact	abdulwaheedanwar@uet.edu.pk
Credit Hrs	2.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Students will learn about the basic physics of one dimensional motion where the object (race car, tectonic plate, blood cell, or any other object) moves along a single axis, means in a straight line	PLO1		
CLO2	Students will learn the mathematical language in the form of vectors for many physical quantities having magnitudes and directions. They will also learn vectors to explain different phenomena like rotation, navigation, magnetic forces etc. The understanding of vectors will help computer science and engineering students in modeling and simulations.	PLO1		
CLO3	Students will learn the aspect of physics that analyzes the motion in two and three dimensions using vectors. with special case of projectile motion.	PLO1		

CLOs	Description	PLOs	Domain	Domain Level
CLO4	Students will learn motion of objects under the force of gravity. They will also learn to analyze and solve the problems related to circular motion.	PLO1		
CLO5	In this section student will learn Newtonian Mechanics and some particular forces.	PLO1		
CLO6	Students will learn how to apply Newton's laws to solve the problems related to different forces, their interactions and different types of motions.	PLO1		
CLO7	In this chapter we focus on only one type of energy (kinetic energy). The students also learn the work-kinetic energy relation along with work done under the force of gravity.	PLO1		
CLO8	In this week students will get familiar with the work done by spring force. Spring forces are involved for broad horizon from chemistry to engineering students. They will also understand the relation between energy and power.	PLO1		
CLO9	In this lesson students will learn that how Physics is used to calculate potential energy of a system that is due to separation of objects in the system	PLO1		
CLO10	In this lecture students will understand the conservation of mechanical energies and how Physics is used to calculate the work done on a system by external forces	PLO1		
CLO11	Gravitational force is very important for understanding of stability of the universe , in this lesson students will study laws of physics for gravitation and use of these laws for gravitational potential energy	PLO1		
CLO12	Students will learn how to analyze motion of planets and satellites by understanding Kepler's laws.	PLO1		
CLO13	Students will learn oscillations and basic form of oscillations .e., Simple Harmonic Motion (SHM) and energy related to SHM	PLO1		
CLO14	In this student will learn how circular motion is related to SHM, damping of SHM and how resonance take place with oscillations.	PLO1		
CLO15	This session focuses on types of waves and different parameters related to waves. The students will also learn how to calculate speed of waves traveling along a stretched string.	PLO1		
CLO16	This lesson focuses on energy and power related travelling wave along string. To completely describe a wave on a string, student will learn a function that gives the shape of the wave. More over they will also understand standing waves and resonance.	PLO1		

Text Books**Grading Policy****Tentative Weekly Lecture Plan**

Week (Lec)	Topics	CLOs
1	Motion along a straight line, Position and Displacement, Average velocity and Average Speed, Instantaneous velocity and speed, acceleration	CLO1
2	Vectors and Scalars, Unit vectors, Vectors and laws of Physics, Addition of vectors, Multiplying vectors	CLO2
3	Motion along two and three dimensions, Position and Displacement, Average velocity, Acceleration and Average acceleration.	CLO3
4	Projectile Motion, Analysis of projectile motion, uniform circular motion	CLO4
5	Force and its types, Mass and inertia, Newton Laws of Motion, particular forces.	CLO5
6	Applications of Newton's laws of motion	CLO6
7	What is energy, Kinetic energy, Work, Work and kinetic energy, work done by gravitational force.	CLO7
8	Work done by spring force, work done by variable force, Power	CLO8
9	Potential energy, Work and Potential energy, Path independence of conservative forces, Conservation of Energy, Determining potential energy values.	CLO9
10	Conservation of mechanical energy, reading potential energy curves, Work done on a system by external forces, Conservation of energy.	CLO10
11	Newton's law of gravitation, gravitation and principle of superposition, gravitation near earth surface, gravitational potential energy	CLO11
12	Kepler's laws	CLO12
13	Simple Harmonic Motion, Force law for SHM, energy in SHM, simple pendulums	CLO13
14	SHM and uniform circular Motion, Damped simple harmonic motion, Forced oscillations and resonance.	CLO14
15	Types of waves, Transverse and Longitudinal waves, parameters related to waves(e.g., wavelength and frequency), the speed of travelling wave, Wave speed on a stretched string.	CLO15
16	Energy and power of a wave travelling along a string, Wave equation, Principle of superposition of waves, Phasors Interference of waves , standing waves and resonance.	CLO16

University of Engineering and Technology Lahore

Course Outline Report

Subject:PHY-121L Mechanics & Wave Motion

Department: Department of Physics

Printed Date: 22/11/2018

Course Description

The lab course will begin with a description of the motion of particles and introduce Newton's dynamical laws and a number of important force laws. We will apply these laws to a wide range of problems to gain a better understanding of the laws and to demonstrate the generality of the framework. The important concepts of work, mechanical energy, and linear and angular momentum will be introduced and the unifying idea of conservation laws will be discussed. The study of mechanical waves permits a natural transition from the dynamics of particles to the dynamics of waves, including the interference of waves. Additional topics may include fluid mechanics and rotational dynamics. Two hour laboratory per week.

Course Detail

Faculty	Dr Abdul Waheed Anwar
Contact	abdulwaheedanwar@uet.edu.pk
Credit Hrs	1.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Students will measure the value of g by compound pendulum. They will be able to determine the moment of inertia about C.G. by means of a compound pendulum and determine the radius of Gyration.	PLO1		
CLO2	Students will Calculate the frequency of A.C. mains by Melde's experiment through transverse arrangement.	PLO1		
CLO3	Students will measure the value of g by compound pendulum. They will be able to determine the moment of inertia about C.G. by means of a compound pendulum and determine the radius of Gyration. Students will Calculate the frequency of A.C. mains by Melde's experiment through transverse arrangement.	PLO1		
CLO4	Students determine the diameter of the capillary tube using Travelling Microscope. They measure the height of the liquid (water) column and calculate the mean value of surface tension of water.	PLO1		
CLO5	In this experiment resolving power of diffraction will be determine by using spectrometer.	PLO1		

CLOs	Description	POs	Domain	Domain Level
CLO6	Students determine the diameter of the capillary tube using Travelling Microscope. They measure the height of the liquid (water) column and calculate the mean value of surface tension of water. In this experiment resolving power of diffraction will be determine by using spectrometer.	PLO1		
CLO7	Student will learn what Maxwell needle is and how Maxwell needle can be used to determine the Modulus of rigidity of material of a wire. What is the superiority of Maxwell needle over pendulum.	PLO1		
CLO8	Student will measure the velocity of stationary waves using a brass rod. The longitudinal velocity of sound in the material of the vibration generator is determined, given the velocity of sound in air. They also find the Young's modulus of the material of the rod.	PLO1		
CLO9	Student will learn what Maxwell needle is and how Maxwell needle can be used to determine the Modulus of rigidity of material of a wire. What is the superiority of Maxwell needle over pendulum. Student will measure the velocity of stationary waves using a brass rod. The longitudinal velocity of sound in the material of the vibration generator is determined, given the velocity of sound in air. They also find the Young's modulus of the material of the rod.	PLO1		
CLO10	Student will determine the elastic constant Modulus of rigidity of the material of flat spiral spring.	PLO1		
CLO11	In this experiment student will measuring the angle between two objects and calculate the height of vertical objects (trees, buildings, flagpoles). They will also determine the exact distance between the observation point and the base of object.	PLO1		
CLO12	Student will determine the elastic constant Modulus of rigidity of the material of flat spiral spring. In this experiment student will measuring the angle between two objects and calculate the height of vertical objects (trees, buildings, flagpoles). They will also determine the exact distance between the observation point and the base of object.	PLO1		
CLO13	The students will learn to analyze the motion of particles and introduce Newton's dynamical laws and a number of important force laws. They will also learn how to apply these laws to a wide range of problems to gain a better understanding of the laws and to demonstrate the generality of the framework. The important concepts of work, mechanical energy, and linear and angular momentum will be introduced and the unifying idea of conservation laws will be discussed. The study of mechanical waves permits a natural transition from the dynamics of particles to the dynamics of waves, including the interference of waves.	PLO1		

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	To determine the value of “g” Radius of Gyration and Moment of Inertia by using using compound pendulum. To determine the frequency of A. C. Mains by Meld’s Experiment	CLO1 , CLO2 , CLO3
2	To determine the surface tension of water by capillary rise method. To determine the resolving power of diffraction grating.	CLO4 , CLO5 , CLO6
3	To determine the Modulus of rigidity of material of a wire by Maxwell needle. To find the velocity of sound waves in a given rod with Kundt’s tube apparatus.	CLO7 , CLO8 , CLO9
4	To determine the elastic constant Modulus of rigidity of the material of flat spiral spring To determine the vertical distance between two points by sextant.	CLO10 , CLO11 , CLO12
5	Final Viva	CLO13

University of Engineering and Technology Lahore

Course Outline Report

Subject:IS-101 Islamic & Pakistan Studies-I

Department: Department of Islamic Studies

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Prof Dr Hafiz Israiel Farooqi
Contact	israiefarooqi@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Recognize the basic teachings of Islam in the light of Qur'an and Sunnah and ethical and moral teachings of contemporary religions.	PLO8	Cognitive	2. Understand
CLO2	Deduce ethical and social ways of life and evaluate un-social values and extremism.	PLO8	Affective	3. Valuing
CLO3	Describe the ideology of Pakistan and its historical emergence that culminated in the formation of Pakistan.	PLO12	Affective	4. Responding

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	<p>Islam and basic beliefs</p> <ul style="list-style-type: none"> • Qualities of believers • Tawheed Fundamentals and types • Prophet-hood and its finality • The Day of Judgment • Characteristics of Ibad-ur-Rehman (Slaves of Allah) <p>Ideology of Pakistan</p> <ul style="list-style-type: none"> • Definition and Explanation 	CLO1 , CLO3
2	<p>Islam and basic beliefs</p> <ul style="list-style-type: none"> • Importance of intention (Niyya) in human actions • Islam, Iman (belief), Ihsan (excellence) and the Hour. • Sincerity to Allah, His Books, His Messengers, leaders of the Muslims and common people <p>Ideology of Pakistan</p> <ul style="list-style-type: none"> • With reference to Allama Iqbal and Quaid-i-Azam 	CLO1 , CLO3
3	<p>Islamic teachings regarding social behavior</p> <ul style="list-style-type: none"> • Etiquettes regarding seeking knowledge • Importance of good talk and silence • Prevention from inventing a lie <p>Ideology of Pakistan</p> <ul style="list-style-type: none"> • Aims and Objectives of the creation of Pakistan 	CLO1 , CLO2 , CLO3
4	<p>Islamic teachings regarding social behavior</p> <ul style="list-style-type: none"> • Brotherhood • Efforts to compose the quarrels of groups and reconciliation between them • Elimination of social evils such as to laugh at people in contempt, calling others by offensive nick names and suspicion etc. • Backbiting <p>Muslim Rule in South Asia</p> <ul style="list-style-type: none"> • Arrival of Muhammad bin Qasim and successors 	CLO2 , CLO3
5	<p>Islamic teachings regarding social behavior</p> <ul style="list-style-type: none"> • Importance of modesty (Al-Haya) • Good behavior towards people • Fair speaking to the people • To control anger • Ihsan (excellence) with regards to everything <p>Muslim Rule in South Asia</p> <ul style="list-style-type: none"> • Tolerance, Religious Freedom and kind treatment towards Non-Muslims 	CLO2 , CLO3
6	<p>Prophetic life as a role model</p> <ul style="list-style-type: none"> • Life of The Holy Prophet (Peace be upon him) from prophet-hood to Hijra • Difficulties in preaching Islam in Makka and opposition of Quresh • Reasons of hijra (migration) to Madina and impact of this migration <p>Historical Background of Ideology of Pakistan</p> <ul style="list-style-type: none"> • Services of Mujadid Alf Sani 	CLO1 , CLO3

7	History of the Holy Qur'ān <ul style="list-style-type: none"> • Revelation • Compilation • Significance Reformative movement <ul style="list-style-type: none"> • Social and religious services of Shah Waliullah • Efforts for sectarian harmony 	CLO1 , CLO3
8	Importance of hadith <ul style="list-style-type: none"> • Definition • Importance • Authenticity Reformative movement <ul style="list-style-type: none"> • Syed Ahmad Shaheed • Biography • Creation of Islamic State • Opposition from Local tribes and Martydom at Balakot 	CLO1 , CLO3
9	MIDTERM EXAMINATION	
10	Prophetic ethical behaviours <ul style="list-style-type: none"> • Significance of moral values in the light of the life of the Holy Prophet peace be upon him: -Tolerance -Patience (c) -Endurance (d) Generosity (e) Honesty Sir Syed Ahmad Khan <ul style="list-style-type: none"> • Educational and Social services Political aspect of Aligarh movement	CLO1 , CLO2 , CLO3
11	Islamic teachings regarding social behavior <ul style="list-style-type: none"> • Stress on fulfillment of uqud (obligations) • Sanctity of religious symbols Arise of Political consciousness among Muslims <ul style="list-style-type: none"> • Establishment of All India Muslim League (AIML): • Objective and achievement 	CLO1 , CLO2 , CLO3
12	Islam and Halal & haram <ul style="list-style-type: none"> • Concept of Halal (lawful) and haram (forbidden) in Islam • Halal and haram animals and food • Rules of hunting the animals for food • Lawful, unlawful and doubtful matters • Importance of lawful food, drink, clothing and nourishing Pakistan Movement <ul style="list-style-type: none"> • Muslim Nationalism • Khilafat Movement • Non cooperation Movement 	CLO1 , CLO3

13	<p>Islamic rules of purity and cleanliness</p> <ul style="list-style-type: none"> • Importance of purity and cleanliness in the life • Rules of purity and cleanliness <p>Non cooperation movement</p> <ul style="list-style-type: none"> • Role of Ali Brothers • Role of Mr.Ghandi • Failure and affects of Khilafat movement 	CLO1 , CLO3
14	<p>Relationship with other religions</p> <ul style="list-style-type: none"> • Respect of other religions and their believers • Relationship with Ah'l Al-Kitab (people of the Book). • Social relationships with non- Muslims • The Covenant of Bani-Israel (The children of Isreal) with Allah • Address of prophet Moses (peace be upon him) to his people <p>Pakistan Movement</p> <ul style="list-style-type: none"> • Allahabad Address of Allama Iqbal • Idea of independent Muslim State 	CLO1 , CLO3
15	<p>Islam and ethics</p> <ul style="list-style-type: none"> • Definition, importance and significance of Ethics • Concept of Ethics in the light of Qur'ān and Hadith <p>Pakistan Movement</p> <ul style="list-style-type: none"> • Provincial Elections 1937 • Establishment of Congress Ministries • Behaviour towards Muslims 	CLO2 , CLO3
16	<p>Islam and ethics</p> <ul style="list-style-type: none"> • Comparative Religious Morals <p>(i) Hinduism (ii) Buddhism (iii) Judaism (iv) Christianity (v) Islam</p> <ul style="list-style-type: none"> • Philosophy of Ethics in revealed and non revealed religions: an analysis <p>Pakistan Movement</p> <ul style="list-style-type: none"> • Lahore/ Pakistan Resolution of 23rd March 1940 	CLO2 , CLO3
17	<p>Islam and Modern Science</p> <ul style="list-style-type: none"> • The Holy Qur'ān as s guide for the modern scientific development, • Importance of science education in the modern age • Introduction of Muslim scientists • Contribution of Muslim Scholars towards science <p>Pakistan Movement</p> <ul style="list-style-type: none"> • Establishment of Pakistan 	CLO1 , CLO3
18	ENDTERM EXAMINATION	

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-141 Introduction to Computing

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course assumes that students coming from different academic backgrounds do not possess prior knowledge and understanding of computer science. It will provide basic knowledge about computers and processing information through computers. It includes topics related to computer hardware and software. Major computer science subjects will be delivered to the students which they will study throughout their degree program. These major subjects include computer architecture, software engineering, data structures, operating system, computer networks and databases.

