Curriculum

of

Associate Degree Program (ADP)

in

Cyber Security

(December 2019)

Department of Information Technology

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

Table of Contents

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. Ms. Saima Noreen Khosa, Lecturer (Member)
5. Ms. Urooj Akram, Lecturer (Member)

2. Preface

The main objective of Associate Degree Program (Cyber Security) 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 21st century. This program will provide a strong foundation for the students to have good expertise in the domain of cyber security 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. Muhammad Suleman Tahir, Vice Chancellor and Prof. Dr. Muhammad Munir Ahmad, Senior Dean of All Faculties, KFUEIT, to initiate the program is highly acknowledged. The contribution of the faculty members is also appreciated.

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 1st 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 2nd 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 = **K**nowledge-able
F = **F**aithful
U = **U**seful
E = **E**co-friendly
I = **I**nnovative
T = **T**olerant

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 21st 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 Cyber Security

6.3 Short Title of the Programs

ADP(Cyber Security)

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), this 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 5th 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:

1st ADP Semester			
Code	**Title of the Course**	**Cr. Hrs.**	**Remarks**
ADIT-1103	ICT & Introduction to programming (using C language)	3	
ADIT-1203	ICT & Introduction to programming (using C language) - Lab	1	
MATH-1121	Calculus and Analytical Geometry	3	
ELEN-2100	Digital Logic Design (DLD)	3	

ELEN-2200	Digital Logic Design (DLD) - Lab	1	
XXXX-XXXX	English Comprehension	3	
XXXX-XXXX	Pakistan Studies and Global Perspectives	2	
	Total	**16**	

2nd ADP Semester			
Code	**Title of the Course**	**Cr. Hrs.**	**Remarks**
ADIT-1106	Data Structures & Algorithms (using C language)	3	
ADIT-1206	Data Structures & Algorithms (using C language) - Lab	1	
ADIT-1207	Computer Architecture & Organization	3	
STAT-2104	Probability and Statistics	3	
ADIT-1208	OWASP / Penetration Testing	3	
XXXX-XXXX	Communication Skills	3	
XXXX-XXXX	Islamic Studies & Professional Ethics OR General and Professional Ethics (for Non-Muslims)	2	
	Total	**18**	
3rd ADP Semester			
Code	**Title of the Course**	**Cr. Hrs.**	**Remarks**
ADIT-2112	Ethical Hacking	3	
ADIT-2212	Ethical Hacking - Lab	1	
ADIT-2113	Operating System	3	
ADIT-2213	Operating System - Lab	1	
ADIT-2114	Database System	3	
ADIT-2214	Database System - Lab	1	
ADIT-2115	Computer Networks - I	3	
ADIT-2116	Methodology Standards & Protocol (27001)	3	
	Total	**18**	
4th ADP Semester			
Code	**Title of the Course**	**Cr. Hrs.**	**Remarks**
ADIT-2117	Computer Networks – II with Lab	3	
ADIT-XXXX	Distributed Systems / Internet of Things	3	
ADIT-XXXX	Information Security / Network Security	4	
ADIT-2120	Software Engineering	3	
XXXX-XXX	Technical Report Writing	3	
ADIT-2111	Internship (Mandatory)	Pass / Fail	Duration 3 Months
	Total	**16**	
	Grand Total	**68**	

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:

ICT & Introduction to Programming (using C language) with Lab					
Credit Hours:	4	**Course Code:**	ADIT-1203	**Prerequisites:**	None
Course Content:					
Introduction to C, The Structure of a C program, Some basic C commands, for loop, Symbolic Constants, Character input and output, Logical AND and OR, Arrays and Functions, Call by Reference and Call by Value, Variables and constants, Data Types, Operators, Expressions , if, switch, Conditional Expressions, while, break and continue , Multi-file programs, Scoping, Recursion, The C Pre-processor, Pointers and addresses, Organisation of Memory, Pointers and Arrays, Managing and manipulating memory, Passing parameters to C programs, Pointers to functions, Basics, Passing and returning structures, Pointers and structures, Arrays of Structures, Memory in C, Manipulating Files					
Teaching Methodology:					
Lectures, Written Assignments, Practical labs, Semester Project, Presentations					
Course Assessment:					
Sessional Exam, Home Assignments, Quizzes, Project, Presentations, Final Exam					
Reference Books:					
1. Starting out with Python by Tony Gaddis, Pearson, 4th Edition 2017; ISBN-13: 978-0134444321. 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. 3. Practice of Computing Using Python by William F. Punch and Richard Enbody, Pearson, 3rd Edition 2016; ISBN-13: 978-0134380315.					

