

Curriculum  
of  
Associate Degree Program (ADP)  
in  
Web Design and Development

(December 2019)



KHWAJA FAREED  
**UEIT**  
RAHIM YAR KHAN

Department of Information Technology  
Faculty of Computer Science and Information Technology  
Khwaja Fared University of Engineering & Information Technology  
Rahim Yar Khan, Pakistan

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## **1. Curriculum Committee**

The committee consists of the following faculty members for developing the curriculum:

1. Dr. Muhammad Faheem Mushtaq, Assistant Professor, HoD (Chairperson)
2. Dr. Bushra Mughal, Assistant Professor (Member)
3. Mr. Muhammad Rizwan, Lecturer (Member)
4. Mr. Muhammad Adeel Abid, Lecturer (Member)
5. Ms. Urooj Akram, Lecturer (Member)

## **2. Preface**

The main objective of Associate Degree Program (Computer Networking and Infrastructure) program is to facilitate the students of South Punjab region to earn technology related degree early in the career to further target job market. We believe technology education has become necessary in the modern era to develop the indigenous strength and to face the future challenges of the 21<sup>st</sup> century. This program will provide a strong foundation for the students to have good expertise in the domain of web development and aligned fields.

In the curriculum development, courses are developed according to the need of time considering state-of-the-art technologies. Moreover, the curriculum is designed to meet the needs of modern society and to prepare the students who can serve as a network administrator, database developer, system administrator, webmaster, IT consultants, etc. In addition, the curriculum is developed to meet the minimum requirements of the Higher Education Commission (HEC) of Pakistan.

Various meetings were held by the committee, Department of Information Technology, Faculty of Computer Science and Information Technology. The committee thoroughly studied the guidelines provided by HEC. The curricula of top-ranked world universities were also considered to develop the scheme of study and course outline.

Dr. Muhammad Faheem Mushtaq  
Head  
Department of Information Technology

### **3. Acknowledgement**

We are highly grateful to Allah the Almighty who enabled us to accomplish this task. The help and support provided by Prof. Dr. Suleman Tahir, Vice Chancellor, KFUEIT to start the program is greatly acknowledged.

## **4. Khwaja Fareed University of Engineering & IT**

### **4.1 Introduction**

Rahim Yar Khan is located in Southern Punjab and is a major city and industrial hub of the region. This region of Punjab is bordered by areas of Balochistan and Sindh that are similarly deprived in terms of facilities for higher education in science and technology. For decades, students from the region had to travel hundreds of miles to get engineering and technology education, even when they would be lucky enough to get admission in the face of high competition on limited seats in the public sector engineering universities of the province. Hence, establishment of an Engineering University in the city had been a long standing demand of the people of Rahim Yar Khan. Successive governments, over the years, had been making unfulfilled promises on this account. However, Mian Muhammad Shahbaz Sharif, Chief Minister of Punjab, being a man of action and not mere words, fulfilled this demand on 22 April 2014 by laying the foundation of Khwaja Fareed University of Engineering & Information Technology on Abu Dhabi Road, Rahim Yar Khan. The Government of Punjab started out by providing 220 Acres of land and thereafter through the involvement of the University of Engineering & Technology, Lahore under the dynamic leadership of its then Vice Chancellor, Lt. Gen. (Retd.) Akram Khan, a PC-1 of Rs. 3,847 Million was prepared and subsequently approved by the Planning & Development Board, Punjab for the Establishment of Khwaja Fareed University of Engineering & Information Technology, Rahim Yar Khan. M/S NESPAK, the world renowned National Engineering Services of Pakistan, were engaged as Consultants for Engineering Design and Resident Engineering Supervision for Campus Construction.

The Khwaja Fareed University of Engineering & Information Technology, Rahim Yar Khan Act (Act XVI of 2014) was passed by the Punjab Assembly on 29 May 2014 to provide the legal foundations and framework for the University. Classes were started in four rented classrooms of the Government College of Technology, Shehbazpur Road, some 18 kms away from the actual campus site, on 1<sup>st</sup> September 2014 for a batch of 200 students equally divided in the four disciplines of Mechanical Engineering, Electrical Engineering, Computer Science and Information Technology.

The first duly appointed Vice Chancellor of the University, Engr. Prof. Dr. Athar Mahboob, Tamgha-e-Imtiaz joined on 2<sup>nd</sup> September 2015. The second newly appointed Vice Chancellor of the University, Prof. Dr. Muhammad Suleman Tahir joined in November 2019. Under the capable leadership of Vice Chancellor, Prof. Dr. Muhammad Suleman Tahir, the university is being progressed to its new heights and he assured his fullest cooperation & support for launching new programs in university. After due process of following, PPRA regulations several contracts for construction of buildings and infrastructure development have already been awarded. Remaining contracts are in the process of award before the end of the year. First meeting of the duly constituted Syndicate of the University was held on 19 May 2016. The Syndicate while approving the Annual Report and the Budget Estimates expressed its satisfaction over the rapid progress being made for establishment of the University.

#### **4.2 Vision**

To become a world-class university that contributes significantly to the development of regional economy and uplift of local community by becoming a power house of intellectual and human capital generation.