Course Detail

Faculty	Dr Syed Khaldoon Khurshid
Contact	khaldoon@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Solve the problem algorithmically for implementation on computers.	PLO3	Cognitive	3. Apply
CLO2	Understand how software go side by side with computer hardware by recognizing operating system, software engineering and databases	PLO12	Cognitive	2. Understand
CLO3	Understand computer hardware with memory organization (computer architecture) and data manipulation and its storage.	PLO1	Cognitive	1. Remember
CLO4	Recognize distributed network of computers and how they communicate with each other via internet.	PLO7	Cognitive	2. Understand

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	<p>Introduction to Computer Science</p> <ul style="list-style-type: none"> a. The Role of Algorithms b. The History of Computing c. The Science of Algorithms d. Abstraction e. An Outline of Our Study f. Social Repercussions <p>Data Storage</p> <ul style="list-style-type: none"> a. Bits and their storage i. Boolean Operations (AND, OR, XOR) ii. Gates and Flip Flops iii. Hexadecimal Notation b. Main Memory i. Memory Organization 	CLO1 , CLO3
2	<p>Data Storage</p> <ul style="list-style-type: none"> a. Representing information (text, numbers) as bit patterns b. The Binary System <ul style="list-style-type: none"> i. Obtaining the binary representation ii. Binary system addition iii. Fractions in the Binary c. Storing Integers <ul style="list-style-type: none"> iv. Two's complement notation (Overflow) v. Adding in two's complement notation <p>Data Storage</p> <ul style="list-style-type: none"> a. Storing Fractions <ul style="list-style-type: none"> vi. Floating-point Notation (Truncation Errors) b. Mass Storage <ul style="list-style-type: none"> vii. Magnetic disk storage system viii. CD/DVD Storage Format ix. Magnetic Tape <p>Data Manipulation</p> <ul style="list-style-type: none"> a. Computer Architecture (von-Neumann Architecture) <ul style="list-style-type: none"> i. Central role of Control Unit (CU) <p>Networks Flexibility of Execution</p>	CLO3
3	<p>Data Manipulation</p> <ul style="list-style-type: none"> a. Machine Language <ul style="list-style-type: none"> i. Instruction categories (dividing/adding/subtracting values stored in memory) ii. Composition of Machine Instructions iii. Simple Machine Architecture (Decoding Instructions) <p>Data Manipulation</p> <ul style="list-style-type: none"> a. Machine Cycle <ul style="list-style-type: none"> i. Decoding JUMP Instruction ii. Program Execution (with Example) b. Arithmetic Logic Instructions c. Communication with other devices <p>Data Manipulation</p> <ul style="list-style-type: none"> a. 'Von Neumann Architecture'- Problem 'Von Neumann Architecture'- Alternatives (Pipelining, Parallel Processing) 	CLO3

4	<p>Operating Systems</p> <ul style="list-style-type: none"> a. History of Operating System b. Operating System Architecture i. Software Classification ii. Components of an Operating System c. Distributed systems, Multiprocessors & Multicores a. Coordinating the Machine's Activities i. The concept of a Process & Threads ii. Process Administration and Time Sharing iii. Inter-Process Communication (Client-Server Model) d. Handling Competition among Processes (Problems faced?) i. Semaphores (its solution) ii. Deadlock (its solution) 	CLO2
5	<p>Networking and the Internet</p> <ul style="list-style-type: none"> a. Networks i. Network History ii. Different Network Classifications (LAN, MAN, WAN, Closed v/s Open Ownership) iii. Network Topologies (Bus, Star) iv. Network Protocols (CSMA/CD, CSMA/CA) v. Combining/connecting Networks (Repeater, Bridge, Switch, Router) vi. Collisions and line sharing vii. QUIZ # 1 b. The Internet viii. Internet Architecture (ISP, Access ISP) ix. Internet Composition x. Structure of the Internet xi. Basic of IP Addressing Mnemonic Address Domains and Sub-Domains Domain Name Server xii. Traditional Internet Applications xiii. The layered Approach to Internet Software 	CLO2 , CLO3 , CLO4
6	<p>Software Engineering</p> <ul style="list-style-type: none"> a. Engineering Example b. Software vs. Real-world Engineering c. Large/complex software systems d. The Software Development Life Cycle e. Software Engineering Models f. Modularity i. Modularity in OO Systems ii. Inter-Modules Dependencies (Coupling: Control Coupling & Data Coupling, Cohesion: Logical Cohesion & Functional Cohesion) g. Testing h. Documentation Algorithms i. Pseudocode ii. Types of algorithms (Random, Greedy, Dynamic, Divide & Conquer and Brute force etc.) iii. Graphs, DFS, BFS, Binary trees and BST 	CLO1 , CLO2

7	<p>Data Structures</p> <ul style="list-style-type: none"> a. Arrays, Stacks, Queues and Lists b. Static vs. Dynamic Structures <p>Database Systems</p> <ul style="list-style-type: none"> a. Origin of database b. File Structures (Files, Directories and Operating Systems) <ul style="list-style-type: none"> i. Files: Conceptual vs. Actual View ii. Text files & Markup Languages (e.g. HTML) c. Integrated Database System d. Conceptual database layers e. The Relational Model 	CLO1 , CLO2
8	Mid-term exam	CLO1 , CLO2 , CLO3 , CLO4
9	<p>Algorithms</p> <ul style="list-style-type: none"> a. Creation of algorithm in pseudocode form b. Read, Debug and solve <p>Introduction to Computer Programming & Languages</p> <p>Introduction to SNAP tool (Building your own blocks – BYOB)</p> <p>SNAP Basics</p> <ul style="list-style-type: none"> a. Building blocks b. Drawing shapes c. Animations 	CLO1
10	<p>SNAP – Loops (recursive & iterative)</p> <p>SNAP - Nested loops</p> <p>SNAP - Variables</p>	CLO1
11	<p>SNAP - Abstraction</p> <p>SNAP - Procedures</p> <p>SNAP - Customization with example project</p>	CLO1
12	<p>SNAP – Lists</p> <p>SNAP – Static Lists</p> <p>SNAP – Sequential search</p>	CLO1
13	<p>SNAP – Cloning</p> <p>SNAP – Handling multiple objects (Balls example)</p> <p>SNAP – Understanding cloning with example project (Space invader)</p>	CLO1
14	<p>SNAP – Random numbers</p> <p>SNAP – Game development strategies</p> <p>SNAP – Scratch tools, gravity and mazes</p>	CLO1
15	Quiz # 2	CLO1
16	Final Exam	CLO1 , CLO2 , CLO3 , CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-141L Introduction to Computing

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course assumes that students coming from different academic backgrounds do not possess prior knowledge and understanding of computer science. In Lab of ICS Students will be provided with MS Office Orientation with multiple assignments. Then they will be provided with logical building and basic programming skills using RAPTOR and SNAP with Scratch as programming language.

Course Detail

Faculty	Sahar Waqar
Contact	saharwaqar@outlook.com
Credit Hrs	1.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Use state of art tools to develop professional documents, spread sheets, web layouts and presentations in various assignments.	PLO5	Cognitive	3. Apply
CLO2	Understand general problem-solving strategies in development of computer algorithms.	PLO2	Cognitive	2. Understand
CLO3	Apply logical problem-solving skills in writing computer programs for solving real life problems	PLO3	Cognitive	3. Apply
CLO4	Design a project which builds your logic building skills in collaborative environment.	PLO11	Cognitive	2. Understand
CLO5	Value plagiarism and ethical guidelines in all lab assignments/homework.	PLO8	Affective	1. Characterization

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	MS Word Basics with multiple assignments (5 marks) (format, layouts, letters, paragraphs, forms, CVs and lab manual etc.)	CLO1
2	Introduction to MS Excel (formatting, sorting, page layouts, formulas, graphing) (5 marks)	CLO1
3	Raptor (Pseudocode) (5 marks)	CLO2
4	Raptor (Flow charts – variables and conditional logic) (5 marks)	CLO2
5	Raptor (Flow charts – loops) (5 marks)	CLO2
6	Raptor (Arrays) (5 marks)	CLO2 , CLO5
7	Advanced excel (Data analysis, if-else, functions) (5 marks)	CLO1
8	Assessment	CLO1 , CLO2
9	SNAP - Moving blocks, creating scripts, and repeating blocks SNAP - Drawing with a computer	CLO3
10	SNAP - Coordinates and conditionals SNAP - Drawing with iteration SNAP - Updating variables in repeats, iterative development, and the ask and join blocks	CLO3
11	SNAP - Procedures	CLO3
12	SNAP – Game development	CLO3
13	SNAP – Game development	CLO3
14	Project	CLO3 , CLO4
15	Evaluation	CLO1 , CLO4 , CLO5

University of Engineering and Technology Lahore

Course Outline Report

Subject:ME-100L Workshop Practice

Department: Mechanical Engineering

Printed Date: 22/11/2018

Course Description

This workshop practice consists of the following components.

1. Machine Shop: Detailed study of centre lathe and accessories. Plain and Taper turning. Basic lath operations including turning, facing, simple screw cutting/treading, knurling, Grooving (Drilling and Boring), cutting tools and their grinding. Brief Introduction of shaper, milling Shaping and Surface Grinding Machine. Assigning of Practical Jobs.

2. Fitting and Fabrication Shop: The use and care of fitter's tools. Marking out of job. Practice in Metal filing. Sawing, Drilling, dieing, Tapping and reaming. Brief introduction and use of power Hack Saw, Arbor Press, Sheet Shaping Machine, Sheet Rolling Machine, Punching Machine and Drilling Machine. Assigning of practical Jobs.

3. Carpentry Shop: The use and care of tools. Type of Timber, its defects and preservation methods practice in planning and sawing. Different types of wood joints. Study of sawing, planning, turning mortise and tenon machines. Assigning of Practical Jobs.

4. Electrical Shop: Electric shocks and treatment. The use and care of tools used by Electrician. Types and uses of cable and electrical accessories for house wiring, practice in simple house wiring, testing methods. Switch gear used on domestic installation and DB system. Earthing System. Assigning of Wiring arrangements practical

Course Detail

Faculty	Shahid Mahmood Chughtai
Contact	shahid.m.chughtai@gmail.com
Credit Hrs	1.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	To EXECUTE the concepts of metal cutting machines to a part according to the given drawing.	PLO2	Psychomotor	3. Precision
CLO2	PRODUCING new parts according to the given design by applying the concepts of metal part filing and various fitting and fabrication processes	PLO3	Psychomotor	4. Manipulation
CLO3	To IMPLEMENT the concepts of basic wood working and use of various wood working tools according to the given drawing.	PLO4	Psychomotor	3. Precision
CLO4	To LEARN how to work on the tasks assigned in electric shop.	PLO9	Psychomotor	4. Manipulation

CLOs	Description	PLOs	Domain	Domain Level
CLO5	To DEMONSTRATE comprehensive technical knowledge of all shops covered in the lab. Also students are supposed to learn disciplinary and precautionary measures during operation.	PLO12	Affective	4. Responding

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	General Introduction of Subject / orientation.	
2	General Introduction of Labs / Orientation.	
3	Basic Machine Shop	CLO1
4	Basic Machine Shop	CLO1
5	Basic Machine Shop	CLO1
6	Fitting & Fabrication Shop	CLO2
7	Fitting & Fabrication Shop	CLO2
8	Fitting & Fabrication Shop	CLO2
9	Wood Work Shop	CLO3
10	Wood Work Shop	CLO3
11	Wood Work Shop	CLO3
12	Electrical Shop	CLO4
13	Electrical Shop	CLO4
14	Electrical Shop	CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-121 Circuit Analysis I

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Basic concepts of electrical quantities, electric signals, circuit laws, circuit elements and sources. Resistive Circuits include series parallel combinations, dividers, bridges and ladders, practical sources. Circuit Analyses techniques. Circuit theorems and power calculations. Transformers and amplifiers. Operational amplifiers. Energy storage elements and transient response of first order circuits.

Course Detail

Faculty	Dr Yasir Saleem
Contact	yasir@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	MA-123 Calculus,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Describe circuit element laws, Kirchhoff's laws, power, energy, independent sources, dependent sources and circuit models.	PLO1		
CLO2	Determine the average and root mean square (RMS) values of waveforms.	PLO2		
CLO3	Analyze linear circuits using loop analysis, nodal analysis, source transformation techniques and the principle of superposition.	PLO2		
CLO4	Describe one port circuits with their equivalent using Thevenin theorem and Norton theorem	PLO2		
CLO5	Analyze operational amplifier circuits using ideal operational amplifier model.	PLO2		
CLO6	Design amplifiers using operational amplifiers.	PLO3		
CLO7	Determine the transient response of first order d.c circuits.	PLO4		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Units and Notations. Electric quantities. Electric signals. Electric circuits, Kirchhoff's laws, circuit elements, sources.	CLO1
2	Resistance. Series and parallel combinations. Voltage and current dividers. Resistive bridges and ladders. Practical sources and loading. Introduction to Circuit Simulation and Solution Software.	CLO1
3	Nodal analysis.	CLO3
4	Loop analysis.	CLO3
5	Linearity and superposition. Source transformation.	CLO3
6	One port. Circuit theorems.	CLO4
7	Power Calculations.	CLO2
8	Dependent sources and circuit analysis.	CLO1
9	The ideal transformer, amplifier.	CLO5
10	The operational amplifier and basic configurations. Ideal op-amp circuit analysis.	CLO5
11	Summing and differencing amplifiers and other configurations.	CLO6
12	Capacitance, inductance, natural response of RC and RL circuits	CLO7
13	Response to dc and ac forcing function.	CLO7
14	Basic RC and RL circuits. Transient in first order networks.	CLO7
15	Step, pulse response. First order op-amp circuits.	CLO5

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-121L Circuit Analysis I

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Laboratory to supplement CSE 121 Circuit Analysis Course

Course Detail

Faculty	Dr Yasir Saleem
Contact	yasir@uet.edu.pk
Credit Hrs	1.0
Pre-requisite	MA-123 Calculus,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Present experimentally observed circuit behaviour in a logical and scientific manner.	PLO4		
CLO2	Use with identification the circuit components, breadboards, multi-meters, power supplies, signal generators, and oscilloscopes.	PLO5		
CLO3	Make measurements in their own constructed electric circuits.	PLO4		
CLO4	Construct amplifiers with operational amplifiers.	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to laboratory instruments.	CLO2
2	Measurement of waveforms and fundamental quantities: Resistive Circuits.	CLO3

3	Measurement of waveforms and fundamental quantities: Duty Cycle and RMS Values.	CLO3
4	Measurement of waveforms and fundamental quantities: I-V Characteristics.	CLO3
5	Viva voce examination.	
6	Operational Amplifier circuits introduction.	CLO4
7	Operational amplifier circuits: Inverting configuration.	CLO4
8	Operational amplifier circuits: Non-Inverting configuration.	CLO4
9	Operational amplifier circuits: Summer (adder) configuration.	CLO4
10	Operational amplifier circuits: Responses.	CLO4
11	Operational amplifier circuits: Instrumentation amplifier..	CLO4
12	Viva voce examination.	
13	Natural response of RC circuit.	CLO3
14	Project Week	CLO1
15	Project Week	CLO1

University of Engineering and Technology Lahore

Course Outline Report

Subject:PHY-131 Electricity and Magnetism

Department: Department of Physics

Printed Date: 22/11/2018

Course Description

This course provides a comprehensive study of electromagnetic interactions and their applications to solve relevant problems in computer science and engineering. The articles are well backed up by numerical work to create problem solving ability and to enhance the mental faculties of the students. As we are living in electromagnetic world, the focus is especially on the concerned applications to make the course more productive and interesting for the students.

Course Detail

Faculty	Dr Anwar Latif
Contact	anwar1latif@gmail.com
Credit Hrs	2.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	The student will be able to learn fundamental law of electrostatic and its applications. The relevant numerical problems will enable the students to calculate the Coulomb's forces amongst the charges and due to charge distributions. The fundamentals of electric field and electrical potentials and how to find out fields and potentials due to point charges and charge distributions will also be introduced along with its practical applications of these topics.	PLO1		
CLO2	The knowledge will be imparted about different kinds of capacitors, the role of dielectric inside the capacitor, current and current density, resistivity, semiconductors and superconductors along with relevant practical applications.	PLO1		
CLO3	The basic concept of magnetic fields and calculations of static and non static magnetic and electric fields will be introduced. Also physical significance of Maxwell's equations will be discussed to give students a complete know how of electricity and magnetism.	PLO1		
CLO4	Assignments relevant to electricity and magnetism.	PLO1		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Coulomb's Law, and its Applications (Relevant Solved Examples and numerical work)	CLO1
2	The Electric Field, Electric Field Lines, The Electric Field due to a Point Charge, The Electric Field due to an Electric Dipole (Relevant Solved Examples and numerical work)	CLO1
3	The Electric Charge due to a Line Charge, The Electric Charge due to a Charged Disk, A Point Charge in a Electric Field, A Dipole in an Electric Field (Relevant Solved Examples and numerical work)	CLO1
4	Flux, Flux of an Electric Field, Gauss,s Law, Gauss,s Law and Coulomb's Law, A charged Isolated Conductor (Relevant Solved Examples and numerical work)	CLO1
5	Applying Gauss,s Law, Cylindrical symmetry, Applying Gauss,s Law: Planar Symmetry, Applying Gauss,s Law: Spherical Symmetry (Relevant Solved Examples and numerical work)	CLO1
6	Electric Potential Energy, Electric Potential, Equipotential Surface, Calculating the Potential from the Field, Potential due to a point Charge, Potential due to group of point Charge, Potential due to an Electric Dipole (Relevant Solved Examples and numerical work)	CLO1
7	Potential due to a continuous Charge Distribution, Calculating the Field from the Potential, Electric Potential Energy of a System of Point Charges, Potential of a Charged isolating Conductor (Relevant Solved Examples and numerical work)	CLO1
8	Capacitance, Calculating the Capacitance, Energy Stored in an Electric Field (Relevant Solved Examples and numerical work)	CLO2
9	Capacitor with a Dielectric, Dielectrics: an Atomic Overview, Dielectrics and Gauss Law Electric Current, Current Density, Resistance and Resistivity (Relevant Solved Examples and numerical work)	CLO2
10	Ohm's Law, A Microscopic View of Ohm's Law, Semiconductors, Superconductors (Relevant Solved Examples and numerical work)	CLO2
11	What Produces a Magnetic Field, The Definition of Magnetic Field B, Crossed Fields: The Hall Effect, A circulating Charged Particle (Relevant Solved Examples and numerical work)	CLO3
12	Cyclotrons and Synchrotron, Magnetic Field of a Current Carrying Wire, Torque on a current loop, The magnetic dipole moment (Relevant Solved Examples and numerical work)	CLO3
13	Calculating the Magnetic Field due to a Current Force Between Two Parallel Currents, Ampere's Law, Solenoids and Toroids (Relevant Solved Examples and numerical work)	CLO3

14	Two Experiments, Faraday's Law of Electromagnetic Induction, Lenz's Law, Induction and Energy Transfer (Relevant Solved Examples and numerical work)	CLO3
15	Inductors and Inductance, Self Induction, Energy Stored in a Magnetic Field, Energy Density of a Magnetic Field, Mutual Induction (Relevant Solved Examples and numerical work)	CLO3
16	Gauss's Law for Magnetic Fields, Induced Magnetic Fields, Displacement Current, Maxwell's Equations, (Relevant Solved Examples and numerical work)	CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:PHY-131L Electricity and Magnetism

Department: Department of Physics

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Anwar Latif
Contact	anwar1latif@gmail.com
Credit Hrs	1.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Students will be able to measure the Hall voltage and Hall coefficient as a function of current and magnetic induction. They will also learn how to measure the voltage and current across the given semiconductor for varying temperature. They will be able to find out the band gap energy of Germanium and will know how to determine the capacitance of a metallic sphere by conduction method. The student will also come to know about the effect of dimensions of metallic spheres on the capacitance. The students will also learn to determine the dielectric constant of air/vacuum and the dielectric constant of plastic relative to air. The students will be able to find the resistance of different materials and components as a function of temperature. The students will observe the formation of standing waves on a given thread and can calculate the frequency of A.C. mains by counting the number of loops formed by varying the tension in the thread. Students will be able to determine e/m (specific charge) of electrons by deflection method. The students will also be able to draw the BH curve to study the magnetic properties of ferromagnetic material.	PLO1		
CLO2	Final comprehensive examination from all the experiments performed by the students in the laboratory.	PLO1		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:IS-201 Islamic & Pakistan Studies-II

Department: Department of Islamic Studies

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Hafiz Muhammad Shahbaz
Contact	pdshahbaz@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Explain doctrines of Islam with reference to Islamic primary sources.	PLO8	Cognitive	4. Analyze
CLO2	Deduce ethical and social values from the life of the Holy Prophet (PBUH) and identify criminal behavior in the light of Islamic penal law.	PLO8	Affective	3. Valuing
CLO3	Recognize the geography, resources and foreign policy of Pakistan which emphasizes on progression and peaceful co-existence.	PLO12	Affective	2. Organization