Calculus and Analytical Geometry					
Credit Hours:	3	**Course Code:**		**Prerequisites:**	None

Course Contents:

Limits And Continuity; Introduction To Functions, Introduction To Limits, Techniques Of Funding Limits, Indeterminate Forms Of Limits, Continuous And Discontinuous Functions And Their Applications, Differential Calculus; Concept And Idea Of Differentiation, Geometrical And Physical Meaning Of Derivatives, Rules Of Differentiation, Techniques Of Differentiation, Rates Of Change, Tangents And Normal Lines, Chain Rule, Implicit Differentiation, Linear Approximation, Applications Of Differentiation; Extreme Value Functions, Mean Value Theorems, Maxima And Minima Of A Function For Single-Variable, Concavity, Integral Calculus; Concept And Idea Of Integration, Indefinite Integrals, Techniques Of Integration, Riemann Sums And Definite Integrals, Applications Of Definite Integrals, Improper Integral, Applications Of Integration; Area Under The Curve, Analytical Geometry; Straight Lines In R3, Equations For Planes.

Teaching Methodology:

Lecturing, Written Assignments

Course Assessment:

Sessional Exam, Home Assignments, Quizzes, Final Exam

Reference Material:

1. Calculus and Analytic Geometry by Kenneth W. Thomas, Addison-Wesley Longman, Incorporated; 8 1992.ISBN-9780201607000
2. Calculus by James Stewart, Cengage Learning; 7th Edition, 2012. ISBN-10: 0538497815
3. Calculus by Earl Swokowski, Michael Olinick and Dennis D. Pence, Brooks Cole; 6th Edition, 1996. ISBN-10: 0534936245

Digital Logic Design (DLD) with Lab					
Credit Hours:	4	**Course Code:**	ADIT-1204	**Prerequisites:**	

Course Contents:

Number Systems, Logic Gates, Boolean Algebra, Combination -logic circuits and designs, Simplification Methods K-Maps, Quinne, Mc-Cluskey,, Flip Flops and Latches, Asynchronous and Synchronous circuits, Counters, Shift Registers, Shift Registers Counters, Triggered devices & its types. Binary Arithmetic and Arithmetic Circuits, Memory Elements, State Machines. Introduction Programmable Logic Devices (CPLD, FPGA); Lab Assignments using tools such as Verilog HDL/VHDL, MultiSim, etc.

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. Fundamental of Digital Logic with Verilog Design by Stephen Brown, McGraw-Hill Education, 3rd Edition, 2013; ISBN-10: 0073380547.
2. Digital Fundamentals by Thomas L Floyed, Pearson, Prentice Hall, 10th Edition, 2008; ISBN-10: 0132359235.
3. Digital Logic Design by Moras Mano, Pearson College Div, 1st Edition, 1979; ISBN-10: 0132145103.

Probability and Statistics					
Credit Hours:	3	**Course Code:**	STAT-2104	**Prerequisites:**	None

Course Contents:

Set Theory, Types of sets, Methods of Representing sets ,Venn Diagram, System of Linear Equations and its Applications, Solution of Linear system of equations as well as solution by graphically method, Quadratic Inequalities, Sets and properties of sets, Slopes, distance between two points, graphical understanding, Rate, Ratio, proportion, percentage, Interest, depreciation and fraction, Solution of linear equations involving one and two variables and presenting them in real line, Mathematical concepts in Business, Introduction to Statistics, Constructing a Frequency Distribution, Graphing Frequency Distribution, Measures of Central Tendency, Percentiles, Declines and Quartiles, Measures of Dispersion and skewness, Range and Semi-Inter quartile Range, Definitions of Probability, Addition and Multiplication Rules of Probability, Probability Distribution

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. Business statistics by Malim, Muhammad Razi | Faridah Abdul Halim, Call Number: 519.5 MAL, ISBN: 9789834509644, Publication Date: 2011
2. Business Accounting, Frank Wood‟s, Pearson Education Limited14th Edition, ISBN: 10: 1292208627.