#### **4.3 Mission**

1. To offer an educational experience wherein:
  - a) The curriculum and its delivery conform to international standards.
  - b) The students are provided an environment for wholesome development of their personality and creative potential.
  - c) The graduates produced are most sought after by prospective employers.
2. To conduct research to solve local and national problems requiring knowledge based solutions.

#### **4.4 Core Values**

**K** = Knowledge-able

**F** = Faithful

**U** = Useful

**E** = Eco-friendly

**I** = Innovative

**T** = Tolerant

## **5. Department of Information Technology**

### **5.1 Introduction**

The Department of Information Technology at KFUEIT offers students and faculty a close-knit community to learn, discover, and innovate, in a shared quest for computational solutions to a spectrum of challenging problems. Our focus is on quality teaching and research using state-of-the-art facilities. The department copes with the modern needs of Information Technology where the main objective is to produce graduates to meet the emerging demands of IT at national and international markets. We have a well-designed curriculum as per HEC requirements with a combination of foundation, core, computing, supporting and elective courses equally supported by the thesis and case studies. The examination of the department is based on the semester system under unified exam policy of the university. The department educates and conducts research covering wide areas from fundamental technologies such as software engineering, image processing, object-oriented programming, computer architecture, algorithms, database system, networks, and Internet technologies, which support infrastructures of the highly information-oriented society to applied and advanced technologies. To achieve this mission, we provide attractive educational programs for students to learn from the basics to advanced technologies related to computer science and information technology. Through our educational programs, students are expected to become leading developers and researchers who are highly motivated and have practical, creative, and management skills to drive an advanced next-generation information society in all industrial fields.

### **5.2 Vision**

To be a professional leader in delivering IT based services in support of teaching, learning, research and produce self-motivated, creative, and professionals.

### **5.3 Mission**

Our mission is to provide a quality education and;

1. To produce graduates who are successful professionally, ethically, technically and scientifically to make positive contributions in the field of Information Technology.
2. To prepare students to function effectively in a dynamic technological era.



3. To contribute positively to the economic development of the country providing services to the community.
4. To prepare the human resources to overcome the shortage of skilled manpower who can face the challenges of the 21<sup>st</sup> Century.

## **6. Program Description**

Program description is given below.

### **6.1 Program Introduction**

The program is designed to meet the growing needs for experts in the rapidly evolving century by delivering education based on the state-of-the-art technologies. The mission is to produce graduates with a robust and solid knowledge for the development of computer and information age. The study program will enable the students to capitalize on the increasing career opportunities in the relevant industry, to increase the knowledge, and to pursue the graduate studies. Focus of the program will be on software project management, software development, web-based technologies, database, network management, system analysis, software testing and security analyst.

### **6.2 Exact Title of the Program**

Associate Degree Program in Web Design and Development

### **6.3 Short Title of the Program**

ADP(Web Design and Development)

### **6.4 Program Objectives**

As per HEC initiative old BSc/BA programs are to be replaced with more suitable degree programs i.e. ADP(Associate Degree Programs), the program offers high quality education with technical expertise at a low cost and less time to produce skilful and employable force Scope of the Program.

### **6.5 Scope of the Program**

The breadth and strong practical emphasis of this program will prepare students for early careers working with in a wide range of IT positions in business, government and industry both local and international. After completing ADP(Associate Degree Program),

the students may pursue their early career in a wide variety of computing or computing security areas dealing with systems analyst, database administrator, database designer, web developer, software engineer, IT consultant, enterprise-wide solution developer and security analyst. The students further may get admission in the 5<sup>th</sup> semester of relevant BS program.

### **6.6 Duration of the Program**

The program information, duration and semester details are given in the following:

Program Type	Full Time
Duration of the program	2 Years
Study system	Semester
Total regular semesters	4
Number of credit hours required for degree completion	68

### **6.7 Entry/Admission Requirements**

At the time of admission, the students must have

1. At least 50% marks in Intermediate (HSSC) examination or equivalent qualification.
2. No entry test required OR as per the University policy.
3. Any other requirement recommended by HEC or approved by the department.

## 6.8 Semester Plan

The semester plan is given below in the following Table:

<b>1<sup>st</sup> ADP Semester</b>			
<b>Code</b>	<b>Title of the Course</b>	<b>Cr. Hrs.</b>	<b>Remarks</b>
ADIT-1101	Introduction to ICT	3	
ADIT-1102	Introduction to Programming	3	
ADIT-1105	Fundamentals of Front-end Development	3	
ADIT-1112	Discrete Structures	3	
XXXX-XXXX	English Comprehension	2	
XXXX-XXXX	Pakistan Studies and Global Perspectives	2	
	Islamic Studies & Professional Ethics OR General and Professional Ethics (for Non Muslims)	2	
	<b>Total</b>	<b>18</b>	

<b>2<sup>nd</sup> ADP Semester</b>			
<b>Code</b>	<b>Title of the Course</b>	<b>Cr. Hrs.</b>	<b>Remarks</b>
ADIT-2101	Data Structures	3	
ADIT-1110	Object Oriented Programming	3	
ADIT-1111	Database Management	3	
ADIT-1108	Web Design and Development	3	
ADIT-2109	Data Communication	3	
ENGL-1111	Technical and Business Writing	2	
	<b>Total</b>	<b>17</b>	