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	<p>Characteristics of the righteous people</p> <ul style="list-style-type: none"> • Al-Mohsineen and their reward • Explanation of Lahw al-Hadith and torment for its buyer • Stress on fear of Allah the Lord and the Judgment Day <p>National Integration</p> <ul style="list-style-type: none"> • Role of Ulema & Mashaikh in Pakistan Movement • Role of Students, Women and Journalists in Pakistan Movement 	CLO1 , CLO3
2	<p>Advices of Luqman a wise man</p> <ul style="list-style-type: none"> • Not to associate anyone with Allah • To establish Salat (prayer) • To enjoin good • To forbid evil • To bear the difficulties • Not to speak to others with your face turned away • Not to walk proudly and lower your voice <p>National Integration</p> <ul style="list-style-type: none"> • Initiatives of Muhammad Ali Jinnah to strengthen the State 	CLO1 , CLO2 , CLO3
3	<p>Scientific study of the universe</p> <ul style="list-style-type: none"> • Universal arguments on Allah as the Creator • Conquering the Universe <p>Initial Problems of Pakistan and Efforts to Resolve</p> <ul style="list-style-type: none"> • Refugee Crisis • Water Disputes • Kashmir Issue • Distribution of Assets 	CLO1 , CLO3
4	<p>Pillars of Islam</p> <ul style="list-style-type: none"> • Shahada • Salat • Saum • Zakāt • Hajj <p>Striving in the cause of Allah(Jihad)</p> <ul style="list-style-type: none"> • Importance and significance • Kinds: • Against one's soul: to control its ego and desires (The greatest Jihad) • Against ignorance • Against Satan • Against the enemy • Against disbelievers by the Holy Qur'an etc <p>Land of Pakistan</p> <ul style="list-style-type: none"> • Geographical Importance of Pakistan • China-Pakistan Economic Corridor(CPEC) • TAPI Gas Pipeline Project 	CLO1 , CLO3

5	<p>Social manners</p> <ul style="list-style-type: none"> • Obligations on a Muslim for a Muslim • Golden principal to and lead a satisfied life and to control one's greed • What is righteousness? What is sin? • Emphasis on the respect of human sentiments • Awareness of a meal blessed with auspiciousness <p>Resources of Pakistan</p> <ul style="list-style-type: none"> • Agriculture: Potential and Performance 	CLO2 , CLO3
6	<p>Social manners</p> <ul style="list-style-type: none"> • Manners of salam and greeting Muslims and non-Muslims • Manners regarding sneeze, eating, drinking, wearing cloths, putting on and off shoes and walking with shoes • Restriction of trailing garments arrogantly • Restriction of overspending <p>Resources of Pakistan</p> <ul style="list-style-type: none"> • Industry: Problems and viable solutions 	CLO2 , CLO3
7	<p>Qur'ān sciences</p> <ul style="list-style-type: none"> • Miracles of the Holy Qur'an • Usul-e-Tafseer <p>State and Constitution of Pakistan</p> <ul style="list-style-type: none"> • Objectives Resolution 1949 	CLO1 , CLO3
8	<p>History of Hadith</p> <ul style="list-style-type: none"> • Compilation of Hadith • A Brief Introduction of Sihah Settah and its compilers <p>State and constitution of Pakistan</p> <ul style="list-style-type: none"> • Fundamental Rights in the Constitution of 1956 and 1962 	CLO1 , CLO3
9	MidTerm Examination	
10	<p>Human Rights</p> <ul style="list-style-type: none"> • Human rights • Rights of parents • Rights of relatives <p>State and constitution of Pakistan</p> <ul style="list-style-type: none"> • Islamic Provisions of 1973 Constitution 	CLO2 , CLO3
11	<p>Human Rights</p> <ul style="list-style-type: none"> • Rights of neighbours • Women rights • Privacy <p>Foreign Policy of Pakistan</p> <ul style="list-style-type: none"> • Definition and Concept of Foreign Policy 	CLO2 , CLO3

12	<p>Islamic criminal law</p> <ul style="list-style-type: none"> • Introduction to the criminal law of Islam • Concept of crime and punishment • Role of Islamic criminal law in eliminate crimes in the society • Classification of crimes in Islamic • Criminal Law: Hudood and Tazirat <p>Foreign Policy of Pakistan</p> <ul style="list-style-type: none"> • Determinants and Objectives of Foreign Policy 	CLO2 , CLO3
13	<p>Islamic criminal law</p> <ul style="list-style-type: none"> • Qad'f (false accusation) • Li'ān (accusation of a wife of zina) • Zina (adultery, fornication) <p>Relations with Neighbouring Countries</p> <ul style="list-style-type: none"> • India • China • Afghanistan • Iran 	CLO2 , CLO3
14	<p>Islamic criminal law</p> <ul style="list-style-type: none"> • Drinking intoxicating liquors and narcotics • Theft • Dacoity & robbery • Rebellion <p>Relations with Muslim World</p> <ul style="list-style-type: none"> • Pakistan and Saudi Arabia • Pakistan and Turkey 	CLO2 , CLO3
15	<p>Islamic criminal law</p> <ul style="list-style-type: none"> • Murder • Retaliation • Apostasy <p>Pakistan and Contemporary World</p> <ul style="list-style-type: none"> • United Nations • America • Russia • Europe 	CLO2 , CLO3
16	<p>Prophetic life as a role model</p> <ul style="list-style-type: none"> • The Holy Prophet peace be upon him, as a role model • Life of the Holy Prophet peace be upon him, after migration <p>Principles of Foreign Policy</p> <ul style="list-style-type: none"> • Bilateralism • Non-Alignment • Peaceful Co-Existence • Nuclear Non-Proliferation 	CLO2 , CLO3

17	<p>Islam and ethics</p> <ul style="list-style-type: none"> • Ethical behavior of the Prophets • Impact of belief on Ethics • Concept of worship and manners/ social relations in religion and their impact on ethics • Ethics and character building, significance of moral values <p>Charity, Tolerance, Simplicity, Respect of mankind Social Etiquettes of meetings, eating & drinking and conversation, Right of people</p> <p>Pakistan and Regional Organizations</p> <ul style="list-style-type: none"> • SAARC • OIC • ECO • SCO 	CLO2 , CLO3
18	End Term Examination	

University of Engineering and Technology Lahore

Course Outline Report

Subject: MA-224 Multivariate Calculus

Department: Department of Mathematics

Printed Date: 22/11/2018

Course Description

- The concept of limit, continuity and differentiation in functions of several variables; Geometric interpretation of partial derivatives; Total differential; Chain rule; Implicit differentiation; Maxima and minima of functions of two independent variables. Taylor's and Maclaurin's series for functions of two variables.
- Double Integration; Fubini's Theorems; Change of order; Geometrical Interpretation of double integral; Applications to find volumes and areas; Multiple Integration and applications.
- Integration in vector field; Vector differentiation and integration; Gradient, Divergence and curl; Directional derivatives.

Course Detail

Faculty	Muhammad Shafique
Contact	3520193851575@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply the concepts of limit, continuity and differentiation of functions of several variables and use partial derivatives to carry out the optimization of functions of two variables.	PLO1	Cognitive	3. Apply
CLO2	Evaluate area and volume of different regions using double and triple integrals and develop understanding of vector calculus.	PLO1	Cognitive	5. Evaluate
CLO3	Carry out differentiation and integration of vector point functions, the curl and divergence of a vector field.	PLO1	Cognitive	3. Apply

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Limits for Functions of Two and Three Variables	CLO1
2	Continuity for Functions of Two Variables	CLO1
3	Partial Derivatives of a Function of Two or more Variables	CLO1
4	The Chain Rule for a Function of Two or More Variables, Tree Diagrams, Differentiation of Implicit Functions	CLO1
5	Linearization and Error Estimates	CLO1
6	Application Problems related with the Linearization and Error Estimates	CLO1
7	Extreme Values for a Function of Two Variables	CLO1
8	Taylor Series for a Function of Two Variables	CLO1
9	Double and Iterated Integrals over Rectangles	CLO2
10	Double Integrals over General Regions	CLO2
11	Area and Volume Using Double Integration	CLO2
12	Triple Integrals and Volume Using Triple Integration	CLO2
13	Vector differentiation	CLO2
14	Vector Integration	CLO2
15	Scalar and Vector Fields, Gradient, Directional derivatives	CLO2
16	Divergence and Curl	CLO2

University of Engineering and Technology Lahore

Course Outline Report

Subject: CS-241L Object Oriented Programming

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course provides an introduction to object-oriented programming, with an emphasis on the development of correct, efficient programs. Students are exposed to the principles of object oriented programming with mathematical and real world problems.

Course Detail

Faculty	Dr Hafiz Muhammad Shahzad Asif
Contact	shehzad.asef@gmail.com
Credit Hrs	1.0
Pre-requisite	CS-142L Programming Fundamentals,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO2	Apply composition, inheritance and polymorphism and language extension concepts to build classes	PLO3	Cognitive	3. Apply
CLO1	Implement abstraction and encapsulation to develop reusable classes for objects of real world problems	PLO2	Cognitive	3. Apply
CLO3	Select programming API functionality and incorporate them into object design	PLO5	Cognitive	4. Analyze
CLO4	Show compliance to guidelines provided in lab manual for programming assignments and lab sessions.	PLO8	Affective	1. Characterization

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	Visual Studio IDE, Advantages, Intelligence Features, Compiling C++ in Visual Studio, Debugging	CLO3
2	Lab 2: Revision Structure, Pointers, Syntax and Implementation	CLO1
3	Simple Classes, Create Objects, Constructor Calls	CLO1
4	Different type of constructors, Implement Access Modifiers	CLO1
5	Add member functions to classes, reuse of code, cascaded calls	CLO1 , CLO3
6	Implementation of this pointer	CLO2 , CLO1
7	Dynamic memory for objects using -> (arrow) pointer	CLO1
8	Compound objects, create has-a relationship.	CLO2 , CLO1
9	Overload different Operators to perform extra functionality on objects, Unary operators overloading	CLO2 , CLO1
10	Binary Operators and their overloading	CLO2 , CLO1
11	Lab 11: Inheritance: Create Base and Derived Classes. Implementation of function overloading. PROJECT-I	CLO2 , CLO4
12	Implementation of function overriding, Late binding through virtual functions PROJECT-I	CLO2 , CLO4
13	Polymorphism implementation PROJECT-II	CLO2 , CLO4
14	Abstract Classes Multiple Inheritance implementation. PROJECT-II	CLO2 , CLO1 , CLO4
15	PROJECT (I & II) Revision of Selected Topics	CLO1

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-241 Object Oriented Programming

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course is designed to teach object-oriented programming techniques to those who have learned basic programming concepts. Topics include: Classes; Objects; Data Abstraction; Data Encapsulation; Polymorphism; and Inheritance; Overloaded Operators; Overridden Methods; Friend Functions; Virtual Functions; Streams and Files. C++ programming language is used to demonstrate the object-oriented programming constructs.

Course Detail

Faculty	Dr Muhammad Afzal
Contact	shmafzal@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CS-142 Programming Fundamentals,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Explain OOP concepts like object, class, data & function members, friend functions, message, abstraction, encapsulation, protection, composition, inheritance, polymorphism	PLO1		
CLO2	Devise objects from description implementing their structure and behavior by defining data members, and member functions/operators with emphases on usability	PLO3		
CLO3	Appraise optimal static and dynamic usage of memory and protecting memory breach and wastage	PLO2		
CLO4	Interpret lifespan of objects defined as entry into, computational collaboration through messages and exit from logical spaces in computational tasks	PLO3		
CLO5	Present an object-oriented design in a clear and lucid manner.	PLO10		
CLO6	Apply principles of encapsulation, abstraction, reusability and extensibility to support collaborative development.	PLO11		

Text Books

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Functions: prototype, definition, and call. Function parameter types: in, in-out and out only, value type, reference type. Reference and pointer differentiated. Runtime code segment and data segment explained. System Heap and Stack explained.	CLO1 , CLO4
2	Difference between non-structured programming, structured programming and Object Oriented Programming and problem solving. Where to store Structural, Behavioral and Capabilities with limitation and constraints. Object oriented approach to programming with Concepts of Object Orientation, e.g., Protection, Encapsulation, Abstraction, Messaging. Software reuse through Inheritance and Composition. Language extension view of OOP.	CLO1 , CLO2
3	Migration from modular program having structures and functions to Classes & Object: syntax and semantics. Implicitly available member functions. Default constructor, copy constructor, destructor, = assignment operator, & address-of operator. Access modifiers: public, private.	CLO1 , CLO1 , CLO2 , CLO3 , CLO4
4	Programmer defined constructor, copy constructor, destructor, = assignment operator. Overloading constructors. Shallow and deep objects. Constructor's initializer list.	CLO1 , CLO2 , CLO3 , CLO4
5	Separate declaration and definition of member functions. Accessors, utility methods, Objects as argument and return type. Cascaded calls to functions;	CLO1 , CLO2 , CLO3 , CLO4
6	Static members, const members, objects members; Constructor's initializer list revisited; uses of implicit this pointer/reference or me reference.	CLO1 , CLO2 , CLO4
7	Arrow -> operator, dynamic memory allocation with new operator to instantiate objects in the system heap and de-allocation of object memory with delete operator.	CLO1 , CLO2 , CLO3 , CLO4
8	Composition and related concepts; Has-a relationship. Complex object. Partial classes	CLO2 , CLO3 , CLO4
9	Operator Overloading: operator as member functions; operators as friend functions; Cascaded calls to operator functions; Restriction on friend operator functions [],(), ->	CLO1 , CLO2 , CLO4
10	(Cont.) Operator Overloading: operator as member functions; operators as friend functions; Cascaded calls to operator functions; Restriction on friend operator functions [], (), ->	CLO1 , CLO2 , CLO4

11	Inheritance: private and protected access modifiers. Is-a Relationship of Base class and derived classes, Derived class functions overloading. Data member domination.	CLO1 , CLO2 , CLO3 , CLO4
12	Inheritance: Member function overriding; virtual functions ; pure virtual functions.	CLO1 , CLO2 , CLO4
13	Polymorphism: how to implement; compilation advantage.	CLO1 , CLO2 , CLO4
14	Abstract classes; concrete classes; Class hierarchy. Multiple inheritance; Diamond head problem;	CLO1 , CLO2 , CLO4
15	Review of course topics;	CLO1 , CLO2 , CLO3 , CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-211 Discrete Mathematical Structures

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Discrete Math is needed to see mathematical structures in the object you work with, and understand their properties. This ability is important for software engineers, data scientists, security and financial analysts. We cover the basic notions and results (logic, proofs, combinatorics, graphs, number theory) that are universally needed.

Course Detail

Faculty	Ahmad Awais
Contact	ahmad.awais@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Learn logical notations & its usage to define and reason about fundamental mathematical concepts such as sets, functions.	PLO2	Cognitive	2. Understand
CLO2	Understand mathematical arguments, induction and simple induction proofs.	PLO2	Cognitive	3. Apply
CLO3	Assess elementary properties of modular arithmetic, advanced counting and its applications through different case studies	PLO2	Cognitive	3. Apply
CLO4	Analyze algorithms, recursion, analysis & calculation of complexity with case studies.	PLO3	Cognitive	3. Apply
CLO5	Learn graph theory, trees, matrices & theoretic reasoning to solve advance problems.	PLO12	Cognitive	3. Apply

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	<ul style="list-style-type: none"> o Introduction to Discrete Mathematics & Motivation o Set Theory o Venn Diagram o Relations o Types of Relations 	CLO1
2	<ul style="list-style-type: none"> o Functions o Types of Functions o Inverse Function o Composition of Functions o Sequence & Series 	CLO1
3	<ul style="list-style-type: none"> o Logic o Truth Tables o Laws of Logic o Bi-Conditional Logic o Propositional Logic o Application of Logic o Predicate o Quantifiers o Nested Quantifiers 	CLO1
4	<ul style="list-style-type: none"> o Algorithms o Properties of an algorithm o Growth of functions o Complexity (Linear Search/Bubble sorting) o Recursion/Recursive Functions/Recursive algorithms 	CLO4
5	<ul style="list-style-type: none"> o Recursion/Recursive Functions/Recursive algorithms o Methods of Proof 	CLO2 , CLO4
6	<ul style="list-style-type: none"> o Proof by Contradiction. o Mathematical Induction 	CLO2
7	<ul style="list-style-type: none"> o Basic of counting o Pigeon Hole Principal o Case studies 	CLO3
8	<ul style="list-style-type: none"> o The tower of Hanoi o Binomial Expansion o Pascal Triangle o Application of Number Theory 	CLO3
9	<ul style="list-style-type: none"> o Introduction to Matrices o Matrix operations/Algorithmic Addition, Subtraction & Multiplication 	CLO4 , CLO5
10	<ul style="list-style-type: none"> o Matrix chain multiplication o Introduction to Graphs 	CLO5

11	<ul style="list-style-type: none"> o Graph Types o Graph Applications o Paths and Circuits o Matrix Representation of Graphs o Adjacency list/incidence matrix o Isomorphism of Graphs o Connectivity 	CLO5
12	<ul style="list-style-type: none"> o Traveling Salesman Problem o Shortest Path Algorithms o Euler/Hamilton Paths 	CLO5
13	<ul style="list-style-type: none"> o Degree Sequences & its Properties/Applications o Bipartite Graph o Maximum Flow Min cut (Menger Theorem) 	CLO5
14	<ul style="list-style-type: none"> o Trees o Spanning Trees o Minimum spanning trees o Tree connectivity o Dijkstra Algorithm o Prims Algorithm o Kruskal Algorithm o Huffman Encoding 	CLO5
15	<ul style="list-style-type: none"> o Trees Traversals o In order o Pre order o Post order 	CLO5

University of Engineering and Technology Lahore

Course Outline Report

Subject: MA-219 Linear Algebra and Complex Analysis

Department: Department of Mathematics

Printed Date: 22/11/2018

Course Description

The main objective of this course is to teach the students the important aspects of linear algebra and calculus of complex valued functions. The focus is on those topics which are essential in various engineering problems. The course also contributes to a profound understanding of mathematics.