English Comprehension

Credit Hours:	3	Course Code:		Prerequisites:	None

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

Pakistan Studies and Global Perspectives

Credit Hours:	2	Course Code:		Prerequisites:	None

Course Contents:

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.

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. The emergence of Pakistan by Chaudhri Muhammad Ali,Columbia University Press; 1st Edition,1967. ISBN-10: 0231029330
2. The Making of Pakistan by K.K.Aziz, Sang-E-Meel Publication; 1st Edition, 1967. ISBN-10: 969350870X Subject: Political Science

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

Credit Hours:	2	**Course Code:**		**Prerequisites:**	None

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; 1st Edition, 2016. ISBN-10: 1138848166
2. Muslim Jurisprudence and the Quranic Law of Crimes by Waliullah Mir, Adam Publishers and Distributors; 3rd Edition, 2007. ISBN- 10: 8174355227

Data Structures & Algorithms (using C language) with Lab

Credit Hours:	4	**Course Code:**	ADIT-2206	**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, Dequeuer, 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, 5th Edition 2018; ISBN-13: 978-0134831695.
2. Data Structures and Algorithm Analysis in C++ by Mark A. Weiss, Pearson, 4th Edition, 2013; ISBN-13: 978-0132847377.
3. Java Software Structures: Designing and Using Data Structures by John Lewis and Joseph Chase, Pearson, 4th Edition, 2013; ISBN-13: 978-0133250121.

Computer Architecture & Organization

Credit Hours:	3	Course Code:	ADIT-2107	Prerequisites:	

Course Contents:

Introduction to computer systems, Bits & Bytes, Compilers, Instruction Cycle, Cache Memory, Storage Devices, Operating Systems, Networks, Representing and Manipulating Information, Information Storage, Integer Representations, Integer Arithmetic, Floating Point Representations, Machine-Level Representation of Programs, Program Encodings, Data Formats, Accessing Information, Arithmetic and Logical Operations, Control, Procedures, Array Allocation and Access, Heterogeneous Data Structures, Pointers, gdb Debugger, Out-of-Bounds Memory References and Buffer Overflow, x86-64: Extending IA32 to 64 Bits, Machine-Level Representations of Floating-Point Programs, Processor Architecture, The Y86 Instruction Set Architecture, Logic Design and the Hardware Control Language HCL, Sequential Y86 Implementations, General Principles of Pipelining, Pipelined x86 Implementations.

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. Computer Systems: A Programmer's Perspective by Randal E. Bryant and David R. O'Hallaron, Pearson; 3rd Edition. (2015). ISBN-13:978-0134092669, ISBN-10:013409266.
2. MIPS Assembly Language Programming by Robert Britton, Pearson; 1st Edition. (2003). ISBN-13: 978-0131420441, ISBN-10: 0131420445.
3. Computer System Architecture by M. Morris R. Mano, Pearson; 3rd Edition. (1993). ISBN-13: 978-0131755635, ISBN-10: 0131755633.

Communication Skills

Credit Hours:	3	Course Code:		Prerequisites:	None

Course Contents:

Principles Of Writing Good English, Understanding The Composition Process: Writing Clearly; Words, Sentence And Paragraphs; Comprehension And Expression; Use Of Grammar And Punctuation. Process Of Writing, Observing, Audience Collecting, Composing, Drafting And Revising, Persuasive Writing, Reading Skills, Listening Skills And Comprehension, Skills For Taking Notes In Class, Skills For Exams; Business Communications; Planning Messages, Writing Concise But With Impact. Letter Formats, Mechanics Of Business, Letter Writing, Letters, Memo And Applications, Summaries, Proposals, Writing Resumes, Styles And Formats, Oral Communications, Verbal And Non-Verbal Communication, Conducting Meetings, Small Group Communication, Taking Minutes. Presentation Skills; Presentation Strategies, Defining The Objective, Scope And Audience Of The Presentation, Material Gathering Material Organization Strategies, Time Management, Opening And Concluding, Use Of Audio-Visual Aids, Delivery And Presentation.