<b>3<sup>rd</sup> ADP Semester</b>			
<b>Code</b>	<b>Title of the Course</b>	<b>Cr. Hrs.</b>	<b>Remarks</b>
ADIT-2142	Open Source Web Application Development (PHP, PERL, CGI, MySQL)	3	
ADIT-1109	Information Systems	3	
ADIT-2113	Operating Systems	3	
ADIT-2129	E-Commerce	3	
ADIT-2132	Software Engineering-I	3	
ADIT-2144	Introduction to Web Services Development	3	
	<b>Total</b>	<b>18</b>	

<b>4<sup>th</sup> ADP Semester</b>			
<b>Code</b>	<b>Title of the Course</b>	<b>Cr. Hrs.</b>	<b>Remarks</b>
ADIT-2134	Cyber Law	3	
ADIT-2135	Human Computer Interaction	3	
XXXX-XXXX	Numerical Analysis	3	
ADIT-2136	Web Development for Portable Devices	3	
ADIT-2130	Semester Project	3	
ADIT-2111	Internship (Mandatory)	Pass / Fail	Duration 3 Months
	<b>Total</b>	<b>15</b>	
	<b>Grand Total</b>	<b>68</b>	

### **6.9 Degree Completion Requirements**

The degree completion requirements are summarized below:

- Completion of 68 credit hours
- Mandatory Internship of 03 months

### **6.10 Date of Commencement**

Spring Semester, 2020

## **7. Course Contents**

The course contents are given below for all the courses:

<b>Introduction to Programming</b>					
<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-1102	<b>Prerequisites:</b>	None
<b>Course Content:</b>					
Introduction to Problem Solving, Brief Review of Von-Neumann Architecture, Introduction to Programming, Role of Compiler and Linker, Introduction to Algorithms, Basic Data Types and Variables, Input/Output Constructs, Arithmetic, Comparison and Logical Operators, Conditional Statements and Execution Flow for Conditional Statements, Repetitive Statements and Execution Flow for Repetitive Statements, Lists and Their Memory Organization, Multi-Dimensional Lists, Introduction to Modular Programming, Function Definition and Calling, Stack Rolling and Unrolling, String and String Operations, Pointers/References, Static and Dynamic Memory Allocation, File I/O Operations.					
<b>Teaching Methodology:</b>					
Lectures, Written Assignments, Practical labs, Semester Project, Presentations					
<b>Course Assessment:</b>					
Sessional Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam					
<b>Reference Books:</b>					
<ol style="list-style-type: none"> <li>1. Starting out with Python by Tony Gaddis, Pearson, 4<sup>th</sup> Edition 2017; ISBN-13: 978-0134444321.</li> <li>2. Introduction to Computation and Programming Using Python With Application to Understanding Data by John V. Guttag, The MIT Press, 2016; ISBN-13: 978-0262529624.</li> <li>3. Practice of Computing Using Python by William F. Punch and Richard Enbody, Pearson, 3<sup>rd</sup> Edition 2016; ISBN-13: 978-0134380315.</li> </ol>					

<b>Introduction to ICT</b>					
<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-1101	<b>Prerequisites:</b>	None
<b>Course Contents:</b>					
Introduction to IT, Computing & Communication, Understanding Computer, Peripheral Devices, Hardware Technology, System Unit, Storage Devices, Input / Output devices, Output Devices, Telecommunications, Operating Systems, Application Software, Microsoft Office, World Wide Web, Browsers & Search Engines, Web Page Basic Design, Introduction to Data Communication and Computer Networks Connectivity, Interactivity & Multimedia, Internet Access Devices and connecting medias, Basics of Digital & Analogue Signal, Digital Communication, Networks & Protocols, System Development, Introduction to Programming, Programming Languages, Problems solving Techniques, Introduction to Software Engineering.					
<b>Teaching Methodology:</b>					
Lectures, Written Assignments, Practical labs, Semester Project, Presentations.					
<b>Course Assessment:</b>					
Mid Term Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam.					
<b>Reference Material:</b>					
<ol style="list-style-type: none"> <li>1. Introduction to Computers by Peter Norton, McGraw Hill Education; 6th International Edition. (2004). ISBN-10: 0672315327</li> <li>2. Using Information Technology: A Practical Introduction to Computer &amp; Communications by Williams Sawyer, McGraw Hill Learning Solution; 10th Edition. (2013). ISBN-10:0071317902</li> <li>3. Computing Essentials 2017 by Timothy O'Leary and Linda O'Leary and Daniel O'Leary, McGraw Hill Education; 1<sup>st</sup> Edition. (2016). ISBN10: 1259737659</li> </ol>					

## English Comprehension

<b>Credit Hours:</b>	3	<b>Course Code:</b>		<b>Prerequisites:</b>	None
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### Course Contents:

Essay Writing (Introduction, Body, Conclusion), Paragraph Structure (Topic Sentence, Supporting Examples, Transition Sentences), Basic Rhetorical Modes (Narration, Description, Comparison/Contrast, Cause & Effect), Descriptive Essays; Sentence Errors, Writing Process (Brainstorming, Outlining, Drafting, Revising, Editing), Thesis Statements, Fundamentals Of Persuasive Writing: Supporting Claims, Acknowledging Counter-Arguments, Making Concessions, Persuasive Writing; How To Give Presentations, Sentence Errors; Oral Presentations, Effective Use Of Quotation, Paraphrase And Summary, Stylistics (Syntax, Vocabulary, Conciseness, Creating Interest, Tone), Correct Paper Formatting, Grammar & Mechanics As Needed, Responding To And Discussing Assigned Readings, Comparison And Contrast Essays, Dialogue Writing, Short Story Writing, Review Writing, Narrative Essays, Letter Writing.