Course Detail

Faculty	Dr Muhammad Irfan Qadir
Contact	mirfan@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Understand the complex calculus by introducing complex numbers, complex functions, and analytic function.	PLO1	Cognitive	2. Understand
CLO2	Carry out complex integration for many difficult integrals that appear in applications.	PLO1	Cognitive	3. Apply
CLO3	Understand the linear algebra in the clearest possible way by knowing that linear algebra is a cohesive subject which is useful in engineering and other branches of science.	PLO1	Cognitive	2. Understand

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	• A review of matrices and determinants	CLO3

2	Finding inverse of a matrix through elementary row operations	CLO3
3	Solution of the system of linear equations	CLO3
4	Applications to relevant problems	CLO3
5	Euclidean spaces, Vector spaces, Subspaces	CLO3
6	Linear independence and dependence, Basis and dimensions	CLO3
7	Normed spaces, Inner product spaces, Angle and orthogonality in inner product spaces, Orthogonal basis	CLO3
8	Linear transformations, Kernel and range, Inverse linear transformation, Rank and nullity of linear transformation	CLO3
9	Eigenvalues and eigenvectors	CLO3
10	Polar and exponential forms of complex numbers	CLO1
11	Product and quotient of complex numbers in polar form; Properties of complex numbers	CLO1
12	Logarithm of a complex number; De Moivre's Theorem, The n th roots of a number	CLO1
13	Solution of equations; Circular and hyperbolic functions; Inverse hyperbolic functions	CLO1
14	Limit, continuity and differentiability of complex functions; Analytic functions, Harmonic functions	CLO1
15	Cauchy fundamental theorem and its consequences; Cauchy Integral formula	CLO2
16	Derivatives of an analytic function; Singularities and calculus of residues; Contour integration.	CLO2

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-221 Digital Logic Design

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Introduction to logic circuits, truth tables, logic gates and networks, boolean algebra, synthesis using AND, OR and NOT gates, NAND and NOR logic networks, design examples, introduction to CAD tools, introduction to Verilog. Implementation technology. Optimized implementation of logic functions. Number representation and arithmetic circuits. Combinational circuit building blocks. Flip flops, registers, counters and simple processor.

Course Detail

Faculty	Dr Yasir Saleem
Contact	yasir@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CS-141 Introduction to Computing,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Carry out mathematical computations in Boolean algebra and in various number systems (Binary, Octal, Hexadecimal).	PLO1		
CLO2	Analyze digital circuits in combinational and sequential logic.	PLO2		
CLO3	Design combinational and sequential logic circuits from functional description of digital systems.	PLO3		
CLO4	Comply with plagiarism guidelines	PLO8		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	Introduction to Number Systems: Digital Computers, Arithmetic Operations, Decimal, Alphanumeric, and Gray Codes.	CLO1
2	Boolean Algebra and Binary Logic with arithmetic operations	CLO1
3	Binary Gates, Truth Tables, Standard Forms for optimization	CLO1 , CLO2
4	Combinational Logic Circuits: Mapping techniques, karnaugh maps, Optimization techniques.	CLO1 , CLO2
5	Combinational Logic Circuits: Design Steps from given specification to hardware implementation and verification	CLO2 , CLO3
6	Combinational System Decoders, Encoders, Multiplexers, De-Multiplexers	CLO2
7	Arithmetic Operations: Adders, Subtractors, Signed Addition/Subtraction, Binary Adders implementation, Overflow and Contraction	CLO1 , CLO2
8	Combination Logic Design: Implementation of function using Decoders, multiplexers from functional description	CLO2 , CLO3
9	Sequential Circuits: Basic Latches and SR, D, JK and T Flip-Flops	CLO2
10	Sequential System: Analysis of clocked sequential circuits, State assignment, state tables, state diagrams, Use of FF tables	CLO2
11	Sequential Logic System: Design procedure, FF Excitation Tables, Design using Functional description to State diagram. State diagram to hardware implementation and verification	CLO3
12	Digital Logic Design: Construction of gates using CMOS, Timing problems, Metastability, Integration of Asynchronous and Synchronous systems	CLO2
13	PLDs: Programmable Logic Devices, Gate Arrays, Design using ROM, PLA, PAL	CLO3
14	Registers and Counters: Introduction, Registers, Shift and Multi-mode registers, Ripple and Synchronous counters.	CLO3
15	FSM: Basic introduction of Finite state machine and its design	CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-221L Digital Logic Design

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

The laboratory component for Digital Logic Design is aimed at imparting "seeing is believing" sense to the theoretical in-class understanding of concepts. The lab is designed in-line with the week-wise lecture breakdown following the flow right from Boolean algebra to the use of counters. The students are expected to perform hand-on in individual and group-based formations on workstations comprising indigenously produced trainer that contains breadbord, switch and LED panels, clock and power supplies.

After completion of the lab component, the students are expected to understand gate-level integration of boolean systems, usage and configuration of MSI ICs and general understanding of digital system design principles. As part of self-styled exercise, the students are encouraged to pick-up real world problems of small scale and translate them into the realm of digital and binary world to propose a solution thereof.

Course Detail

Faculty	Asim Rehmat
Contact	asimrehmat@hotmail.com
Credit Hrs	1.0
Pre-requisite	CS-141 Introduction to Computing,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Recognize various logic gates	PLO1		
CLO2	Implement basic Boolean expressions using basic logic gates and MSI	PLO2		
CLO3	Construct cost-effective digital logic circuits.	PLO3		
CLO4	Implement arithmetic and logic operations using MSI.	PLO3		
CLO5	Build digital circuits for real-world applications.	PLO4		
CLO6	Demonstrate technical communication skills by writing a brief paper/report on a DLD project	PLO10		

Text Books

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	To get understanding of basic logic gates and to analyze their inputs and outputs	CLO1
2	To get understanding of basic logic gates and to analyze their inputs and outputs	CLO1
3	To get understanding of basic logic gates and function of universal gates.	CLO1 , CLO2
4	To study the Half & Full Adder and Half & Full Subtractor and 4 bit adder & subtractor can be constructed.	CLO3 , CLO4
5	To study the Half & Full Adder and Half & Full Subtractor and 4 bit adder & subtractor can be constructed.	CLO4
6	To study the Half & Full Adder and Half & Full Subtractor and 4 bit adder & subtractor can be constructed.	CLO4
7	Understanding the implementation of Boolean and combinational logic using universal gates. In addition magnitude comparator is studied.	CLO5
8	Understanding the implementation of Boolean and combinational logic using universal gates. In addition magnitude comparator is studied.	CLO5
9	Understanding the implementation of Boolean and combinational logic using decoders. Multiplexers are studied and implemented. BCD to seven segment is implemented.	CLO5
10	Understanding the implementation of Boolean and combinational logic using decoders. Multiplexers are studied and implemented. BCD to seven segment is implemented.	CLO5
11	Understanding the implementation of simple flip flop using NAND gates. Understanding of JK Flip Flop and it is used to implement D and T FFs.	CLO5
12	Understanding the implementation of simple flip flop using NAND gates. Understanding of JK Flip Flop and it is used to implement D and T FFs.	CLO5

University of Engineering and Technology Lahore

Course Outline Report

Subject: HU-221 Technical Writing & Presentation Skills

Department: Humanities Department

Printed Date: 22/11/2018

Course Description

This course has been designed to teach students to adapt their writing to different audiences and purposes. It will help learners develop strategies for making subjects clear to readers who need to understand them. Though this course, learners will learn to write in a clear, concise style and to present information logically, and to design documents in which format contributes to clarity and efficiency.

Course Detail

Faculty	Ms Sadaf Qureshi
Contact	sadaf.linguist@live.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Learning principles of effective Technical Writing and Presentation Skills to develop proficiency in written and oral communication.	PLO10		
CLO2	Developing effective writing strategies for devising clear, concise and meaningful documents ranging from Memos, Emails, Business Letters to CV Writing.	PLO2		
CLO3	Providing an effective framework for the development and presentation of Technical and Research Reports to the target audience.	PLO4		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:MA-225 Differential Equations and Transforms

Department: Department of Mathematics

Printed Date: 22/11/2018

Course Description

This aim of this course is familiarize students to the differential equations and their application to simple physical situations. The students get a general understanding of how differential arise in mathematics, physics and engineering. They should also be aware that we will rely on material that they have studied in prior courses. This course deals with the formation of ordinary differential equations and different techniques for the solutions of ordinary and partial differential equations. Introduction to Laplace transform and Fourier series.

Course Detail

Faculty	Dr Asma Rashid Butt
Contact	asma@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Solve first order (linear or nonlinear) and higher order ODEs with their application	PLO1	Cognitive	3. Apply
CLO2	Use Laplace transform to solve initial value problems.	PLO2	Cognitive	3. Apply
CLO3	Develop the understanding of separation of variables and the use of Fourier series to solve PDEs.	PLO2	Cognitive	3. Apply

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to differential equation basic definitions and terminology.	CLO1

2	Solution and its different type. First order differential equations, Initial value problems, 1st order linear non linear separable differential equations	CLO1
3	Linear homogeneous and non homogeneous differential equations Exact, Non Exact Differential equations	CLO1
4	Irreducible Homogeneous Equations, Bernoulli Equations	CLO1
5	Application of differential equation: Exponential growth and decay, Orthogonal Trajectories of Curves, Newton law of cooling, series circuits etc.	CLO1
6	Differential equation of higher order: Elementary Theory: Linear equations, Homogeneous equations, Non homogeneous equations, Reduction of order,	CLO1
7	Reduction of order, Homogeneous linear equations with constant coefficients,	CLO1
8	Undetermined coefficients approach, Variation of parameter, Cauchy Euler Equations,	CLO1
9	Laplace Transformation: Laplace transform of elementary functions, Laplace transform theorems	CLO2
10	Shifting Theorems, Laplace of derivative of a function, Inverse Laplace transform theorems, Laplace of unit step function	CLO2
11	Laplace of periodic function, Convolution Theorem	CLO2
12	Dirac delta function and its Laplace transformation Solution of initial value problems with the help of Laplace Transforms.	CLO2
13	Periodic Functions, Fourier Series of Periodic Functions with Period 2π ,	CLO3
14	Fourier Series of Even and Odd Functions, Half Range Fourier Sine and Cosine.	CLO3
15	Partial differential equations, basic terminologies, Classification of PDEs	CLO3
16	Solution of linear 1st and 2nd order PDEs by Separation of variables.	CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject: CS-212 Data Structures and Algorithms

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

The course introduces the theory of complexity and abstract data structures as basic building blocks to structure problem objects for efficient solution. The course prepares the students to pick and combine the right data structure for a given problem. The students are prepared to interpret a data structure and associated algorithms to distinguish their space and time requirements.

Course Detail

Faculty	Dr Muhammad Afzal
Contact	shmafzal@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CS-142 Programming Fundamentals,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Manipulate pointers/references syntactically and algorithmically to rearrange relations between objects/nodes of a collection	PLO3		
CLO2	Convert expressions in infix, prefix or postfix notation into one another according to precedence rules and build expression tree from them and vice versa	PLO3		
CLO3	Rewrite code for methods of using abstract data structures populated in system heap through dynamic memory allocation like stacks, queues, priority queues, linked lists for addition and removal of nodes/objects as iterative and recursive functions.	PLO3		
CLO4	Rewrite code for methods of abstract data structures trees and graphs for addition, removal, search and inspect of nodes/objects and traverse through them recursively and non-recursively.	PLO3		
CLO5	Analyze complexity and criticality of algorithms to manipulate aforementioned ADTs as well as searching, sorting and balancing of data/nodes/objects in general; and in hash tables.	PLO2		

Text Books

Grading Policy**Tentative Weekly Lecture Plan**

Week (Lec)	Topics	CLOs
1	Introduction to course of Data Structures and Algorithms highlighting its importance in computer science. Stack based and heap based dynamic implementation of Abstract Data Structures in OOP. Pointers and self-referential structures.	CLO1 , CLO3
2	Static and dynamic Multi-dimensional Arrays and Jagged Arrays. Mapping Functions.	CLO1 , CLO3
3	Stack (LIFO) using arrays, CStack class by maintaining nodes in the system heap. Push/Pop operations and preconditions and their implementation.	CLO1 , CLO3
4	Post-condition/Precondition based usage and design of collection structures. Copy constructor, assignment operator and destructor of stack class. Supplying print function to help debugging for users of CStack class objects.	CLO1 , CLO3
5	Conversion of infix Arithmetic expressions to prefix, postfix Arithmetic expressions. Evaluation of Arithmetic Expressions in prefix, postfix notations using stack.	CLO2 , CLO3
6	Tree representations of expressions and inter conversion to different notation.	CLO2 , CLO4
7	Queues using arrays and dynamic memory, Priority Queue. Singly-linked list and its operations. Their uses to handle different computational tasks.	CLO1 , CLO3
8	Circular and Doubly-linked lists. Uses of such lists. Recursion: decrease and concur strategy for problems	CLO1 , CLO3
9	Binary Trees and M-ary Trees. Components of a tree-nodes, edges. Types of nodes. Terminology and definitions. Insertion of new nodes. Unique key constraint and its handling issues.	CLO1 , CLO4
10	Binary Search Trees (BST). Searching in linked lists, arrays. Linear and binary search. Order of execution of search techniques. Pros and cons of binary search BST.	CLO1 , CLO3 , CLO4 , CLO5
11	Binary Trees to revisit to infix, prefix, postfix notations and inter conversion to different notation. Threaded Tree, Recursion revisited for tree traversals.	CLO1 , CLO4
12	Balancing Binary Tree and Other Height Balanced Trees (Red-Black Tree/AVL Trees).	CLO4
13	Sorting—Bubble sort, Selection sort, insertion sort, Quick sort, Merge Sort, Recursion revisited for sorting.	CLO4 , CLO5
14	Hashing, Hash Table its properties, Hash function and its characteristics, Collision, techniques to avoid or resolve collisions, String hashing concepts.	CLO5

15	Graphs , Basic Operations and traversals, Minimum spanning Tree, Shortest Path problems	CLO4 , CLO5
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-212L Data Structures and Algorithms

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Students develop programs to build basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, stack, queue, priority queue, linked lists, circular lists, doubly linked lists, binary trees, and hash tables. Students develop applications of data structures by implementing algorithms for the creation, insertion, deletion, searching, and sorting of each data structure. Students implement projects requiring the implementation of the above data structures.

Course Detail

Faculty	Dr Muhammad Afzal
Contact	shmafzal@uet.edu.pk
Credit Hrs	1.0
Pre-requisite	CS-142L Programming Fundamentals,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply pointer manipulation constructs to rewrite classes for ADTs for collections of objects in system heap.	PLO3		
CLO2	Rewrite iterative and recursive functions for linear and binary search in linked lists, arrays and trees.	PLO3		
CLO3	Rewrite iterative and recursive functions for sorting data in arrays.	PLO1		
CLO4	Organize data structures to write programs to solve real world problems.	PLO1		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	Review of Pointers, Arrays, Dynamic Memory Allocation, File Handling Implementation of Related Problem	CLO1 , CLO4
2	self-referential structures (SRS), Implementing linked chain of SRS nodes. Navigating each node iteratively to print contents of each node. Copying one linked chain into an other.	CLO1 , CLO2 , CLO4
3	Implementing Stacks using arrays and Stack class for maintaining nodes in the system heap with primitive functions, like push, pop with precondition.	CLO1 , CLO2 , CLO4
4	Improving CStack class with proper definition of copy constructor, assignment operator and destructor.	CLO1 , CLO2 , CLO4
5	Implementing Queues using arrays and using linked object populated in system. Completing class and testing if function with suitable driver functions.	CLO1 , CLO2 , CLO4
6	Lab exercises on recursion. Writing recursive print function forward and backward printing of nodes. Writing recursive copy constructor and destructor workhorse function of already practiced classes.	CLO1 , CLO2 , CLO4
7	Static class implementation for iterative member functions to sort arrays.	CLO2
8	Static class implementation updating with recursive member functions to sort arrays.	CLO2 , CLO4
9	Project selection/allocation initiated. Groups of 3 and some of 4 students to formed under a group leader. Circular and doubly linked list to be implemented as Lab exercise.	CLO1 , CLO2 , CLO4
10	Project selection/allocation to be finalized. Groups of 3 and some of 4 students to formed under a group leader. Binary search tree class to be implemented as class exercise.	
11	Hash table with suitable function to be implemented as lab work.	
12	Project progress presentation.	CLO1 , CLO2 , CLO3 , CLO4
13	Project final progress presentation and evaluation.	CLO1 , CLO2 , CLO3 , CLO4
14	Project final progress presentation and evaluation.	CLO1 , CLO2 , CLO3 , CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-222 Computer Organization and Assembly

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course will provide an overview of structure and function of computers at microprocessor level and how data and program instructions are represented at machine level. Main topics of the course are: organization of computer hardware, x86 microprocessors, register set, memory management , addressing modes, 32 bit x86 arithmetic, logical and data transfer instructions, stack and procedures, string processing , file handling and interrupt processing in assembly language. Students will learn to design, implement, and debug programs in assembly language.

Course Detail

Faculty	Asim Rehmat
Contact	asimrehmat@hotmail.com
Credit Hrs	3.0
Pre-requisite	CSE-221 Digital Logic Design,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Examine data types, registers, instruction set, addressing modes, memory model and interrupt processing mechanism of x86 micro processors	PLO1		
CLO2	Use syntax and semantics of assembly language for 16-bit, 32-bit and 64-bit instruction set	PLO1		
CLO3	Analyze assembly language program components, working and outputs	PLO2		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	Why Assembly Language? Applications of assembly language; Data representation; different number systems and their arithmetic; Boolean expressions. First Assembly Language Program; General Design Concepts and typical components of a computer; 3 address, 2 address, 1 address and zero-address machines,	CLO1
2	modes of operation, basic execution environment, processor registers, memory management of 32 bit x86 processors; modes of operation, basic execution environment, memory management of 64 bit x86 processors; I/O system	CLO1
3	Basic language elements; adding and subtracting integers; exploring LST file; defining data; symbolic constants; 64 bit programming; data transfer instructions; operand types; integer arithmetic instructions; data-related operators and directives	CLO1 , CLO2
4	Indirect addressing model; unconditional branching instructions; loop instruction; revision of concepts for 64 bit programming	CLO2 , CLO3
5	Stack operations; defining and using procedures; linking to an external library	CLO1 , CLO2
6	Stack and Procedures :64 bit assembly programming;	CLO2 , CLO3
7	Conditional branching; Boolean and comparison instructions; conditional loop instructions; conditional and repetition high level constructs using conditional, unconditional branching and loop instructions; conditional control flow directives	CLO2 , CLO3
8	Shift and rotate instructions and their use; multiplication and division instructions; extended addition and subtraction; ASCII and unpacked decimal arithmetic;	CLO2 , CLO3
9	Stack parameters; stack frames; creating local parameters in procedures; INVOKE, ADDR PROC and PROTO directives; creating multi-module programs ; advanced use of parameters	CLO2 , CLO3
10	String primitive instructions; example string procedures; 2-Dimensional arrays using Based and Indexed addressing modes; searching and sorting integer arrays	CLO2 , CLO3
11	Structures and macros; conditional assembly directives; defining repeat blocks	CLO1 , CLO2
12	Interfacing with high level language; inline assembly code; linking 32 bit assembly code with C++ code	CLO3
13	16-bit MS-DOS programming; MS-DOS and the IBM-PC; MS-DOS function calls(INT21h); standard MS-DOS file I/O services;	CLO1 , CLO2 , CLO3
14	BIOS-level programming introduction; keyboard input with INT 16h and video programming with INT 10h; drawing graphics using INT 10h;	CLO1 , CLO2
15	Memory mapped graphics; Accessing I/O ports , course review	CLO1 , CLO2 , CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-222L Computer Organization and Assembly

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course will provide an overview of the structure and function of computers at the level of micro processor and how data is represented at this level. Main topics of the course are: organization of computer hardware, the functions of assembler, linker, and loader, basic assembly language instruction set, memory management, addressing modes, stack and procedures, low-level I/O. Students will learn to design, implement, and debug programs in assembly language.