Teaching Methodology:

Lecturing, Written Assignments, Project, Presentation, Report Writing

Course Assessment:

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

Reference Material:

1. Practical Business English by Colleen Vawdrey, Ted D. Stoddard and R. Dermont Bell, Richard d Irwin; 1st Edition, 1992. ISBN-10: 0256102740
2. Effective Communication Skills: The Foundations for Change by John Nielsen, Xlibris Corporation; 2008. ISBN-10: 1453506748

Database Systems

Credit Hours:	3+1	Course Code:	ADIT-3209	Prerequisites:	None

Course Contents:

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.

Teaching Methodology:

Lectures, Power Point Slides, Interactive Sessions, Extra Material, Projects, Presentations

Course Assessment:

Midterm Exam, Quizzes, Home Assignments, Case Study, Projects, Presentations, Final Exam

Reference Material:

1. Database Systems: Design, Implementation & Management by Thomas Connolly and Steven Morris, Cengage Learning, 13th Edition, 2018; ISBN-10: 1337627909
2. Modern database management by Jeffrey A. Hoffer, Ramesh Venkataraman and Heikki Topi, Pearson, 11th Edition, 2012; ISBN-10: 0132662256.
3. Database system concepts by Abraham Silberschatz, Henry Korth and S. Sudarshan, McGraw-Hill Education, 6th Edition, 2010; ISBN-10: 0073523321

Computer Networks - I

Credit Hours:	3	Course Code:	ADIT-3110	Prerequisites:	None

Course Contents:

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.

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. Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill Science, 5th Edition, 2012; ISBN-10: 073376221
2. Data and Computer Communications by William Stallings, Prentice Hall, 9th Edition, 2010;ISBN-10: 0131392050
3. Computer Networks by Andrew S. Tanenbaum and David J. Wetherall, Prentice Hall, 5th Edition, 2010; ISBN-10: 0132126958
4. Computer Networks and Internets by Douglas E. Comer, Prentice Hall, 5th Edition, 2008;ISBN-10: 0136066984

Internet of Things

Credit Hours:	3	Course Code:	ADIT-4107	Prerequisite:	

Course Contents:

Introduction to Internet of Things (IoT): Wireless Networks, Wireless Sensor Networks, Protocol Stacks, IoT paradigm, Future of IoT, Challenges & applications of IoT in modern world, Routing Protocols, Transport Layer Congestion Control & Reliability, Building Blocks of IoT: Sensors, Processors, Gateways, Applications. Technologies behind the IoT: RFID and NFC, GPS, agents & multiagent systems, Architecture of IoT: Node Structure: Sensing, Processing, Communication, Powering, Networking Topologies, Layer/Stack architecture, Physical layer of WSN, Performance measurements, Link quality metrics, Network performance metrics, MAC layer of IEEE 802.15.4, Introduction to Contiki and its MAC, Cooja emulator, Network Layer of IEEE 802.15.4 based IoT applications, Transport Layer for IoT, Application layer for IoTs, HTTP and REST services, CoAP for services, MQTT and MQTT-SN, IoT Communication technologies: ZigBee, BLE, WiFi, LTE, IEEE 802.11ah. Cloud Computing and IoT, Security in IoT.

Teaching Methodology:

Lectures, Power Point Slides, Interactive Sessions, Extra Material, Projects, Presentations

Course Assessment:

Midterm Exam, Quizzes, Home Assignments, Projects, Presentations, Final Exam

Reference Material:

1. The Internet of Things by Samuel Greengard, The MIT Press Essential, Kindle Edition, 2015; ISBN:9780262527736
2. Designing the Internet of Things by Adrian McEwen, Hakim Cassimally, Wiley, 1st Edition, 2013; ISBN: 978-1-118-43062-0

Distributed Systems					
Credit Hours:	3	**Course Code:**	ADIT-2146	**Prerequisites:**	

Course Contents:

Asynchronous/Synchronous Computation/Communication, Concurrency Control, Fault Tolerance, GPU Architecture and Programming, Heterogeneity, Interconnection Topologies, Load Balancing, Memory Consistency Model, Memory Hierarchies, Message Passing Interface (MPI), MIMD/SIMD, Multithreaded Programming, Parallel Algorithms and Architectures, Parallel I/O, Performance Analysis and Tuning, Power, Programming Models (Data Parallel, Task Parallel, Process-Centric, Shared/distributed Memory), ScaLability and Performance Studies, Scheduling, Storage Systems, Synchronization, Tools (Cuda, Swift, Globus, Condor, Amazon AWS, OpenStack, Cilk, gdb, threads, MPICH, OpenMP, Hadoop, FUSE)

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. Distributed Systems: Principles and Paradigms, Andrew S. Tanenbaum and Maarten van Steen, Prentice-Hall of India Pvt.Ltd, 2nd Edition, 2007; ISBN-13: 978-1530281756
2. Distributed and Cloud Computing by Kai Hwang, Jack Dongarra and Geoffery C. Fox, Morgan Kaufmann, 1st Edition, 2013; ISBN-10: 0123858801.

Technical Report Writing

Credit Hours:	3	**Course Code:**		**Prerequisites:**	None

Course Contents:

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, P aragraphs, 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.

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. Technical Report Writing, by Pauley and Riordan, Houghton Mifflin Company; 8thEdition, 2002. ISBN -10: 0618140166, ISBN - 13: 9780618140169
2. Effective Technical Communication by Ashraf Rizvi, Tata McGraw-Hill; 3rd Edition, 2005. ISBN-10:1259082512, ISBN-13: 9781259082511

Software Engineering

Credit Hours:	3	Course Code:	ADIT-4109	Prerequisites:	None

Course Contents:

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 &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 &Non-Functional Requirement, User Domain Requirement, Requirement Gathering and Documentation, Requirement Engineering Process, Feasibility Study, Requirement Elicitation, Requirement Discovery, Requirement Verification &Validation, System Models, Behavioral Model, Object Oriented Model, Agile & RAD Development, Software &System Architecture, Architectural Styles and Design Element, Architectural Design & Interface Design, Component Level Design Element, Deployment Design Element, Software Testing, Unit Testing &Integration Testing, System Testing Process, Internal &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 &Scheduling, Project Cost, Project Cost Management

Teaching Methodology:

Lectures, Written Assignments, Semester Project, Presentations.

Course Assessment:

Lectures, Written Assignments, Semester Project, Presentations.

Reference Material:

1. Software Engineering by Ian Summerville, Pearson Publishers, 10th Edition, 2015, ISBN: 13-978-0133943030
2. Software Engineering: A Practitioner's Approach by Roger S, Pressman, McGraw-Hill Education, 8th Edition , 2014, ISBN: 13-978-0078022128

Operating Systems					
Credit Hours:	3+1	**Course Code:**	ADIT-3208	**Prerequisites:**	None

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

Information Security

Credit Hours:	4	Course Code:	ADIT-2119	Prerequisite:	None

Course Contents:

Introduction to information security, Security Models and Policies, Program Security, Malicious Software, Operating system security, Privacy and Privacy Enhancement Tools, Steganography, Social Engineering, Security threats on Social networks Stream ciphers, Semantic security, Block ciphers and pseudorandom functions, Chosen plaintext security and modes of operation, The DES and AES block ciphers, Message integrity. CBC-MAC, HMAC, PMAC, and CW-MAC, Collision resistant hashing, Authenticated encryption. CCM, GCM, TLS, and IPsec, Key derivation functions, Odds and ends: deterministic encryption, non-expanding encryption, and format preserving encryption, Basic key exchange: Diffie-Hellman, RSA, and Merkle puzzles, Computational number theory, Number theoretic hardness assumptions, Public key encryption, Trapdoor permutations and RSA, The ElGamal system and variants.