### Teaching Methodology:

Lecturing, Written Assignments, Presentation, Report Writing

### Course Assessment:

Sessional Exam, Home Assignments, Quizzes, Presentation, Final Exam

### Reference Material:

1. College Writing Skills with Readings by John Langan, McGraw-Hill; 5th Edition, 2005. ISBN- 10: 0072381213

<b>Pakistan Studies and Global Perspectives</b>				
<b>Credit Hours:</b>	2	<b>Course Code:</b>		<b>Prerequisites:</b> None
<b>Course Contents:</b>				
<p>Historical Background of Pakistan, Muslim Society in Indo-Pakistan, The Movement Led by the Societies, The Downfall of Islamic Society, The Establishment of British Raj- Causes and Consequences, Political and Social Conditions of South Asia on the Eve of the Mughal Invasion, Zaheeruddin , Muhammad Baburhis Early Life, First Battle of Panipat and the Foundation of Mughal Empire, Wars with the Rajputs, Character and Achievements. Naseeruddin Muhammad Humayun Difficulties after his Accession, Defeat at the Hands of Sher Shah Suri, Humayun In Exile and Reoccupation of Throne, Sher Shah Suri and the Later Rulers of Sur Dynastyearly, Life, Capture of Throne, Conquests, Successors of Sher Shah and the end of Sur Dynast, Jalaluddin Muhammad Akbar Early Life, Accession To Throne, Second Battle Of Panipat, Bairam Khan and his Downfall, Conquests, Deccan Policy, Rajput Policy, Engagements and Wars In the North West with Afghan, Religious Policy, Din-i-Ellahi and Reforms, Administration, Character and Achievements of Akbar, Nuruddin Muhammad Jahangir Early Life and Accession, Khusru’s Revolt, Noor Jehan, Qandhar Question, Revolts of Khurram and Mahabat Khan, Activities of European, Character and Achievements, Shahabuddin, Muhammad Shah Jahan Accession to Throne, Golden Period of the Mughal Rule, Central Asian Policy and Qandhar, Deccan Policy, Relations with English East India Company, War of Succession, Character and Achievements. Muhiyuddin Muhammad Aurangzeb Alamgir Accession and Theory Of Kingship, Military Expeditions, Religious Policy and Policy Towards Marathas, Sikhs and Afghans, Political Evolution of Muslims in the Twentieth Century: Sir Syed Ahmed Khan, Muslim League, Nehru, Allama Iqbal: Independence Movement, Lahore Resolution, Pakistan and Its Geo-Political Dimension, Pakistan and International Affairs, Pakistan and the Challenges Ahead.</p>				
<b>Teaching Methodology:</b>				
Lectures, Written Assignments, Practical labs, Semester Project, Presentations.				
<b>Course Assessment:</b>				
Mid Term Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam.				
<b>Reference Material:</b>				
<ol style="list-style-type: none"> <li>1. The emergence of Pakistan by Chaudhri Muhammad Ali,Columbia University Press; 1<sup>st</sup> Edition,1967. ISBN-10: 0231029330</li> <li>2. The Making of Pakistan by K.K.Aziz, Sang-E-Meel Publication; 1<sup>st</sup> Edition, 1967. ISBN-10: 969350870X Subject: Political Science</li> </ol>				



## **Islamic Studies & Professional Ethics OR General and Professional Ethics (for Non-Muslims)**

<b>Credit Hours:</b>	2	<b>Course Code:</b>		<b>Prerequisites:</b>	None
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### **Course Contents:**

Introduction to Quranic Studies, Basic Concepts of Quran, History of Quran, Uloom-ul-Quran, Basic Themes of Quran, Introduction to Sciences of Hadith, Introduction to Islamic Jurisprudence, Primary & Secondary Sources of Islamic Law, Makken & Madnian life of the Prophet, Islamic Economic System, Political Theories, Social System of Islam, Verses of Surah Al-Baqara Related to Faith (Verse No-284-286), Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18), Verses of Surah Al-Mumanoon Related to Characteristics of Faithful (Verse No-1-11), Verses of Surah al-Furqan Related to Social Ethics (Verse No.63- 77), Verses of Surah Al-Inam Related to Ihkam (Verse No-152-154), Verses of Surah Al-Ihzab Related to Adab al-Nabi (Verse No.6, 21, 40, 56, 57, 58.), Verses of Surah Al-Hashar (18,19,20) Related to Thinking, Day of Judgment, Verses of Surah Al-Saf Related to Tafakar, Tadabar (Verse No-1,14), Seerat of Holy Prophet (S.A.W), Life of Muhammad Bin Abdullah (Before Prophet Hood), Life of Holy Prophet (S.A.W) in Makkah, Important Lessons Derived from the Life of Holy Prophet in Makkah, Life of Holy Prophet (S.A.W) in Madina, Important Events of Life Holy Prophet in Madina.