Course Detail

Faculty	Asim Rehmat
Contact	asimrehmat@hotmail.com
Credit Hrs	1.0
Pre-requisite	CSE-221L Digital Logic Design,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Use assembler, debugger to execute basic assembly language programs.	PLO5		
CLO2	Construct programs in assembly language using x86 32 and 64 bit instruction set.	PLO1		
CLO3	Analyse hardware control and communication using BIOS and DOS interrupts and system calls.	PLO1		
CLO4	Comply with plagiarism guidelines	PLO8		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	Software Required and how to install software. Introduction, installation and operation of tools i. MASM ii. Visual Studio iii. Debuggers Introduction to Assembly Programming in Windows. Assembling and executing your first program and explanation of working. How to debug programs.	CLO1 , CLO2
2	Data Definitions Directives ,Data transfer instructions, Integer arithmetic instructions	CLO1
3	Arrays implementation using Indirect addressing	CLO1
4	Conditional execution using Jmp and Loop instructions	CLO1 , CLO2
5	PUSH and POP instructions, Procedure implementation, Register parameters	CLO1 , CLO2
6	Boolean and comparison instructions, conditional structure implementation	CLO1 , CLO2
7	Shift and rotate instructions , Binary multiplication, Binary bits display	CLO1 , CLO2
8	ASCII and unpacked decimal arithmetic, Packed BCD arithmetic	CLO1 , CLO2
9	Integer multiplication and division instructions, extended arithmetic	CLO1 , CLO2
10	Stack parameters, local variables of procedures, External procedures, Multi module programs	CLO1 , CLO2
11	String instructions, two-dimensional array implementation	CLO1 , CLO2
12	Floating point arithmetic instructions	CLO1 , CLO3
13	High level language interfacing, In-line Assembly	CLO1 , CLO2
14	Interrupts processing, DOS Keyboard interrupts	CLO1 , CLO2
15	Video and graphics interrupts	CLO1 , CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-281 Object Oriented Analysis and Design

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Shazia Shoaib
Contact	prayers5@gmail.com
Credit Hrs	3.0
Pre-requisite	CS-142 Programming Fundamentals,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply object-oriented method for analysis and design	PLO1		
CLO2	Analyse information systems in real-world settings and to conduct methods such as interviews and observations	PLO2		
CLO3	Distinguish between the variety of approaches and perspectives of systems development,	PLO2		
CLO4	Apply appropriate techniques (such as sequence diagrams, state machine diagrams, collaboration diagrams) to achieve the objective and expected results of a systems development process	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-281L Object Oriented Analysis and Design

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Muhammad Awais Hassan
Contact	awais.hassan@hotmail.com
Credit Hrs	1.0
Pre-requisite	CS-142L Programming Fundamentals,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Demonstrate an understanding of the application of OOAD practices from a software project management perspective	PLO9		
CLO2	Apply UML to understand various system models.	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-201 Numerical Analysis

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This is an introductory course on numerical methods and their applications. The primary objective of the course is to develop basic understanding of the numerical methods, applicability and limits of their appropriate use to compute approximate solution of complex mathematical problems. It covers following topics: Error Analysis, Finite Differences, Interpolation, Numerical Differentiation, Numerical Integration, Non-Linear Equations, Linear Systems of Equations etc...

Course Detail

Faculty	Aatif Hussain
Contact	aatif@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	MA-123 Calculus,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Compute the errors, source of error and its effect on any numerical computations and also analyze the efficiency of any numerical algorithms.	PLO1		
CLO2	Determine the methodology of numerical analysis to solve ordinary differential equation.	PLO2		
CLO3	Apply numerical methods to obtain approximate solutions to the following mathematical problems : Root finding, Curve fitting, interpolation, numerical differentiation and integration, system of linear equations, and ordinary differential equations.	PLO3		
CLO4	Analyze the performance, the accuracy and convergence of various algorithms.	PLO4		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to Numerical Analysis and Computing <ul style="list-style-type: none"> • Why Numerical Analysis • Applications of Numerical Methods • Numerical Errors • Effect of Rounding Errors in Arithmetic Operations • Arithmetic Accuracy & Precision 	CLO2
2	Finite Differences <ul style="list-style-type: none"> • Introduction to Finite Difference • Detection and Correction of Errors in a Difference Table • Difference Operators • Relationship between Operators 	CLO1 , CLO3
3	Interpolation <ul style="list-style-type: none"> • Newton's Forward Difference Interpolation Formula • Newton's Backward Difference Interpolation Formula • Interpolation with Central Difference Formula 	CLO1 , CLO3
4	<ul style="list-style-type: none"> • Interpolation and Curve Fitting • Lagrange Interpolating Polynomial • Divided Differences • Error of Interpolation 	CLO1 , CLO3 , CLO4
5	Numerical Differentiation <ul style="list-style-type: none"> • Derivation of Differentiation Formulas. • Relationship b/w Operators E and D • Derivatives using Newton's Forward Difference Formula 	CLO1 , CLO3
6	<ul style="list-style-type: none"> • Derivatives using Newton's Backward Difference Formula • Derivatives using Central Difference Formulas • Higher Order Derivatives, Error Analysis, Applied Problems 	CLO3 , CLO4
7	Numerical Integration <ul style="list-style-type: none"> • Derivation of Integration Formula Based on Forward Diff. • The Newton-Cotes Formulas • Trapezoidal Rule • Simpson's 1/3 rd rule • Combination of Trapezoidal and Simpson's Rules 	CLO1 , CLO3 , CLO4
8	<ul style="list-style-type: none"> • Simpson's 3/8 th Rule • Boole's Rule • Weddle's Rule • Estimation of Errors in some Newton-Cotes Formulas 	CLO3 , CLO4
9	Ordinary Differential Equation <ul style="list-style-type: none"> • Classification of Differential Equations • Taylor Series Method • Euler's Method and its Variations 	CLO1 , CLO3 , CLO4

10	Non-Linear Equations <ul style="list-style-type: none"> • Methods to Solve Non-Linear Equations • Simple Iterative Method/Procedure • Acceleration of Convergence • Newton-Raphson Method 	CLO1 , CLO3
11	Linear Systems of Equations <ul style="list-style-type: none"> • Methods to Solve a System of Linear Equations • Cramer's Rule and Its Modified Form • Gaussian Elimination Methods • Pivot Strategy • Partial Pivoting Scheme 	CLO1 , CLO3
12	<ul style="list-style-type: none"> • Triangular Decomposition (Factorization) Method • Solution of Systems of Equations • Inverse of a Matrix A using L and U • Triangular Decomposition for Symmetric Matrices 	CLO1 , CLO3
13	<ul style="list-style-type: none"> • Solution of Tridiagonal Systems of Equations • Iterative Methods • Jacobi's Method 	CLO1 , CLO3
14	<ul style="list-style-type: none"> • Gauss-Seidel Method • Multistep Methods • Applied Problems, Review 	CLO1 , CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-201L Numerical Analysis

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course is designed for students with no prior programming experience. In this course, existing algorithms are implemented for solving different numerical problems. Topics include MATLAB language syntax, non-linear methods including single root Newton, multi-root Newton, symbolic and non-symbolic, series, 2D and 3D plotting, convergence and divergence of algorithms, Bisection, Secant, Regula falsi methods, linear algorithms including Guassian, Cramer rule, numerical differentiation, QR method, interpolation, integration, trapezoidal rules etc.

Course Detail

Faculty	Aatif Hussain
Contact	aatif@uet.edu.pk
Credit Hrs	1.0
Pre-requisite	MA-123 Calculus,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems using appropriate numerical tool.	PLO5	Cognitive	2. Understand
CLO2	Derive and implement numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.	PLO1	Cognitive	2. Understand
CLO3	Examine & select appropriate numerical method for moderate computer science and engineering problems for approximate solutions	PLO2	Cognitive	2. Understand
CLO4	Write efficient, well-documented code and present numerical results in an informative way	PLO1	Cognitive	2. Understand

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to MATLAB (Syntax, functions) Variables, Matrices, Formatting, Plots, Functions, Scripts, Code files	CLO1 , CLO4
2	Newton's method and MATLAB(while loop, for loop, if else), Error calculation (Absolute, Relative, Residual) Series (Beginner)	CLO1
3	Series and Symbolic functions Derivatives & Integrals (Indefinite and definite) 3D and 2D plotting of equations/functions (Using MATLAB)	CLO1 , CLO2
4	System of non linear equations (Newton Raphson method) Jacobian matrix	CLO2
5	System of non-linear equations Bisection method Regula Falsi Method	CLO2
6	Quiz Newton method Root finding Error calculation Plotting (2D, 3D) MATLAB System of non-linear equations Bisection method Regula-Falsi Newton Raphson Secant method (Will work on it if time available) Iteration method Root finding revision	CLO3 , CLO4
7	Solution of Linear Systems of Equations - Basic Concepts - Cramer's Rule and its Modified Form - Direct Methods for Solving Linear Systems - Gaussian Elimination Method	CLO2
8	Solution of Linear Systems of Equations - Pivot Strategy - Partial Pivoting Scheme - Complete Pivoting Scheme - Iterative techniques in Matrix Algebra	CLO2

9	<p>Solution of Linear Systems of Equations</p> <ul style="list-style-type: none"> - Triangular Decomposition (Factorization) Method - Jacobi Method - Gauss-Seidel Iteration Method <p>Mixed with previous Linear systems of equations</p>	CLO3
10	<p>Finite Differences</p> <ul style="list-style-type: none"> - Difference Table - Detection and Correction of Errors in a Difference Table - Forward Difference Operator - Backward Difference Operator - Central Difference Operator - Shift Operator - Mean Operator 	CLO2
11	<p>Interpolation</p> <ul style="list-style-type: none"> - Introduction & Basic Concepts - Newton's Forward Difference Interpolation - Newton's Backward Difference Interpolation - Interpolation with Central Difference Formulas - Error Estimation In Interpolation 	CLO2
12	<p>Numerical Differentiation</p> <ul style="list-style-type: none"> - Derivation of Differentiation Formulas. - Relationship b/w Operators E and D - Derivatives using Newton's Forward Difference Formula 	CLO2
13	<p>Numerical Integration (Details to be added later) or MATLAB UI Creation discussion Research paper reading for numerical analysis problem in computer science. Selection of projects based on it.</p>	CLO3
14	Project	CLO3 , CLO4
15	Project	CLO3 , CLO4
16	Presentation & Viva	CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-301 Probability and Random Variables

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

The course introduces students to the modeling, quantification, and analysis of uncertainty. Topics covered include: formulation and solution in sample space, random variables, transform techniques, simple random processes and their probability distributions, Markov processes, limit theorems, and elements of statistical inference.

Course Detail

Faculty	Dr Irfan Ullah Chaudhary
Contact	irfanc@mit.edu
Credit Hrs	3.0
Pre-requisite	MA-224 Multivariate Calculus,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Compute probability and conditional probability of events.	PLO1		
CLO2	Use the concepts of discrete and continuous random variables, discrete and continuous probability distributions, joint probability distributions, expectation values, variance and covariance (using distributions like Bernoulli, Uniform, Gaussian and Geometric).	PLO2		
CLO3	Use various forms of the Law of Large Numbers to simplify probability calculations.	PLO3		
CLO4	Demonstrate an understanding of Bernoulli and Poisson distributions, and the relationship between them.	PLO1		
CLO5	Use simple dynamical models as Markov chains to solve real world problems.	PLO3		
CLO6	Apply basic inference methodologies (for both estimation and hypothesis testing) to real world problems.	PLO1		

Text Books

Grading Policy**Tentative Weekly Lecture Plan**

Week (Lec)	Topics	CLOs
1	Probability models and axioms, Conditioning and Bayes' rule	CLO1
2	Independence, Counting, Discrete random variables;	CLO1 , CLO2
3	Probability mass functions; expectations, Discrete random variable examples; joint PMFs	CLO2
4	Multiple discrete random variables: expectations, conditioning, independence; Continuous random variables	CLO2
5	Multiple continuous random variables, Continuous Bayes rule; derived distributions	CLO2
6	Derived distributions; convolution; covariance and correlation; iterated expectations;	CLO2
7	Sum of a random number of random variables	CLO2
8	Limit theorems	CLO3
9	Limit theorems	CLO3
10	Bernoulli Process, Poisson Process	CLO4
11	Bernoulli Process, Poisson Process	CLO4
12	Markov chains	CLO5
13	Markov chains	CLO5
14	Bayesian statistical inference - I	CLO6
15	Classical statistical inference - II	CLO6

University of Engineering and Technology Lahore

Course Outline Report

Subject: HU-111L communication skills

Department: Humanities Department

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty

Contact

Credit Hrs

1.0

Pre-requisite

CLOs

Description

PLOs

Domain

**Domain
Level**

Measureable Student Learning Outcomes

Text Books

Grading Policy

Tentative Weekly Lecture Plan

**Week
(Lec)**

Topics

CLOs

University of Engineering and Technology Lahore

Course Outline Report

Subject: CS-312 Theory of Automata and Formal languages

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Tauqir Ahmed
Contact	tauqir_ahmad@hotmail.com
Credit Hrs	3.0
Pre-requisite	CS-211 Discrete Mathematical Structures,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Define concepts in automata theory and theory of computation	PLO1		
CLO2	Identify different formal language classes and their relationships	PLO1		
CLO3	Design grammars and recognizers for different formal languages	PLO1		
CLO4	Prove or disprove theorems in automata theory using its properties	PLO1		
CLO5	Determine the decidability and intractability of computational problems	PLO1		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Languages, Recursive Definition and Regular Expressions <ul style="list-style-type: none">• Languages in the abstract• Kleene Closure• A New method for defining languages	CLO2

2	<ul style="list-style-type: none"> • Formal Definition of Defining Regular expressions • Languages associated with regular expressions • Introducing EVEN-EVEN 	CLO2
3	Finite Automata <ul style="list-style-type: none"> • FAs and their languages • EVEN-EVEN Revisited 	CLO3
4	Transition Graphs <ul style="list-style-type: none"> • Relaxing the Restriction on Inputs • Generalized Transition Graphs • Nondeterminism 	CLO3
5	Kleene's Theorem <ul style="list-style-type: none"> • Unification • Turning TG's into Regular Expressions 	CLO4
6	<ul style="list-style-type: none"> • Converting Regular Expressions into FAs • FAs and Kleene's Theorem 	CLO4
7	Finite Automata with Output <ul style="list-style-type: none"> • Moore Machines • Mealy Machine • Moore-Mealy 	CLO4
8	Mid Term	
9	Non Regular Languages <ul style="list-style-type: none"> • Pumping Lemma • The Myhill-Nerode Theorem • Quotient Languages 	CLO2
10	Context Free Grammars <ul style="list-style-type: none"> • Syntax as a Method for Defining a Languages • Symbolism for Generative Grammars • Trees 	CLO3
11	<ul style="list-style-type: none"> • Lukasiewicz Notation • Ambiguity • The Total Language Tree 	CLO5
12	Push Down Automata <ul style="list-style-type: none"> • A New format for FA's • Adding a Push Down Stack 	CLO4
13	<ul style="list-style-type: none"> • Defining the PDA 	CLO1
14	Context Free and Non Context Free Languages <ul style="list-style-type: none"> • Self-Embeddedness • The Pumping Lemma for CFLs 	CLO2
15	<ul style="list-style-type: none"> • Closure Properties • Intersection and Complement 	CLO1

16	<p>Turing Machine</p> <ul style="list-style-type: none">• The Turing Machine• The subprogram INSERT• The sub Program DELETE	CLO1
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-381 Software Engineering

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course is intended to provide students with an understanding of the concepts and methods for the definition, development and maintenance of software systems. The course discusses important software development activities, emphasizing on analysis, design, and testing. The objective is to inculcate a disciplined approach to software development, enabling students to effectively use this approach to develop software.

Course Detail

Faculty	Dr Amjad Farooq
Contact	amjadfarooq@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CS-241 Object Oriented Programming,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Perform requirements Engineering for a software product	PLO2	Cognitive	2. Understand
CLO2	Design and implement, in a programming language, an executable solution to a given problem using common software principles and best practices	PLO3	Cognitive	3. Apply
CLO3	Apply appropriate software testing techniques and evaluate the quality of a software product at module, integration, and system granularity levels	PLO4	Cognitive	5. Evaluate

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	FAQ's about Software Engineering Professional and Ethical Responsibilities	CLO1
2	Software Engineering: A Layered Technology The software Process Software Process Models:	CLO1
3	Functional and Non Functional Requirements	CLO1 , CLO2
4	User Requirements System Requirements Interface Specification The Software Requirements document	CLO3
5	Feasibility Studies Requirements Elicitation	CLO3
6	Requirements Validation Requirements Management	CLO3
7	Architectural Design Decisions System Organization	CLO3
8	Modular Decomposition Styles Control Styles Reference Architectures	CLO3
9	Objects and Object Classes	
10	An Object Oriented Design Process Design Evolution	
11	Agile Method Extreme Programming	CLO2
12	Rapid Application Development Software Prototyping	CLO1 , CLO2
13	System Testing Component Testing	
14	Test Case Design Test Automation	

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-381L Software Engineering

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course introduces the fundamental principles and methodologies of software engineering. It covers the software process and methods and tools employed in the development of modern systems. The use of UML tools are emphasized. The course includes a team-based project in which students apply their new knowledge to a full development life cycle, including maintenance.