Teaching Methodology:

Lectures, Power Point Slides, Interactive Sessions, Extra Material, Projects, Presentations

Course Assessment:

Midterm Exam, Quizzes, Home Assignments, Projects, Presentations, Final Exam

Reference Material:

1. Network Security Essentials: Applications and Standards by William Stallings, Pearson; 5th Edition, 2013; ISBN-13: 978-0133370430
2. Computer Networks: A system approach by Larry L. Peterson, Bruce S. Davie, Morgan Kaufmann; 5th Edition, 2011; ISBN-13: 978-0123850591
3. Cryptography and Network Security by Behrouz A. Forouzan, Tata McGraw-Hill Education; 2nd Edition, 2010; ISBN: 9780070702080
4. .Introduction to Cryptography – Principles and Applications by Delfs and Knebl, Springer; 2nd Edition, 2007; ISBN-13: 978-3540492436

Network Security					
Credit Hours:	3	**Course Code:**	ADIT-2145	**Prerequisites:**	

Course Contents:

Introduction to Information Assurance, Threats, Vulnerabilities, Attacks, and Controls, Trusted Computing Domains, Overview of Security Policy & Mechanisms, Natural Language Security Policies, Policy Models, Policy Languages, Low-Level Policy Languages, Security Planning and Risk Analysis, Elements of Risk Analysis, Quantitative vs Qualitative Analysis, Risk Management Cycle, Risk/Control Tradeoffs, Risk Analysis Frameworks, Classic Cryptography, Transposition Ciphers, Substitution Ciphers, Cæsar cipher, Vigènere cipher, Solitaire cipher, One Time Pad, Book cipher, Private Key Cryptography, Stream and Block Ciphers, DES and AES, Public Key Cryptography, Diffie-Hellman, RSA, MD5 and SHA, Key Management, Session and Interchange Key, , Authentication Protocols (X.509, Kerberos), PKI Trust Models, Digital Signatures, Electronic Mail Security (S/MIME, PGP), Web Security and Protocols for Secure Electronic Commerce (IPSec, SSL, TLS, SET), Firewall & Virtual Private Network, Intrusion Detection System.

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. CompTIA Security+ Guide to Network Security Fundamentals by Mark Ciampa, Cengage Learningm, 6th Edition, 2017; ISBN-13: 9781337288781
2. Cryptography and Network Security: Principles and Practice by William Stallings, Pearson, 7th Edition, 2016; ISBN-10: 0134444280
3. Computer Security: Art and Science by Matt Bishop, Pearson, 1st Edition, 2015; ISBN-13: 978-0134289519

Ethical Hacking

Credit Hours:	4	Course Code:	ADIT-3207	Prerequisites:	None

Course Contents:

Understanding Ethical Hacking Terminology, Identifying different types of Hacking, Technologies, Five Stages of Ethical Hacking, Hacker Classes, Vulnerability Research, Legal Implications of Hacking, Introduction to foot printing, Information gathering methodology, DNS Enumeration, Whois and ARIN Lookups, Introduction to Social Engineering, Common type of social engineering attacks, Port Scanning, Network Scanning, Ping Sweep techniques, Understanding Nmap Command switches, Using SYN, Stealth, XMAS,NULL and FIN Scans, Understanding Banner Grabbing, Enumeration, Password cracking techniques, Redirecting the SMB Logon to Attacker, Redirecting SMB, NetBIOS DoS attacks, Password cracking countermeasures, Understanding Keyloggers and other spyware technologies, Understanding Rootkits, Rootkits installation, Vulnerabilities in software and applications, Different ways to break Glow application, Fuzzing basic concepts, Understanding protocols susceptible to sniffing, Active and passive sniffing, ARP poisoning, Understanding MAC flooding, DNS Spoofing, Sniffing countermeasures, Overview of WEP and WPA cracking techniques, Wireless sniffers and locating SSIDs, MAC Spoofing, Rogue Access Points, Methods used to break security, Wireless Networks, Conducting inside attack

Teaching Methodology:

Lecturing, Written Assignments, Presentation, Report Writing

Course Assessment:

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

Reference Material:

1. EC-Council Official Certified Ethical Hacker by Kimberly Graves
2. Gray Hat Hacking- The Ethical Hacker's Handbook by Allen Harper, Jonatahn Ness, Shon Hairs et al.