### **Teaching Methodology:**

Lectures, Written Assignments, Practical labs, Semester Project, Presentations.

### **Course Assessment:**

Mid Term Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam.

### **Reference Material:**

1. Islamic Ethics: Critical Concepts in Islamic Studies by Tariq Ramadan, Routledge; 1<sup>st</sup> Edition, 2016. ISBN-10: 1138848166
2. Muslim Jurisprudence and the Quranic Law of Crimes by Waliullah Mir, Adam Publishers and Distributors; 3<sup>rd</sup> Edition, 2007. ISBN- 10: 8174355227

## Data Structures

**Credit Hours:**

3

**Course Code:**

ADIT-2101

**Prerequisites:**

### Course Content:

Abstract data types, Complexity Analysis, Big-O notation, Stacks (Linked Lists and Array Implementations), Recursion and Analyzing Recursive Algorithms, Divide and Conquer algorithms, Sorting Algorithms (Selection, Insertion, Merge, Quick, Bubble, Heap, Shell, Radix, Bucket), Queue, Dequeue, Priority Queues (Linked and Array Implementations of Queues), Linked List & its Various Types, Sorted Linked List, Searching an Unsorted Array, Binary Search for Sorted Arrays, Hashing and Indexing, Open Addressing and Chaining, Trees and Tree Traversals, Binary Search Trees, Heaps, M-way Tress, Balanced Trees, Graphs, Breadth-First and Depth-First Traversal, Topological Order, Shortest Path, Adjacency Matrix and Adjacency List Implementations, Memory Management and Garbage Collection.

### Teaching Methodology:

Lectures, Written Assignments, Practical labs, Semester Project, Presentations

### Course Assessment:

Sessional Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam

### Reference Material:

1. Data Structures and Abstractions with Java by Frank M. Carrano & Timothy M. Henry, Pearson, 5<sup>th</sup>Edition 2018; ISBN-13: 978-0134831695.
2. Data Structures and Algorithm Analysis in C++ by Mark A. Weiss, Pearson, 4<sup>th</sup> Edition, 2013; ISBN-13: 978-0132847377.
3. Java Software Structures: Designing and Using Data Structures by John Lewis and Joseph Chase, Pearson, 4<sup>th</sup>Edition, 2013; ISBN-13: 978-0133250121.

<b>Database Management</b>					
<b>Credit Hours:</b>	4	<b>Course Code:</b>	ADIT-1111	<b>Prerequisites:</b>	None
<b>Course Contents:</b>					
<p>Basic database concepts, Characteristics, advantages and implications of the database approach to information systems as contrasted with traditional integrated file systems. DBMS architecture. Roles involved with database systems. The database system environment including data models, schemas, database languages and interfaces. Three-schema architecture and data independence. Information analysis to identify query keys, candidate keys, entities, attributes relationships and integrity constraints. ER modeling as a means of representing information concepts. Extended entity relationship modeling as it relates to specialization, generalization and inheritance. Relational model concepts. Referential integrity, entity integrity, and other constraints. Defining a relational schema from an ER diagram. Definition and use of relational algebra operations to query a relational database. Use of SQL to define a relational data model. Basic and complex queries in SQL. Insert, delete and update statements in SQL. Defining and using Views in SQL. Implement security with Grant/Revoke. Definition of functional dependency, full functional dependency, transitive dependency and multi-valued dependency. Definition of the normal forms from un-normalized through 4th normal form and how to apply the normalization process to recognize normal forms. How to move a data model to a higher normal form and the issues of de-normalization as it applies to retrieval performance.</p>					
<b>Teaching Methodology:</b>					
Lectures, Power Point Slides, Interactive Sessions, Extra Material, Projects, Presentations					
<b>Course Assessment:</b>					
Midterm Exam, Quizzes, Home Assignments, Case Study, Projects, Presentations, Final Exam					
<b>Reference Material:</b>					
<ol style="list-style-type: none"> <li>1. Database Systems: Design, Implementation &amp; Management by Thomas Connolly and Steven Morris, Cengage Learning, 13<sup>th</sup> Edition, 2018; ISBN-10: 1337627909</li> <li>2. Modern database management by Jeffrey A. Hoffer, Ramesh Venkataraman and Heikki Topi, Pearson, 11<sup>th</sup> Edition, 2012; ISBN-10: 0132662256.</li> <li>3. Database system concepts by Abraham Silberschatz, Henry Korth and S. Sudarshan, McGraw-Hill Education, 6<sup>th</sup> Edition, 2010; ISBN-10: 0073523321</li> </ol>					