Course Detail

Faculty	Samyan Qayyum Wahla
Contact	samyantwahla@gmail.com
Credit Hrs	1.0
Pre-requisite	CS-241L Object Oriented Programming,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Evaluate Requirements and Design software systems using common software principles and industry known tools	PLO3	Cognitive	3. Apply
CLO2	Implement, in a programming language, an executable solution to a given problem using best practices.	PLO3	Cognitive	3. Apply
CLO3	Apply appropriate software testing techniques and evaluate the quality of a software product at module, integration and system granularity levels.	PLO5	Cognitive	3. Apply
CLO4	Collaborate in teams for development of significantly sized software system.	PLO10	Psychomotor	1. Naturalization
CLO5	Comply with Plagiarism Policies	PLO8	Cognitive	2. Understand

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	C# Crash Course I Basic Constructs Code Documentation Guidelines	CLO2
2	C# Crash Course II Database Connectivity Project Proposal Guidelines	CLO2
3	Software Prototype	CLO1
4	Web Development	CLO2
5	Software Requirement Specification	CLO1
6	Software Project Planning	CLO1
7	UML Modeling	CLO1
8	Code Sharing	CLO4
9	Mid Term	
10	Project Implementation I	CLO4
11	Test Cases Unit Tests Test Coverage	CLO3
12	Project Implementation II	CLO4
13	Project Testing Bug Logs	CLO4
14	Project Bugs Solving	CLO4
15	Project Deployment	CLO4
16	Project Demonstration	CLO4
17	Project Viva	CLO4
18	Final Term	

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-361 Artificial Intelligence

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course introduces representations, techniques, and architectures used to build applied systems and to account for intelligence from a computational point of view. This course also explores applications of rule chaining, heuristic search, logic, constraint propagation, constrained search, and other problem-solving paradigms. In addition, it covers applications of decision trees, KNN, Naive Bayes Classification, neural nets, and other learning paradigms.

Course Detail

Faculty	Prof Dr Muhammad Shahbaz
Contact	muhammad.shahbaz@gmail.com
Credit Hrs	3.0
Pre-requisite	CS-142 Programming Fundamentals, CS-211 Discrete Mathematical Structures,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply Informed and Uninformed Search Techniques and build the ability to theoretical and practical understanding of Blind and Informed machine search and machine learning techniques.	PLO3		
CLO2	Develop ability for designing intelligent solution for adversarial Search and game playing	PLO3		
CLO3	Apply AI techniques both in analytical and in programming contexts to solve classification problems, and to communicate the results.	PLO2		
CLO4	Construct the models for knowledge representation	PLO5		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction of AI and Search Techniques Supplemental Readings: AIMA2E: Chapter 1	CLO1 , CLO4
2	Introduction to Informed Vs Uninformed Searches Any Path Vs Optimal Path Searches Depth First, Breadth First and Best First Searches Progressive Deepening or Iterative deepening Search	CLO1
3	Introduction to Heuristic Searches Designing Optimal Searches Uniform Cost Search A* Search Techniques	CLO1
4	Dynamic Programming Optimality Principal Revisiting all search techniques with basis of Optimal Search techniques Consistency Conditions for A* Search	CLO1 , CLO3
5	Constraint Satisfaction Problems	CLO1
6	Adversarial Search and Two players Game Playing	CLO2
7	Machine Learning Introduction Nearest Neighbore Algorithm	CLO3 , CLO4
8	Mid Term Exams	
9	Building Learning Techniques using Conjunctive Normal Forms Disjunctive Normal Forms	CLO3
10	Building Intelligent Systems using Decision Trees	CLO3
11	Introduction to Bayes Theorem Classification using Naive Base Classification	CLO3
12	Introduction to Artificial Neural Networks Solving problems using Perceptron and Adaline	CLO3
13	Introduction to Logic and Knowledge Representation Propositional Logic	CLO3
14	Introduction to Natural Language Processing First Order Logic	CLO4
15	Language and Revision of all Concepts covered during the course	CLO1 , CLO2 , CLO3 , CLO4

16	Final Exam	
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-361L Artificial Intelligence

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This Lab course will provide student an opportunity to practically implement the concepts of search techniques and machine learning algorithms to learn how they can be used to solve complex engineering problems. This course will provide an opportunity to students to learn how to model engineering problems and find their solutions using Artificial Intelligence.

Course Detail

Faculty	Prof Dr Muhammad Shahbaz
Contact	muhammad.shahbaz@gmail.com
Credit Hrs	1.0
Pre-requisite	CS-142L Programming Fundamentals, CS-211 Discrete Mathematical Structures,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Describe Informed and Uninformed Search Techniques with an ability to theoretical and practical understanding of Blind and Informed machine search and machine learning techniques.	PLO3		
CLO2	Develop intelligent solution for adversarial Search and game playing	PLO5		
CLO3	Apply AI techniques both in analytical and in programming contexts to solve problems, and to communicate the result of such application.	PLO3		
CLO4	Use project management frameworks that ensure successful.	PLO11		
CLO5	Select AI solutions that help sustainable development of society	PLO7		
CLO6	Demonstrate ethical and professional responsibilities involved in AI design	PLO8		
CLO7	Demonstrate life long learning skills	PLO12		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to AI and its Applications	CLO1
2	Simple searching (linear search using array of integers, Strings, from Files)	CLO1
3	Advance search techniques like binary search.	CLO1
4	Breadth First Search using graphs	CLO1
5	Depth First Search	CLO1
6	Heuristic Search / Best First Search	CLO1
7	A* Search	CLO1
8	Mid Term Exam Week	
9	Wumpas World Game	CLO2
10	Unbeatable Tic Tac Toe Game	CLO2
11	Nearest Neighbour and clustering Algorithms Implementation to solve Classification Problems	CLO3
12	Artificial Neural Networks to classify linearly separable data	CLO3
13	Introduction to Prolog	CLO3
15	Predicate logic using Prolog Group Project	CLO3
16	Group Project	CLO1 , CLO2 , CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-311 Analysis of Algorithms

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Outline Introduction to algorithms, the role of algorithms in computing, algorithm design techniques; methods of specification of algorithms, proving an algorithm's correctness, fundamental of the analysis of algorithms efficiency, asymptotic notations, mathematical analysis of non-recursive algorithms, mathematical analysis of recursive algorithms, divide-and-conquer algorithms and recurrences, greedy algorithms, data structures, graph algorithms, and, dynamic programming.

Course Detail

Faculty	Dr Khadim Hussain Asif
Contact	asifkhad@yahoo.com
Credit Hrs	3.0
Pre-requisite	CS-211 Discrete Mathematical Structures, CS-212 Data Structures and Algorithms, CS-212L Data Structures and Algorithms,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Classify algorithms according to their complexity	PLO4		
CLO2	Compute time and space complexity of algorithms using algorithm analysis techniques	PLO2		
CLO3	Perform asymptotic analysis of recursive as well as non-recursive algorithms.	PLO2		
CLO4	Devise efficient algorithms using various algorithm design techniques	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to Algorithms Role of Algorithms in computing Methods of specification of algorithms Algorithms as a technology	CLO1
2	Fundamental of the analysis of algorithms efficiency Asymptotic Notations Mathematical analysis of non-recursive algorithms	CLO2 , CLO3
3	Description of Selection Sort Analysis of Selection Sort Analysis of Linear Search Algorithm	CLO2 , CLO3
4	Analysis of Binary search Algorithm Mathematical analysis of recursive algorithms, Tower of Hanoi Problem.	CLO2 , CLO3
5	What are Recurrences? Methods to solve recurrences: i. Substitution Method ii. Recursion Tree Method iii. Master Method	CLO1 , CLO3
6	Sorting and Order Statistics Heap Sort Maintaining the heap property Building a heap The Heap-Sort Algorithm	CLO2 , CLO3
7	Quick Sort Description of Quick Sort Analysis of Quick Sort Merge Sort Description of Merge Sort Analysis of Merge Sort	CLO1 , CLO2 , CLO3
8	Radix Sort Bucket Sort Counting Sort	CLO2 , CLO4
9	Mid Term Exam	
10	Algorithm Design Techniques Description of Dynamic Programming Steps required for the Design of Dynamic Programming Algorithms	CLO1 , CLO4
11	Assembly-Line Scheduling Matrix Chain Multiplication	CLO4

12	Greedy Algorithms Elements of Greedy strategy Coin Chaining	CLO4
13	Minimum Spanning Tree Growing a Minimum Spanning Tree Kruskal's Algorithm Prim's Algorithm	CLO3 , CLO4
14	Elementary Graph Algorithms Representation of graph Breadth-First Search Depth-First Search	CLO3 , CLO4
15	Single-Source Shortest Paths Single-Source Shortest Paths in DAG Dijkstra's Algorithm All Pairs Shortest Paths The Floyd-Warshall algorithm	CLO2 , CLO4
16	Final Term Exam	

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-362 Operating Systems

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course is intended to study operating system design, and takes an in-depth look at the design of robust multitasking operating systems. We will study theoretical and practical issues with an objective to attempt designing robust operating systems. Important topics include naming, operation, structure, process, process scheduling, Inter-process communication, process synchronization, deadlock, memory management, system protection and security, and distributed systems.

Course Detail

Faculty	Dr Muhammad Aslam
Contact	maslam@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CS-212 Data Structures and Algorithms, CSE-222 Computer Organization and Assembly,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Describe theoretical and practical issues in designing robust operating systems	PLO1		
CLO2	Analyse the concepts and principles applied in UNIX, Linux, and MS-DOS/MS-Windows operating systems	PLO1		
CLO3	Analyze the important UNIX and Linux data structures and its various services through programming exercises	PLO5		
CLO4	Identify simple security threats to computing systems.	PLO6		
CLO5	Differentiate between collaboration and plagiarism.	PLO8		
CLO6	Discuss some of the security features of operating system	PLO6		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Overview, Introduction to basic concepts, Definition, OS kernel, Operating System Structures	CLO1 , CLO3
2	Processes, Process states, PCB, inter-process communication, process coordination and, process management, POSIX shared Library, Windows XP.	CLO1 , CLO2
3	Threads, Multithreading Models, Operation on threads, Thread Libraries, Pthreads.	CLO1 , CLO2
4	Process synchronization: Principles of concurrency, critical section problem (SW and HW solutions), Monitors, Semaphores, synchronization in Linux, synchronization in Pthread.	CLO1 , CLO2
5	Deadlock: Introduction, necessary condition for deadlock, identification, prevention, avoidance, safe sequence, banker algorithm, Deadlock recovery.	CLO2
6	CPU Scheduling: Scheduling Criteria, scheduling algorithms and their evaluation, Multi-processor scheduling, Linux scheduling, Windows XP scheduling.	CLO2 , CLO3
7	Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Page Table, The Intel Pentium.	CLO2 , CLO3
8	Mid Term Exam	CLO1 , CLO2
9	Virtual memory: Demand paging, page replacement thrashing, Windows XP.	CLO1 , CLO2
10	File-System interface: Concepts, protection, access methods, directory structure, file sharing	CLO2 , CLO3
11	File system implementation: structure, log-structured, NFS, free space management	CLO1 , CLO2
12	Mass-Storage Structure: Disk structure, attachment, scheduling, management, RAID structure, Disk attachment, sharing, scheduling.	CLO2
13	I/O systems, I/O HW, STREAMS, Application I/O subsystems	CLO1 , CLO2
14	Systems Protection: Access matrix and its implementation, domain of protection, Access rights, protection models.	CLO2 , CLO3
15	Systems Security: problems and threats, cryptography, user authentication, Firewall.	CLO1 , CLO3
16	Course Final Exam	CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-362L Operating Systems

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This lab course is designed to give understanding of underlying concepts and principles for implementation of contemporary operating systems. Starting from exploring various system commands, services, and system programs. the lab work interfaces includes shell programs. All exercises/practical work will be done on UNIX/Linux OS system. Also, Students will examine important UNIX and Linux data structures. Programming language environment: C on UNIX/Linux.

Course Detail

Faculty	Dr Muhammad Aslam
Contact	maslam@uet.edu.pk
Credit Hrs	1.0
Pre-requisite	CS-212L Data Structures and Algorithms, CSE-222L Computer Organization and Assembly,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Create efficient C programs on the Linux platform	PLO1		
CLO2	Develop applications that create new processes and communicate with each other through pipes and signals	PLO3		
CLO3	Apply OS knowledge to efficiently and correctly execute concurrent processes	PLO1 PLO3 PLO5		
CLO4	Compare various scheduling algorithms using diverse engineering metrics	PLO3		
CLO5	Demonstrate a commitment to life-long learning	PLO12		
CLO6	Identify potential of modern operating systems to solve social, scientific , engineering, and technological problems	PLO7		
CLO7	Follow plagiarism guidelines	PLO8		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Linux OS Linux Installation	CLO1
2	Installation Virtual Machine Linux Shell Commands	CLO1 , CLO2
3	Linux Programming: C/C++ File System Calls I/O system Calls	CLO1 , CLO2
4	Linux Process System Calls: Fork () and exec() system Calls	CLO1 , CLO2
5	Inter-Process Communication through Shared Memory	CLO3 , CLO4
6	Linux Pipes Programming Message queues	CLO2 , CLO3
7	POSIX Threads Library: pthread	CLO2
8	Java Threads	CLO2 , CLO3
9	Mid Term Exam	
10		
11	Process and Threads Synchronization	CLO3 , CLO4
12	Producer-Consumer Problem: synchronization through semaphores implementation	CLO2 , CLO3
13	FCFS ,Round Robin Scheduling Shortest Job First , Priority Scheduling	CLO3 , CLO4
14	Process Scheduler Simulator	CLO1 , CLO2 , CLO3
15	First Fit and Best Fit for Memory Management	CLO3
16	File Manipulation	CLO2 , CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-331 Computer Networks

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Computer Networks is the second subject in the track of “Communications Networks” following either data communications or telecommunication networks. It may however be the first course in the subject track, though the students are expected to learn rudimentary issues at their own. The subject introduces the students the applications, principles, design, and standards of the various types of computer networks that are both existent and evolving. The pedagogical theme emanates from Internet and WWW as the baseline architecture and foundation application, respectively, and their relationship to the ISO OSI reference model. Specific topics include Internet protocols such as routing in LANs, WANs and other networks, TCP for connection management and congestion control, switching and routing, and latest developments in wireless networking. Coupled with supervised labs, the student shall get hands-on exposure to the Internet at work. After the completion of the course, the students shall be able to handle existing and newer networks both in theory and practice at both the operational and planning levels. At the engineering levels, the students would be able to identify engineering problems and design architectural and algorithmic solutions, accordingly.

Course Detail

Faculty	Dr Ali Hammad Akbar
Contact	ahakbar@gmail.com
Credit Hrs	3.0
Pre-requisite	CS-241 Object Oriented Programming,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Describe the structure and organization of Internet and major applications like HTTP, DNS	PLO1		
CLO2	Develop small applications like chat and mail client etc at application layer	PLO3		
CLO3	Analyze the underlying techniques like reliable data transfer, flow control etc, core protocols like TCP/IP and algorithms like Reno/Tahao which enable end-to-end data transfer in heterogeneous environment of Internet	PLO2		
CLO4	Identify the principles behind routing algorithms for IP based routed network design	PLO3		
CLO5	Demonstrate the function of switches and routers etc which enable Intranet and Internet	PLO1		

Text Books**Grading Policy****Tentative Weekly Lecture Plan**

Week (Lec)	Topics	CLOs
1	What Is the Internet? A Nuts-and-Bolts Description A Services Description What Is a Protocol? The Network Edge The Network Core Delay, Loss, and Throughput in Packet-Switched Networks	CLO1
2	Protocol Layers and Their Service Models Networks Under Attack History of Computer Networking and the Internet	CLO1
3	Application layer Principles of Network Applications The Web and HTTP File Transfer: FTP Electronic Mail in the Internet	CLO1 , CLO2
4	DNS The Internet's Directory Service Peer-to-Peer Applications BitTorrents	CLO1 , CLO3
5	Transport Layer Services Multiplexing and Demultiplexing Connectionless Transport: UDP	CLO3
6	Principles of Reliable Data Transport	CLO3
7	Connection-Oriented Transport: TCP Principles of Congestion Control TCP Congestion Control	CLO3
8	Mid-Term	
9	Virtual Circuits and Datagram Networks Inside a Router Details of the Internet Protocol (IP)	CLO4
10	IP Subnetting and design of wide area network	CLO4
11	Routing Algorithms like Link State, Distance Vector and Hierarchical Routing	CLO4
12	Routing in the Internet Routing Information Protocol (RIP) Open Shortest Path First (OSPF) Border Gateway Protocol (BGP)	CLO4
13	Link Layer Error Detection and Correction Multiple Access Protocols	CLO5
14	Network Devices at link layer switches, switch learning, campus area networks VLANs MPLS	CLO5

15	Multiprotocol Label Switching (MPLS)) Data Center Networking	CLO5
16	Wireless network, WiFi Mobility and Mobile IP	CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-331L Computer Networks

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

The students carry out a number of experiments during 15 laboratory sessions of 2h each. Based on most of the popular textbooks on computer networking, such as Douglas E Comer [4], Peterson and Davie, William Stallings [6], and Tanenbaum [7] the lab modules have been designed. We are currently using Kurose-Ross [8] and find its top-down approach useful in motivating student interest. For example, we start our students off with Python/Java network programming very early in the course. The material covered in laboratory sessions is easily transported to students' home machines, and many students enthusiastically run client-server applications between their homes or dormitory rooms.