Computer Networks II

Credit Hours:	3	Course Code:	ADIT-4106	Prerequisites:	None

Course Contents:

etwork Overview, Foundation and Building Blocks, Multiplexing, Performance Metrics, Network Architecture, Protocols, Protocol Machinery, Standard Architectures, Internet Architecture, Network Models, Network Software, Socket Programming, Client-Server Model, Network Programming, TCP and UDP, Connections, Advanced Socket Programming, Direct Link Networks, Building Blocks, Encoding, Modulation Schemes, Framing (Advantages, Problem, Boundary, HDLC, Point-to-Point, SONET), Error Detection, Error Detection & Correction, Reliable Transmission and its Approaches, Shared Access Networks (Ethernet 802.3), Token Rings (802.5, FDDI), Wireless LAN, Spread Spectrum, Wireless LAN (802.11), Network Adaptor, Switching and Forwarding, Bridges and Extended LANs, Cell Switching (ATM), Switches: The Intersections, Simple Internetworking (IP, Fragmentation & Reassembly, ARP, ICMP, DHCP), Virtual Private Network(VPN), Routing (Bellman-Ford Algorithm, Dijkstra's Algorithm, Distance Vector Routing Algorithm, Link State Algorithm, Route Calculation), OSPF Routing Protocol, Mobile IP, Global Internet, Virtual Geographies, Subnetting, Supernetting / CDIR, Routing in Large Scale Networks, Inter-domain & Intra-domain Routing, EGP, BGP, IPv6 (Addresses, Packet Format, Design Controversies), Multicast, Support Strategy, IP Multicast Service Model, ELAN Multicast Techniques, Multicast Routing in the Internet, Limitations on Multicast, Multi Protocol Label Switching (MPLS), End-to-End Protocols, Service Model, Challenges, UDP, Reliable Byte Stream (TCP), Remote Procedure Call (RPC)

Teaching Methodology:

Lecturing, Written Assignments, Presentation, Report Writing

Course Assessment:

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

Reference Material:

1. Computer Networks: A Systems Approach, 3rd Edition, Larry Peterson and Bruce Davie
2. Unix Network Programming, 2nd Edition, Richard Stevens

OWASP/ Penetration Testing

Credit Hours:	3	Course Code:	ADIT-2108	Prerequisites:	None

Course Contents:

Beginning with Kali Linux, Penetration testing methodology, Target scoping, Information gathering, Target discovery, Enumerating target, Vulnerability mapping, Social engineering, Target exploitation, Privilege escalation, Maintaining access, Documentation and reporting, Supplementary tools, OWASP Introduction, Injection, Vulnerabilities and Attacks, Command Injection Lab Instructions, HTML Injection Lab Instructions, SQL Injection, Command Injection, Broken Authentication, Sensitive Data Exposure, XML External Entities, WASE Learning - XML External Entities, Broken Access Control, Security Misconfigurations, XSS, Reflected XSS Attack Lab Instructions, XSS Stored, XSS Reflected, Insecure Deserialization, WASE Learning - Insecure Deserialization, Using Components with Known Vulnerabilities, Insufficient Monitoring & Logging Overview

Teaching Methodology:

Lecturing, Written Assignments, Presentation, Report Writing

Course Assessment:

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

Reference Material:

1. Penetration Testing – A Hands on Introduction to Hacking by Georgia Weidman
2. The Basics of Hacking & Penetration Testing by Patrick Engebreston

Methodologies Standards and Protocols (ISO 27001)					
Credit Hours:	3	**Course Code:**	ADIT-3111	**Prerequisites:**	None

Course Contents:

Security and Audit Frameworks, Methodologies and Architecture, ISO27001, CoBIT, COSO, NIST 800-53, SABSA (Zachman Framework), ToGAF, Business Continuity Management, Access Management (Physical & Logical), IS Incident Management, Information Security Management System, Core Information Security Principles, Information Security Controls, Information Security Governance, Information Security Risk Management, Risk Assessment Methodologies, SP 800-30, ISO 27005

Teaching Methodology:

Lecturing, Written Assignments, Presentation, Report Writing

Course Assessment:

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

Reference Material:

1. Information Security Management Handbook, 2007, 6th Edition, Harold F. Tipton and Micki Krause
2. CISSP All-In-One Exam Guide, 2012, 6th Edition, McGraw-Hill/Osborne Media, Shon Harris