<b>Data Communication</b>					
<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-2109	<b>Prerequisites:</b>	None
<b>Course Contents:</b>					
Introduction to Data Communications & Networks, Communication Components, Standards, Protocols, Network Topologies, Effectiveness of Communication, Types of Network, Layered Network Models (OSI Reference Model, TCP/IP Networking Architecture), Physical Layer Functionality, Data Link Layer Functionality, Network Layer Functionality, Transport Layer Functionality, Application Layer Functionality, Transmission Modes, Transmission Media, Transmission Impairments, Multiplexing Techniques, Multiple Access Techniques, Data Link Protocols, Layer 2 & Layer 3 Devices, Layer 2 & Layer 3 Addressing, Sub-netting, Super-netting/CIDR, Routing & Routed Protocols, Distance Vector Routing Protocols, Link State Routing Protocols, Network Address Translation, Circuit Switch Networks, Packet Switch Networks, Wireless Networks, Information Security, Network Security, Latest Trends in Computer Networks.					
<b>Teaching Methodology:</b>					
Lectures, Written Assignments, Practical Labs, Semester Project, Presentations.					
<b>Course Assessment:</b>					
Mid Term Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam.					
<b>Reference Material:</b>					
<ol style="list-style-type: none"> <li>1. Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill Science, 5<sup>th</sup> Edition, 2012; ISBN-10: 073376221</li> <li>2. Data and Computer Communications by William Stallings, Prentice Hall, 9<sup>th</sup> Edition, 2010; ISBN-10: 0131392050</li> <li>3. Computer Networks by Andrew S. Tanenbaum and David J. Wetherall, Prentice Hall, 5<sup>th</sup> Edition, 2010; ISBN-10: 0132126958</li> <li>4. Computer Networks and Internets by Douglas E. Comer, Prentice Hall, 5<sup>th</sup> Edition, 2008; ISBN-10: 0136066984</li> </ol>					

<b>Technical and Business Writing</b>				
<b>Credit Hours:</b>	3	<b>Course Code:</b>	ENGL-1111	<b>Prerequisites:</b> None
<b>Course Contents:</b>				
<p>Overview of Technical Reporting, Use of Library and Information Gathering, Administering ,Questionnaires, Reviewing the Gathered Information, Exemplification, Definition, Classification and Division, Casual Analysis, Effective Exposition, Technical Narration, Description and Argumentation, Persuasive Strategy, Organizing Information and Generation. Organizing Material, Construction of the Formal Outline, Outlining Conventions, Electronic Communication, Paragraphs, Listening Sentence Structure, Clarity, Length and Order, Pomposity, Empty Words, Pompous Vocabulary, Document Structure, Preamble, Summaries, Abstracts, Table of Contents, Footnotes, Glossaries, Cross-Referencing, Plagiarism, Citation and Bibliography, Glossaries, Index, Appendices, Typesetting Systems, Creating the Professional Report; Elements, Mechanical Elements And Graphical Elements. Reports: Proposals, Progress Reports, Leaflets, Brochures, Handbooks, Magazines Articles, Research Papers, Feasibility Reports, Project Reports, Technical Research Reports, Manuals and Documentation.</p>				
<b>Teaching Methodology:</b>				
Lectures, Written Assignments, Practical labs, Semester Project, Presentations.				
<b>Course Assessment:</b>				
Mid Term Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam.				
<b>Reference Material:</b>				
<ol style="list-style-type: none"> <li>1. Technical Report Writing, by Pauley and Riordan, Houghton Mifflin Company; 8<sup>th</sup>Edition, 2002. ISBN -10: 0618140166, ISBN - 13: 9780618140169</li> <li>2. Effective Technical Communication by Ashraf Rizvi, Tata McGraw-Hill; 3<sup>rd</sup> Edition, 2005. ISBN-10:1259082512, ISBN-13: 9781259082511</li> </ol>				

<b>Software Engineering-I</b>			
<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-2132
<b>Prerequisites:</b>	None		
<b>Course Contents:</b>			
<p>Software Engineering Introduction, Professional Software Development and Software Engineering Ethics, Challenges in Software Engineering, Software Aided Software Engineering Tools, System Development Process, Prototyping and the Process of Prototype Development, Software Development Phases, Requirement, Design, Software Models, Implementation, Integration, Evolutions, Maintenance, Development Methodology, Plan-Driven and Agile S/W Development, Validation &amp; Verification, Rational Unified Process, Process Models, Water Fall and Agile Processes, Evolutionary Development, Component Based Reuse Oriented Development, Incremental Development and Spiral Model, Importance of Strategic Planning, System Evaluation, Requirement Engineering, Functional &amp; Non-Functional Requirement, User Domain Requirement, Requirement Gathering and Documentation, Requirement Engineering Process, Feasibility Study, Requirement Elicitation, Requirement Discovery, Requirement Verification &amp; Validation, System Models, Behavioral Model, Object Oriented Model, Agile &amp; RAD Development, Software &amp; System Architecture, Architectural Styles and Design Element, Architectural Design &amp; Interface Design, Component Level Design Element, Deployment Design Element, Software Testing, Unit Testing &amp; Integration Testing, System Testing Process, Internal &amp; External View of Testing, Release Testing, User Testing, White Box Testing Black Box Testing, Stages in Acceptance Test Process, User Testing, Acceptance or Alpha Testing, Interface Testing, Software Project Management, Activity Related To SPM, Proposal Writing, Planning &amp; Scheduling, Project Cost, Project Cost Management</p>			
<b>Teaching Methodology:</b>			
Lectures, Written Assignments, Semester Project, Presentations.			
<b>Course Assessment:</b>			
Lectures, Written Assignments, Semester Project, Presentations.			
<b>Reference Material:</b>			
<ol style="list-style-type: none"> <li>1. Software Engineering by Ian Sommerville, Pearson Publishers, 10<sup>th</sup> Edition, 2015, ISBN: 13-978-0133943030</li> <li>2. Software Engineering: A Practitioner's Approach by Roger S, Pressman, McGraw-Hill Education, 8th Edition , 2014, ISBN: 13-978-0078022128</li> </ol>			