Course Detail

Faculty	Dr Ali Hammad Akbar
Contact	ahakbar@gmail.com
Credit Hrs	1.0
Pre-requisite	CS-241L Object Oriented Programming,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Analyze the Internet traffic using modern sniffer tools	PLO5		
CLO2	Analyze the Internet core functions using diverse online available tools	PLO4		
CLO3	Build simulations to measure the network parameters	PLO3		
CLO4	Design the campus/corporate example network scenarios along with hands on training on network devices like switches and routers	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to the types of labs, their structure and relationship	CLO1
2	Introduction to Internet-emulation laboratory	CLO2
3	Introduction and exposure to Linux basic commands + Viva	CLO2
4	Network diagnostics tools; Ping, traceroute, netstat, IFconfig + Viva	CLO2 , CLO3
5	Introduction to X-window system + Viva	CLO3
6	Introduction to WireShark + TCPDump + Viva	CLO1
8	Analysis of FTP traffic + Viva	CLO1
9	Introduction to installation & experiment on Cisco Packet Tracer + Viva	CLO2
10	Introduction to the Cisco Router User Interface + Viva	CLO2
11	Configuring IP Routing + Viva	CLO2
12	Introduction to OMNET++ and Inet	CLO2
13	Configuring Access Control Lists (ACLs) + Viva	CLO2
14	Project demo 1	CLO4
15	Project demo 2	CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-382 Web Technologies

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

A course focusing on the development of dynamic content and applications to facilitate information distribution. The course stresses development strategies for managing the rapidly changing information of corporations and organizations for just-in-time distribution, using authoring programs to create interactive multimedia products that utilize database management systems, file systems, and HTML/XML to provide a method for visualizing and manipulating that data. Significant time is spent on intermediate to advanced programming and scripting. Students are required to plan, design and implement a major project. Topics include intranets, networks, the World Wide Web, development languages, and other newly developed technologies.

Course Detail

Faculty	Dr Amjad Farooq
Contact	amjadfarooq@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CS-142 Programming Fundamentals,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	What is a web app and how does it work? Purpose and Syntax of HTML & CSS	PLO1		
CLO2	Client Side Scripting Technologies: Implementation via JavaScript, JQuery	PLO3		
CLO3	Implement the Server Side Programming: Discuss the insights of internet programming and implement complete application over the web.	PLO2		
CLO4	Customizations of some existing Open-Source Technologies-based Web Applications: Content Management Systems (WordPress) and eCommerce Solution (OpenCart)	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction to Web Technologies and History of web and Internet	CLO1
2	Introduction to HTML and Introduction to CSS	CLO2
3	Discussion on HTML + CSS	CLO4
4	Introduction to Client Side Programming: JavaScript	CLO4
5	Introduction to JQUERY; JQUEY +HTML+CSS Website	CLO3
6	Data Intensive Web Applications; Web Server, Application Server, Database Server; MySQL: Data & Data Objects Manipulations via SQL	CLO4
7	Server side scripting Technology: PHP - An Introduction	CLO4
8	Review: HTML, CSS, JavaScript, JQuery, BootStrap, SQL, PHP(Syntax,Variables,Operators,Control Instructions, Loop Instructions) Mid-Exam	
9	Writing PHP CODE; Server Side Variables ; Request, Response, Session Handling, Functions, Arrays	CLO3
10	Events, properties of Server Side Controls	CLO2
11	Database Programming With PHP.	CLO4
12	Object Oriented Programming Concept	CLO3
13	PHP Framework (Laravel)	CLO4
14	JSON, AJAX	CLO3
15	Angular JS	CLO4
16	Semester Projects: Presentation & Evaluation	

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-363 Database Systems

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course introduces the basics of database systems, as well as the modeling, designing and manipulation of relational databases. The students will gain the required knowledge to describe terminologies within databases, their characteristics, functions, pros and cons.

Topics include database concepts, data modeling, Relational database models, E-R modeling and normalization of tables. The course will enable the students to acquire knowledge of basic concepts to design database systems.

Course Detail

Faculty	Dr Syed Khaldoon Khurshid
Contact	khaldoon@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CS-212 Data Structures and Algorithms,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Understand the importance and concepts of Database Management Systems	PLO12	Cognitive	2. Understand
CLO2	Understand and Compare different Data Models	PLO2	Cognitive	2. Understand
CLO3	Design ERM for Relational database Model using the concepts of Normalization	PLO3	Cognitive	3. Apply

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	Database Orientation/ Introduction <ul style="list-style-type: none"> • Database: Multi-dimensional • Data and Information • Flat File System: Why to change? • Disadvantages of File system • The layered approach to Database Implementation 	CLO1
2	<ul style="list-style-type: none"> • Control to DBA • Disadvantages of Database • Schema and Sub-schema • Difference between software application and DBMS • Relational Database Model 	CLO1
3	<ul style="list-style-type: none"> • Relational Operations • Structure of DB • SQL • Object Oriented Database • Benefits of OODB 	CLO1
4	<ul style="list-style-type: none"> • Relational Database Background • Computer File Systems • Data, Information and Knowledge • Data management • Intro. to DB and DBMS • Metadata • DBMS • Advantages of DBMS • Types of databases • Data warehouses • Database Design • Manual File System 	CLO2
5	<ul style="list-style-type: none"> • Data processing Specialist • Basic File Terminologies • Problems with File system • Structural and Data Dependence • Field Definition and Naming Convention • Data Redundancy • Data Inconsistency and Data integrity • Data Anomalies and its Types • Difference between database systems and file system • Database System Environment • Database Functions 	CLO1 , CLO2
6	<ul style="list-style-type: none"> • The importance of Data Models • Data Model basic building blocks • Business Rules 	CLO3
7	<ul style="list-style-type: none"> • The Evolution of Data Models • Degrees of Data Abstraction 	CLO1 , CLO2

8	<ul style="list-style-type: none"> • The Logical View of the Data • Keys • Relational Set Operations • The Data dictionary and system catalog 	CLO2
9	<ul style="list-style-type: none"> • The Relationship within the relational Database • Data Redundancy revisited • Indexes • Codd's Relational Database Rules 	CLO2
10	E-R Modeling <ul style="list-style-type: none"> • The E-R Model • Developing ER Diagram • Database Design Challenges: Conflicting Goals 	CLO3
11	Normalization of Database Tables <ul style="list-style-type: none"> • Database Tables and Normalization • The Need of Normalization • The Normalization Process 	CLO3
12	Normalization of Database Tables <ul style="list-style-type: none"> • Improving the design • Surrogate Key Considerations 	CLO3
13	Normalization of Database Tables <ul style="list-style-type: none"> • Higher Level Normal Forms • Normalization and Database Design • De-normalization 	CLO3
14	Advance Data Modeling <ul style="list-style-type: none"> • The Extended ER Model 	CLO2 , CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-363L Database Systems

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course relies on primary readings from the database community to introduce graduate students to the foundations of database systems, focusing on basics such as the relational algebra and data model, schema normalization, query optimization, and transactions.

Course Detail

Faculty	Samyan Qayyum Wahla
Contact	samyanwahla@gmail.com
Credit Hrs	1.0
Pre-requisite	CS-212L Data Structures and Algorithms,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Construct DML queries to retrieve and store data in different relations	PLO5	Cognitive	2. Understand
CLO2	Construct DDL queries to manage relations, constraints and indexes	PLO5		
CLO3	Derive physical model from conceptual design methods	PLO5		
CLO4	Develop project in higher level programming language to solve real world problem using relational model	PLO3	Cognitive	3. Apply

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Goals of the Course	

2	Introduction to entities, attributes, relationship, referential integrity constraints. creating tables and inserting data with help of visual interface.	CLO1
3	Retrieving Data Using the SQL SELECT Statement	CLO1
4	Restricting and Sorting Data	CLO1
5	Using Single-Row Functions to Customize Output	CLO1
6	Reporting Aggregated Data Using the Group Functions	CLO1
7	Crystal Reports	CLO1
8	Displaying Data from Multiple Tables	CLO1
9	Using Sub queries to Solve Queries	CLO1
10	Quiz 01	
11	Quiz 01 Solution	
12	DML STATEMENTS and Transactions [Save Points, Rollback and Commit]	CLO1
13	Using DDL Statements to Create and Manage Tables	CLO2
14	Creating Other Schema Objects , Views, Sequences etc	CLO2
15	Procedural Language, Creating Procedures, Functions, Triggers.	CLO2
16	Quiz 02	

University of Engineering and Technology Lahore

Course Outline Report

Subject:MGT-410 Project Management

Department: Institute of Business & Management

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Muhammad Shoaib Farooq
Contact	sshoaibfarooq2@yahoo.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-421 Computer Architecture

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course extends the concepts of computer organization and uniprocessor architecture to more advanced topics. These topics include: structures and functions of modern digital computer systems, advanced pipelined Reduced Instruction Set Computer (RISC) machines, instruction level parallelism (ILP), dynamic scheduling, thread level parallelism (TLP), multi-processors, memory hierarchy design, storage systems and I/O devices. The course provides the students with current trends and future insight to modern computer architecture design.

Course Detail

Faculty	Dr Muhammad Junaid Arshad
Contact	junaidarshad@uet.edu.pk
Credit Hrs	3.0
Pre-requisite	CSE-222 Computer Organization and Assembly,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Describe the fundamentals of Intel x86 and ARM instruction set architectures (ISA) and their relationship to the CPU design	PLO1		
CLO2	Explain the structure of computing system comprising of processor, cache, memory and system buses	PLO2		
CLO3	Demonstrate the design challenges faced by advanced computer architectures such as power, area, memory organization.	PLO3		
CLO4	Compare the performance of modern multiprocessor communication architecture, such as SIMD multiprocessing, MIMD multiprocessing etc	PLO4		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Fundamentals of Computer Design, Computer history and performance metrics, Computer components and function, registers, ALU, control unit, interconnection structures, bus architecture, PCI	CLO1 , CLO2
2	Cache Memory: Memory hierarchy, elements of cache design, cache performance metrics and principles, cache mapping function, Pentium and PowerPC cache organization	CLO1 , CLO2
3	Internal Memory: Semiconductor main memory, error correction, direct memory access- DMA, SRAM vs. DRAM	CLO2 , CLO3
4	External Memory: Magnetic disk, RAID, optical memory, magnetic tape	CLO2 , CLO3 , CLO4
5	Input/Output: External devices, I/O modules, programmed I/O, direct memory access, I/O channels and processors	CLO1 , CLO2
6	Computer Arithmetic: ALU, integer representation, integer arithmetic, floating-point representation, floating-point arithmetic	CLO1 , CLO2 , CLO3
7	Instruction Sets- Characteristics and Functions: Instruction Set Principles, Machine instruction characteristics, operand types, data types, assembly language	CLO1 , CLO3
8	Instruction Sets- Addressing Modes and Formats: Addressing, instruction formats, Pentium and PowerPC addressing modes	CLO3 , CLO4
9	Processor Structure and Function: Processor organization, registers, instruction cycle, instruction pipelining	CLO1 , CLO2
10	Reduced Instruction Set Computers: Instruction execution characteristics, register files, compiler register optimization, RISC architecture, CISC vs. RISC, Advanced Pipelining in modern processors	CLO3 , CLO4
11	Instruction-Level Parallelism and Superscalar Processors: Design issues, ILP and its Dynamic Exploitation	CLO1 , CLO2 , CLO3
12	Control Unit Operations: Micro-operations, control of the processor	CLO2 , CLO3
13	Micro-programmed Control: Sequencing, execution of instructions	CLO1 , CLO3
14	Multi-core architecture, multiprocessor memory type, SMT, Multi-core vs. SMT	CLO3 , CLO4
15	Parallel Processing: Multiple processors, cache coherence, multi-threading, clusters	CLO2 , CLO3 , CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-491 FYP I

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

The main objective of the final year project is to provide students with a design experience in setting solution to real-life model required in society or related industry. These projects are related to field of Computer Science and Engineering. The final year Project will be completed over 2 semesters typically Fall and Spring and coded as FYP I and FYP II respectively.

Course Detail

Faculty	Hina Khalid
Contact	hinna.khalid@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply knowledge of mathematics, science and engineering when come across a real world computing problem.	PLO1		
CLO2	Solve engineering problems reaching substantiated conclusions with Identification, formulation, and Research through relevant literature review.	PLO2		
CLO3	Decompose design problem into subtasks, prioritizes subtasks, and establishes a time table and milestones by which progress may be evaluated	PLO3		
CLO4	Convert an open-ended problem statement into a statement of work or a set of design specifications for solution with elaboration of steps used to investigate the problem at each stage.	PLO4		
CLO5	Select appropriate models or simulations of the real world with use of modern tools and analyzes output of models/simulations to provide information for design decisions	PLO5		
CLO6	Exhibit the impact of engineering solutions in a societal context with effective response to the need of sustainable development.	PLO6		

CLOs	Description	PLOs	Domain	Domain Level
CLO7	Perform feasibility analysis and uses it to choose best candidate solution based upon sustainability and quality in context of its environment specific utilization.	PLO7		
CLO8	Produce professional, ethical and moral values in any workplace they are placed.	PLO8		
CLO9	Collaborate with team members to achieve a common goal where team members are with diverse skills and perspectives.	PLO9		
CLO10	Communicate effectively with individule or in combined industry-academia presentations	PLO10		
CLO11	Produce usable documents of record regarding the data collection, design process and output states to demonstrate the efficient project management.	PLO11		
CLO12	Recognize the need for the ability to engage in life-long learning	PLO12		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-492 FYP II

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

The main objective of the final year project is to provide students with a design experience in setting solution to real-life model required in society or related industry. These projects are related to field of Computer Science and Engineering. The final year Project will be completed over 2 semesters typically Fall and Spring and coded as FYP I and FYP II respectively.

Course Detail

Faculty	Hina Khalid
Contact	hinna.khalid@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply knowledge of mathematics, science and engineering when come across a real world computing problem.	PLO1		
CLO2	Solve engineering problems reaching substantiated conclusions with Identification, formulation, and Research through relevant literature review.	PLO2		
CLO3	Decompose design problem into subtasks, prioritizes subtasks, and establishes a time table and milestones by which progress may be evaluated	PLO3		
CLO4	Convert an open-ended problem statement into a statement of work or a set of design specifications for solution with elaboration of steps used to investigate the problem at each stage.	PLO4		
CLO5	Select appropriate models or simulations of the real world with use of modern tools and analyzes output of models/simulations to provide information for design decisions	PLO5		
CLO6	Exhibit the impact of engineering solutions in a societal context with effective response to the need of sustainable development.	PLO6		

CLOs	Description	PLOs	Domain	Domain Level
CLO7	Perform feasibility analysis and uses it to choose best candidate solution based upon sustainability and quality in context of its environment specific utilization.	PLO7		
CLO8	Produce professional, ethical and moral values in any workplace they are placed.	PLO8		
CLO9	Collaborate with team members to achieve a common goal where team members are with diverse skills and perspectives.	PLO9		
CLO10	Communicate effectively with individual or in combined industry-academia presentations	PLO10		
CLO11	Produce usable documents of record regarding the data collection, design process and output states to demonstrate the efficient project management.	PLO11		
CLO12	Recognize the need for the ability to engage in life-long learning	PLO12		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-441 Mobile Application Development

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Muhammad Awais Hassan
Contact	awais.hassan@hotmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Assess the complexities critically involved in designing and building systems and applications in a mobile and ubiquitous computing context	PLO2		
CLO2	Employ advanced principles of computer science and engineering in the identification, formulation, analysis and solution of real-world problems in the domains of ubiquitous computing and mobile.	PLO1		
CLO3	Assess available techniques and tools for interaction design and usability improvement, and apply these techniques within the software development process, taking account of the factors which influence human performance, and the major concepts relevant to human error, and critique the interface of interactive systems with reference to a task model and its associated scenarios	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-461 Management Information Systems

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Information systems began as automation of office systems, and have grown into systems that assist managers to make decisions, systems that model successful business practices, and systems that transform the modern business into a knowledge-based enterprise. This course will introduce information systems in the modern enterprise through a survey of information systems technologies and the way they affect management. Although the course considers information technology, it focuses on management strategies, not technical issues.

Course Detail

Faculty	Prof Dr Muhammad Shoaib
Contact	shoaib_uet@hotmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Describe the fundamental concepts and terminologies in management information systems	PLO1		
CLO2	Identify ways information systems and technology may improve an organization's performance, including improving organizational processes, decision-making, collaboration, and personal productivity	PLO3		
CLO3	Illustrate the trends, ethical security and globalization issues in Information technology.	PLO8 PLO2		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	<p>What is MIS?</p> <p>Effects of MIS in business</p> <p>Subsystems of MIS</p> <p>Goals of Information System</p> <p>Quality customer service</p> <p>Information technology fundamentals</p> <p>Technical operation of CVIS</p>	CLO1
2	<p>MIS challenges</p> <p>Psychological factors</p> <p>Risk taking tendencies</p> <p>Optimism and pessimism</p> <p>Centralized vs Decentralized</p> <p>MIS function in organization</p> <p>MIS personnel</p> <p>Database Administrator</p>	CLO2
3	<p>Inter group conflict</p> <p>Intra group dynamics</p> <p>Systems and models</p> <p>Open vs Close system</p> <p>Levels of models</p> <p>Types of models</p> <p>Models of organizational system</p> <p>Strategic MIS planning</p>	CLO3
4	<p>Levels of management</p> <p>Contingency approach of management</p> <p>Planning and control</p> <p>Managerial decision making</p> <p>Effectiveness VS Efficiency</p>	CLO2
5	<p>Input Technologies</p> <p>Sizing CBIC</p> <p>Types of computer system</p> <p>Tape devices</p> <p>Output technology</p> <p>Micro computer operating system</p>	CLO3
6	<p>Data management and its issues</p> <p>User Interfaces</p> <p>File management</p> <p>Data access and organization method</p> <p>Database management and Models</p>	CLO3

7	Database security Processing Activities Image processing and Document management system	CLO3
8	External databases and information services Application framework Strategic Alliances Distributed processing system Communication media Network Topologies	CLO2
9	Mid term	
10	Transaction processing system Role of information technology in transaction processing Transaction Processing cycle and subsystem Management reporting system Role MRS outputs in management	CLO1
11	What is DSS. DSS goals and applications Components of DSS DSS development Group decision support system GDSS goals	CLO2
12	Executive information system Executive decision making environment Artificial Intelligence Need for Expert System Component of Expert system Developing Expert System	CLO2
13	Expert system VS Conventional Application Uses and limitations of expert system Offices and Office system Types of OA System	CLO2
14	How Information System Impact Organization and Business Firm Economic Impact Behavioral Impact	CLO2
15	Image processing system Teleconferencing applications Implementing Offices Functional Areas of system Financial information system Accounting Information system	CLO1

16	Role of manager and user in system development System development life cycle Approaches to system development Determining the scale of development effort Requirement Analysis Review System Requirements	CLO2
17	Designing system Outputs Determine processing requirements Determine Storage requirements Vendor Market place System Implementation Program debugging and Testing	CLO1
18	Final Term	

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-462 Data Mining

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Data Mining studies algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data. It is currently regarded as the key element of a more general process called Knowledge Discovery that deals with extracting useful knowledge from raw data. The knowledge discovery process includes data selection, cleaning, coding, using different statistical and machine learning techniques, and visualization of the generated structures. The course will cover all these issues and will illustrate the whole process by examples. Special emphasis will be give to the Machine Learning methods as they provide the real knowledge discovery tools. Important related technologies, as data warehousing and on-line analytical processing (OLAP) will be also discussed. The students will use recent Data Mining software.