## Operating Systems

<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-2113	<b>Prerequisites:</b>	None
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### Course Contents:

Introduction to Operating System, Computer-System Organization , Computer-System Architecture , Operating-System Structure , Process Management, Memory Management, Storage Management, Kernel Data Structures, Operating-System Services, User and Operating-System Interface ,Operating-System Design and Implementation, Operating-System Structure, System Boot, Process Concept, Process Scheduling, Operations on Processes, Threads, Multicore Programming, Multithreading Models , The Critical-Section Problem , Peterson’s Solution, Semaphores , CPU Scheduling, Scheduling Criteria , Scheduling Algorithms, Thread Scheduling , Multiple-Processor Scheduling, CPU Scheduling, Deadlock, Deadlock Characterization, Methods for Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table, Disk Scheduling, Disk Management, File System Interface, Access Methods, Directory and Disk Structure, Virtual Machines, Distributed Systems, The Linux System, System Security and Protection, Virtualization.

### Teaching Methodology:

Lectures, Written Assignments, Practical labs, Semester Project, Presentations.

### Course Assessment:

Mid Term Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam.

### Reference Material:

1. Operating System Concepts by Abraham Silberschats and Calvin, The MIT press, 9<sup>th</sup> Edition, 2013; ISBN-13: 9781118129388
2. Survey of Operating System by Jan and Charles Holcombe’s , McGraw-Hill Science, 5<sup>th</sup> Edition, 2016; ISBN-13: 9781259618635
3. Principals of Operating Systems by Nearsh Chauhan, Oxford University Press, 1<sup>st</sup> Edition, 2014; ISBN-13: 9780198082873

<b>Web Design and Development</b>					
<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-1108	<b>Prerequisites:</b>	None
<b>Course Contents:</b>					
<p>General introduction about web pages. Client side VS Server side. What are web HTML, CSS and javascript. What tools do we need to build a web page? HTML Elements, HTML attributes, Styling and formatting HTML, Forms , Introduction to CSS, Introduction to javascript , Setting and configuring work environment, PHP syntax, variables, Operators ... etc. PHP Functions, PHP with Forms, PHP Server Variables, PHP &amp; MYSQ etc</p>					
<b>Teaching Methodology:</b>					
Lectures, Power Point Slides, Interactive Sessions, Extra Material, Projects, Presentations					
<b>Course Assessment:</b>					
Midterm Exam, Quizzes, Home Assignments, Case Study, Projects, Presentations, Final Exam					
<b>Reference Material:</b>					
<ol style="list-style-type: none"> <li>1. Learning PHP, MySQL, JavaScript, CSS &amp; HTML5: A Step-by-Step Guide to Creating Dynamic Websites 3rd Edition, 2014; ISBN-13: 978-1491949467</li> <li>2. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics Fourth Edition 2012; ISBN-10: 1449319270.</li> </ol>					



<b>Fundamentals of Front-end Development</b>					
<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-1105	<b>Prerequisites:</b>	None
<b>Course Contents:</b>					
<p>Joining the Community, Developer culture, Local developer resources, Online communities, Freelancing techniques, Contracting, Working with other freelancers, Looking for work, Making critical technical choices, Understanding different types of work and their roles, Project management, Time management, Client communication, Project management platforms, HTML5, New elements and their use, Page structure, Email, CSS3, Preprocessors like SASS, CSS frameworks (bootstrap, foundation), JavaScript &amp; jQuery, Javascript / ECMA Script fundamentals, Using 3rd party libraries, jQuery libraries and patterns, CMS's, Wordpress. Static site generators. Hosted solutions ,Squarespace, Shopify, etc)</p>					
<b>Teaching Methodology:</b>					
Lectures, Power Point Slides, Interactive Sessions, Extra Material, Projects, Presentations					
<b>Course Assessment:</b>					
Midterm Exam, Quizzes, Home Assignments, Case Study, Projects, Presentations, Final Exam					
<b>Reference Material:</b>					
<ol style="list-style-type: none"> <li>1. Learning PHP, MySQL, JavaScript, CSS &amp; HTML5: A Step-by-Step Guide to Creating Dynamic Websites 3rd Edition, 2014; ISBN-13: 978-1491949467</li> <li>2. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics Fourth Edition 2012; ISBN-10: 1449319270.</li> </ol>					

## Discrete Structures

<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-1112	<b>Prerequisites:</b>	None
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### Course Contents:

Propositional & Predicate Logic, Mathematical Reasoning, Logic Connectives & Their Applications, Laws of Logic, Rules of Inference, Contraposition, Proof by Contradiction, Proof by Implication, Circuit's Theory, Logic Connectives & Logic Gates, Set Theory, Venn Diagram, Set Identities & Venn Diagram Applications, Relations, Relation Forms & Types, Relation Representation Mechanism, Partition Orderings, Recurrence Relations, Relation Properties & Their Applications. Functions: Function Mappings, Function Composition, Inverse Functions & Recursive Functions. Sequences, Series, Counting, Permutations & Combinations, Elements of Graph Theory, Directed Graph, Weighted Graph and Its Applications, Path & Circuits, Matrix Representation of Graphs, Function & algorithms, Dividing algorithms, Comparing Different Algorithms, Time and Space Complexity of Algorithms, Data Structures: Stack, Queues, Link List, Trees, and Searching Techniques in Tree.

### Teaching Methodology:

Lectures, Exercise, Practice-Problem Solving Session, Presentations.

### Course Assessment:

Mid Term Exam, Home Assignments, Quizzes, Final Exam.

### Reference Material:

1. Discrete Mathematics and its Applications by Kenneth H. Rosen, McGraw-Hill Education, 7<sup>th</sup> Edition, 2011; ISBN:978-0073383095
2. Discrete Mathematics with Applications by Susanna S. Epp, Cengage Learning, 4<sup>th</sup> Edition, 2010; ISBN:978-0495391326
3. Discrete Mathematics by Richard Johnson Baugh, Pearson, 7<sup>th</sup> Edition, ISBN: 978-0131593183

## Object Oriented Programming

<b>Credit Hours:</b>	3	<b>Course Code:</b>	ADIT-1110	<b>Prerequisites:</b>	COSC-1101
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### Course Content:

Introduction to Object Oriented Design, History and Advantages of Object Oriented Design, Introduction to Object Oriented Programming Concepts, Classes, Objects, Data Encapsulation, Constructors, Destructors, Access Modifiers, Const. vs Non-Const. Functions, Static Data Members & Functions, Function Overloading, Operator Overloading, Identification of Classes and their Relationships, Composition, Aggregation, Inheritance, Multiple Inheritance, Polymorphism, Abstract Classes and Interfaces, Generic Programming Concepts, Function & Class Templates, Standard Template Library, Object Streams, Data and Object Serialization Using Object Streams, Exception Handling.

### Teaching Methodology:

Lectures, Written Assignments, Practical labs, Semester Project, Presentations

### Course Assessment:

Sessional Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam

### Reference Material:

1. Starting Out with C++ from Control Structures to Objects by Tony Gaddis, Pearson, 9<sup>th</sup> Edition, 2017; ISBN-13: 978-0134498379.
2. C++ How to Program by Paul J. Deitel and Harvey Deitel, Pearson, 10<sup>th</sup> Edition, 2016; ISBN-13: 978-0134448237.
3. Java: How to Program by Paul Deitel and Harvey Deitel, Prentice Hall, 9<sup>th</sup> Edition, 2011; ISBN-13: 978-0132575669.

## Numerical Analysis

<b>Credit Hours:</b>	3	<b>Course Code:</b>		<b>Prerequisites:</b>	None
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### Course Contents:

Mathematical preliminaries and error analysis, round-off errors and computer arithmetic, Calculate Divided Differences. Use Divided-difference Table. Find Newton's Interpolation Polynomial. Calculate Interpolation with Equally Spaced Data. Find the Difference Table. Calculate, Newton's Forward & Backward Difference Formulae. Use Gauss Formulae. Use Stirling's Interpolation Formula. Use Bessel's Interpolation Formula. Use Everett's Interpolation Formula. Solve Nonlinear Equations. Solve Equations by Bisection Method. Solve Equations by Regula Falsi Method. Solve Equations by Secant Method. Solve Equations by Newton-Raphson Method. Find Fixed Point Iteration. Solve Equations by Jacobi Iterative Methods. Solve Equations by Gauss Seidel Method Calculate Numerical Differentiation. Find Numerical Differentiation Formulae Based on Equally Spaced Data. Find Numerical Differentiation Based on Newton's Forward Differences. Find Numerical Differentiation Based on Newton's Backward Differences. Find Numerical Differentiation Based on Stirling's Formula. Find Numerical Differentiation Based on Bessel's Formula. Find Numerical Differentiation Based on Lagrange's Formula. Calculate Error Analysis of Differentiation Formulae. Solve Richardson Extrapolation. Calculate Numerical Integration. Use Trapezoidal Rule with Error Term. Use Simpson's 1/3 Rule with Error Term. Use Simpson's 3/8 Rule with Error Term. Use Composite Numerical Integration. Use Composite Trapezoidal Rule. Use Composite Simpson's Rule. Find Richardson's Extrapolation. Find Newton-Cotes Closed Quadrature Formulae.

### Teaching Methodology:

Lectures, Written Assignments, Semester Project, Lab Assignments, Presentations.

### Course Assessment:

Sessional Exam, Home Assignments, Quizzes, Final Exam

### Reference Material:

1. Numerical Analysis by Richard L. Burden, J. Douglas Faires, Brooks/Cole Boston USA, 9<sup>th</sup> Edition, 2011, ISBN-10: 0538733519.
2. Numerical Methods for Scientific Computing by J.H. Heinbockel Trafford Publishing USA, 2004, ISBN 10: 1412031532.