Course Detail

Faculty	Dr Sheikh Faisal Rashid
Contact	shfaisal@gmail.com
Credit Hrs	3.0
Pre-requisite	CS-211 Discrete Mathematical Structures, CS-363 Database Systems,

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Interpret data mining as a a process by demonstrating competency in the use of Cross-Industry Standard Process for Data Mining	PLO2		
CLO2	Apply a range of unsupervised and supervised learning techniques such as clustering, classification and association learning technique.	PLO3		
CLO3	Evaluate the performance of the supervised and unsupervised algorithms/techniques.	PLO1		
CLO4	Apply supervised and unsupervised machine learning techniques to text mining, web mining and biological data mining.	PLO2		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
2	Data Warehouse and OLAP <ul style="list-style-type: none"> • Data Warehouse and DBMS • Multidimensional data model • OLAP operations • Example: loan data set 	CLO1
3	Data pre processing <ul style="list-style-type: none"> • Data cleaning • Data transformation • Data reduction • Discretization and generating concept hierarchies • Installing Weka 3 Data Mining System • Experiments with Weka - filters, discretization 	CLO1 , CLO2
4	Data mining knowledge representation <ul style="list-style-type: none"> • Task relevant data • Background knowledge • Interestingness measures • Representing input data and output knowledge • Visualization techniques • Experiments with Weka - visualization 	CLO1 , CLO2
5	Attribute-oriented analysis <ul style="list-style-type: none"> • Attribute generalization • Attribute relevance • Class comparison • Statistical measures • Experiments with Weka - using filters and statistics 	CLO1 , CLO2 , CLO3
6	Data mining algorithms: Association rules <ul style="list-style-type: none"> • Motivation and terminology • Example: mining weather data • Basic idea: item sets • Generating item sets and rules efficiently • Correlation analysis • Experiments with Weka - mining association rules 	CLO2 , CLO3 , CLO4
7	Data mining algorithms: Classification <ul style="list-style-type: none"> • Basic learning/mining tasks • Inferring rudimentary rules: 1R algorithm • Decision trees • Covering rules • Experiments with Weka - decision trees, rules 	CLO2 , CLO3 , CLO4

1	<p>Introduction to Data Mining and its Applications:</p> <ul style="list-style-type: none"> • What is data mining? • Related technologies - Machine Learning, DBMS, OLAP, Statistics • Data Mining Goals • Stages of the Data Mining Process • Data Mining Techniques • Knowledge Representation Methods • Applications • Example: weather data 	CLO1
9	<p>Data mining algorithms: Prediction</p> <ul style="list-style-type: none"> • The prediction task • Statistical (Bayesian) classification • Bayesian networks • Instance-based methods (nearest neighbor) • Linear models • Experiments with Weka - Prediction 	CLO2 , CLO3
8	Midterm exam	
10	<p>Evaluating what's been learned</p> <ul style="list-style-type: none"> • Basic issues • Training and testing • Estimating classifier accuracy (holdout, cross-validation, leave-one-out) • Combining multiple models (bagging, boosting, stacking) • Minimum Description Length Principle (MLD) • Experiments with Weka - training and testing 	CLO2 , CLO3 , CLO4
11	<p>Mining real data</p> <ul style="list-style-type: none"> • Preprocessing data from a real medical domain (310 patients with Hepatitis C). • Applying various data mining techniques to create a comprehensive and accurate model of the data 	CLO1 , CLO3 , CLO4
12	<p>Clustering</p> <ul style="list-style-type: none"> • Basic issues in clustering • First conceptual clustering system: Cluster/2 • Partitioning methods: k-means, expectation maximization (EM) • Hierarchical methods: distance-based agglomerative and divisible clustering • Conceptual clustering: Cobweb • Experiments with Weka - k-means, EM, Cobweb 	CLO1 , CLO2 , CLO3 , CLO4
14	Affinity Analysis	CLO3
15	Text Mining	CLO3
16	Web Mining	CLO3
13	<p>Advanced techniques, Data Mining software and applications</p> <ul style="list-style-type: none"> • Text mining: extracting attributes (keywords), structural approaches (parsing, soft parsing). • Bayesian approach to classifying text • Web mining: classifying web pages, extracting knowledge from the web • Data Mining software and applications 	CLO1 , CLO2 , CLO3 , CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-466 Computer Vision

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Muhammad Kaleem
Contact	kaleem_16@yahoo.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Explain the foundations of modern computer vision theory, problem and state of the art solutions.	PLO1		
CLO2	Implement and test some fundamental computer vision algorithms e.g. image filtering, restoration, image segmentation, camera calibration.	PLO3		
CLO3	Analyse and evaluate critically the building and integration of computer vision algorithms and systems.	PLO2		
CLO4	Design and demonstrate a working computer vision system through team research project, and project report, presentation.	PLO10		
CLO5	Analyse and evaluate the effectiveness of different computer vision approaches, and assess their relative merits.	PLO2		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-473 Digital Image Processing

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Dr Usman Ghani Khan
Contact	usmanghanikhan@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject: CS-464 Machine Learning

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course provides students with an in-depth introduction to the two main areas of Machine Learning: supervised and unsupervised learning. We will cover some of the main models and algorithms for regression, classification, clustering from two approaches: probabilistic methods and non-probabilistic methods. Different application areas of machine learning such as bioinformatics, text analytics and marketing and sales will be discussed as case studies in this course.

Course Detail

Faculty	Dr Hafiz Muhammad Shahzad Asif
Contact	shehzad.asef@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Identify potential applications of machine learning in practice.	PLO1		
CLO2	Describe the core differences in analyses enabled by regression, classification, and clustering.	PLO1		
CLO3	Select the appropriate machine learning task for a potential application.	PLO3		
CLO4	Represent data as features to serve as input to machine learning models.	PLO2		
CLO5	Assess the model quality in terms of relevant error metrics for each task.	PLO4		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-465 Data Warehousing

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

The primary focus of this course is on Data Warehousing and its applications to business intelligence. We will concentrate on topics like: requirements gathering for data warehousing, data warehouse architecture, dimensional model design for data warehousing, introduction to business intelligence, design and development of business intelligence applications using data mining concepts, expansion and support of a data warehouse.

Course Detail

Faculty	
Contact	
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Discuss the role of data warehousing and enterprise intelligence in industry and government.	PLO6		
CLO2	Summarise the dominant data warehousing architectures and their support for quality attributes.	PLO1		
CLO3	Recognise and describe at least three computational approaches to data clustering, taking cognisance of the contribution of paradigms from the fields of Artificial Intelligence and Machine learning.	PLO2		
CLO4	Construct a lightweight prototype or simulation that supports the concept of data mining.	PLO3 PLO5		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:CSE-431 Wireless Networks

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

This course introduces the concepts of wireless and mobile communication as we are experiencing huge growth rates in mobile communication systems. For many countries, mobile communication is the only solution due to the lack of an appropriate fixed communication infrastructure. Today, more people use mobile phones (over one billion!) than traditional fixed phones. These trends create an ever-increasing demand for well-educated communication engineers who understand the developments and possibilities of mobile communication. While traditional communication paradigms deal with fixed networks, mobility raises a new set of questions, techniques, and solutions. The course establishes the basic understanding of principals involved at all layers for handling mobility mostly in wireless environments.

Course Detail

Faculty	Dr Faisal Hayat
Contact	fsl.hayat@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Demonstrate the concept of systems in the context of mobile and wireless systems	PLO1		
CLO2	Describe the wireless medium characteristics like frequencies for radio transmission, signals, antennas signal propagation, multiplexing, modulation, spread spectrum etc.	PLO1		
CLO3	Analyze the famous mobile wireless technologies like GSM, WiFi, and Wimax	PLO2		
CLO4	Illustrate the design at network and transport layer to support mobility like improvement in TCP and design of Mobile IP	PLO3		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Applications, history of wireless communication, reference model	CLO1
2	Frequencies for radio transmission Signals Antennas Signal propagation	CLO2
3	Multiplexing Modulation Spread spectrum Cellular systems	CLO2
4	Medium access control: SDMA, FDMA, TDMA, CDMA	CLO2 , CLO3
5	GSM: Mobile services, System architecture	CLO3
6	GSM: Radio interface, Localization and calling, Handover, Security	CLO3
7	WiFi (IEEE 802.11): system architecture, Radio properties Protocol architecture Physical layer Medium access control layer	CLO3
8	GPRS: Architecture and Radio Characteristics	CLO3
9	Principals of LTE (MIMO, OFDM)	CLO3
10	WiMax: Principles and architecture	CLO3
11	Traditional TCP (Congestion control, Slow start, fast recovery) Implications of mobility Classical TCP improvements Indirect TCP, Snooping TCP, Mobile TCP	CLO4
12	Fast retransmit/fast recovery Transmission/time-out freezing Selective retransmission	CLO4
13	Transaction-oriented TCP TCP over 2.5/3G wireless networks Performance enhancing proxies	CLO4
14	Mobile IP IP packet delivery Agent discovery, Registration Tunneling and encapsulation, Reverse tunneling	CLO4

15	Dynamic host configuration protocol Mobile ad-hoc networks Routing in Mobile ad-hoc networks	CLO4
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University of Engineering and Technology Lahore

Course Outline Report

Subject: MGT-414 Entrepreneurship and Business Management

Department: Institute of Business & Management

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty

Contact

Credit Hrs

3.0

Pre-requisite

CLOs

Description

PLOs

Domain

**Domain
Level**

Measureable Student Learning Outcomes

Text Books

Grading Policy

Tentative Weekly Lecture Plan

**Week
(Lec)**

Topics

CLOs

University of Engineering and Technology Lahore

Course Outline Report

Subject: HU-102 Functional English

Department: Humanities Department

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Ms Sadaf Qureshi
Contact	sadaf.linguist@live.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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University of Engineering and Technology Lahore

Course Outline Report

Subject:PHY-111 Applied Physics

Department: Department of Physics

Printed Date: 22/11/2018

Course Description

The objective of the course is to make the students of electrical Engineering familiar with the basic concepts of electric field, magnetic field, wave motion, speed of waves in different media, travelling waves and standing waves. The students will also study about Lenses, Snell's Law, total internal reflection and its applications. The students will also learn about cameras, Huygen's principle and its applications.

Course Detail

Faculty	Dr Anwar Latif
Contact	anwar1latif@gmail.com
Credit Hrs	2.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Students will be able to calculate the electric fields produced by continuous uniform and non-uniform charge distributions. Students will also be able to solve the problems involving electric flux to calculate the electric field in different configurations using Gauss's Law. Students will also be able to determine the force on charged particle thrown in a constant magnetic field. They will also be able to know about the concentration and flow of charge carriers using Hall effect.	PLO1		
CLO2	Students will be able to distinguish between different types of waves and how to develop the wave equations? It will be easy for students to calculate the intensity of sound waves. They can also employ the Doppler effect to study and understand different physical phenomena occurring in laboratory as well as in space.	PLO1		
CLO3	Students will understand the basic concepts of optics which will help them to understand the underlying physics of fiber optics. Students will be able to differentiate between different types of lenses and their usages in different optical instruments. Students will also be able to prove laws of refraction and diffraction on the basis of wave nature of light.	PLO1		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Electric Charge and Electric Field Concept of Electric field	CLO1
2	Electric Field Calculations for Continuous Charge Distributions.	CLO1
3	Gauss's Law.	CLO1
4	Applications of Gauss's Law.	CLO1
5	Magnetics. Force on an electric charge moving in a magnetic field.	CLO1
6	Hall effect.	CLO1
7	Types of Waves. Speed of wave in solids	CLO2
8	Speed of wave in fluids. Wave equation.	CLO2
10	The Principal of Superposition. Standing waves.	CLO2
11	Sound waves. Intensity of Sound: Decibels.	CLO2
12	Doppler effect.	CLO2
13	Snell's law. Total internal reflection & fiber optics.	CLO3
14	Thin lens magnification. Combination 'of lenses. Lenses in cameras.	CLO3
15	The Wave nature of Light; Interference. Wave versus particle; Huygens' principle and diffraction. Huygens' principle and law of refraction.	CLO3

University of Engineering and Technology Lahore

Course Outline Report

Subject:PHY-111L Applied Physics

Department: Department of Physics

Printed Date: 22/11/2018

Course Description

The objective of the subject is to make the students to perform experiments in the laboratory. They will do experiments to study the Hall effect in metals, to find the band gap of germanium and to find the capacitance of different metal spheres. They will also determine the dielectric constant of different materials and study the temperature dependence of the resistance of different electrical components. The students will also perform experiment to determine the frequency of A.C. mains and to determine the e/m of an electron. In order to see the magnetization and demagnetization of ferromagnetic material, they will perform experiment and will obtain B-H curve.

Course Detail

Faculty	Dr Anwar Latif
Contact	anwar1latif@gmail.com
Credit Hrs	1.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Students will be able to measure the Hall voltage and Hall coefficient as a function of current and magnetic induction. Students will also learn how to measure the voltage and current across the given semiconductor for varying temperature. They will be able to find out the band gap energy of Germanium.	PLO1		
CLO2	Students will be able to determine the capacitance of a metallic sphere by conduction method. The student will also come to know about the effect of dimensions of metallic spheres on the capacitance. The students will also learn to determine the dielectric constant of air/vacuum and the dielectric constant of plastic relative to air.	PLO1		
CLO3	The students will be able to find the resistance of different materials and components as a function of temperature. The students will observe the formation of standing waves on a given thread and can calculate the frequency of A.C. mains by counting the number of loops formed by varying the tension in the thread.	PLO1		

CLOs	Description	PLOs	Domain	Domain Level
CLO4	Students will be able to determine e/m (specific charge) of electrons by deflection method. The students will also be able to draw the B-H curve to study the magnetic properties of ferromagnetic material.	PLO1		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Orientation of the Lab.	CLO1
2	Introduction of Experiments	CLO1
3	Performance of Exp.1	CLO1
4	Performance of Exp.2	CLO1
5	Viva of Exp.1 and Exp.2	CLO1
6	Performance of Exp.3	CLO2
7	Performance of Exp.4	CLO2
9	Viva of Exp.3 and Exp.4	CLO2
10	Performance of Exp.5	CLO3
11	Performance of Exp.6	CLO3
12	Viva of Exp.5 and Exp.6	CLO3
13	Performance of Exp.7	CLO4
14	Performance of Exp.8	CLO4
15	Viva of Exp.7 and Exp.8	CLO4
16	Final Exam.	CLO1 , CLO2 , CLO3 , CLO4

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-142 Programming Fundamentals

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Samyan Qayyum Wahla
Contact	samyanwahla@gmail.com
Credit Hrs	3.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Describe how data are represented, manipulated, and stored in a computer.			
CLO2	Understand and use the fundamental concepts of data types, structured programming and algorithmic design.			
CLO3	Demonstrate a fundamental understanding of software development methodologies, including modular design, pseudo code, flowcharting, structure charts, data types, control structures, functions, and arrays.			
CLO4	Demonstrate appropriate design, coding, testing, and documenting of computer programs that implement project specifications and requirements.			

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
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1	Introduction	
2	Flowcharts Pseudo Code	
3	More on Flow charts First C++ Program Input/Output Data Types in C++ Basic Expressions	
4	Flowcharts to conditional statements in C++ Flowcharts to Loops in C++ Switch Statement	
5	Arrays Manipulation of arrays with while and for loops Multidimensional Arrays Manipulation of Multi Dimensional arrays with nested while and for loops Character arrays/ Strings	
6	Introduction to Pointers Pointers Arithmetic Manipulation of Arrays using pointers Basic Introduction to Functions	
7	Functions Return Types/ Parameters Passing Arrays to functions Returning Arrays from functions	
8	Mid Term	
9	Recursion Difference between iterative and Recursive functions Conversion of iterative algorithms to Recursive Algorithms	
10	Structures, Declaration and usage Array of instances using structures	
11	File Handling Reading file Sequentially and Randomly Writing file using array of instances of structures	
12	Dynamic memory allocation dynamic arrays	
13	Class Difference between structs and Classes Arrays of objects	

14	Case Study: Taking input into Structs/Classes Saving data into files Reading data from files	
15	Revision for finals	
16	Final Term	

University of Engineering and Technology Lahore

Course Outline Report

Subject:CS-142L Programming Fundamentals

Department: Computer Science and Engineering

Printed Date: 22/11/2018

Course Description

Course Detail

Faculty	Aatif Hussain
Contact	aatif@uet.edu.pk
Credit Hrs	1.0
Pre-requisite	

CLOs	Description	PLOs	Domain	Domain Level
Measureable Student Learning Outcomes				
CLO1	Apply appropriate programming techniques to create executable programs to solve well defined problems	PLO3		
CLO2	Practice collaboratively on large problems and provide their working solutions.	PLO9		
CLO3	Adhere to plagiarism guidelines	PLO8		
CLO4	Display well-commented code	PLO10		

Text Books

Grading Policy

Tentative Weekly Lecture Plan

Week (Lec)	Topics	CLOs
1	Introduction and workflow	CLO1
2	Expressions and Control Structures	CLO1

3	Control and Environments	CLO1 , CLO3 , CLO4
4	Lambdas and Higher-Order Functions	CLO1 , CLO3 , CLO4
5	Lambdas and Higher-Order Functions	CLO1 , CLO3 , CLO4
6	Project	CLO2
7	Environment Diagrams and Recursion	CLO1 , CLO3 , CLO4
9	Environment Diagrams and Recursion	CLO1 , CLO3 , CLO4
10	Project	CLO2
11	Lists and Data Abstraction	CLO1 , CLO3 , CLO4
12	Lists and Data Abstraction	CLO1 , CLO3 , CLO4
13	Project	CLO2
14	Mutable Sequences and Trees	CLO1 , CLO3 , CLO4
15	Object-Oriented Programming	CLO1 , CLO3 , CLO4