



Al Musanna College of Technology

Department of Information Technology

Course Description Details

Advanced Diploma Level (Networking)

Sl.No	Course Code/Name	Course Description
1	ENTW3100-Public Speaking	Speech development strategies and delivery techniques- rhetorical sensitivity and critical thinking- feedback on developing speech forms - principles of public speaking - persuasive speech - Analyze audiences for the purpose of preparing speeches - visual aids for the purpose of speech - different methods of persuasion - introductory speech, a demonstration speech, an informative speech, a persuasive speech, and a special occasion speech - speaking styles to business, government, and industry functions



2	<p>MATH2200-Discrete Structure</p>	<p>Techniques to solve problems in probability theory, counting and number theory - pigeonhole principle - counting methods - Generate functions - Recurrence relations - inclusion-exclusion formula - truth table, implications and equivalence, resolution and proof techniques - graph and set theory - characteristic of an algorithm - directed and undirected- Eulerian paths and cycles - Hamiltonian paths and cycles - Trees - h Sequential circuits - define-state machines - Deterministic and non- deterministic - finite automata - Semi groups, Groups and subgroup - Homomorphism and isomorphism of groups - Lagrange's theorem.</p>
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Course Name: Scaling Networks	Course Code: ITNT301
pre-requisite: ITNT201-Routing and Switching Essentials	Credit Hours: 3
Passing Grade: C	Level: Year3
No. Of Theory & Practical Hours (1 : 4)	
Goal: focuses on switching technologies and router operations that support small-to-medium business networks and includes wireless local area networks (WLANs) and security concepts. Students learn key switching and routing concepts. They can perform basic network configuration and troubleshooting, identify and mitigate LAN security threats, and configure and secure a basic WLAN.	
Objectives: By the end of this course, students will learn the following topics	
<ul style="list-style-type: none"> • L2 Security and WLANs • Routing Concepts and Configuration 	
Outcomes	Method
1. Explain how vulnerabilities compromise LAN security.	Theory & Practical
2. Implement switch security to mitigate LAN attacks.	Theory & Practical
3. Explain how WLANs enable network connectivity.	Theory & Practical
4. Implement a WLAN using a wireless router and a WLC.	Theory & Practical
5. Explain how routers use information in packets to make forwarding decisions.	Theory & Practical
6. Configure IPv4 and IPv6 static routes.	Theory & Practical
7. Troubleshoot static and default routes.	Theory & Practical



Course Name: Network Management	Course Code: ITNT302
pre-requisite: ITSY202- Network OS Administration & Security	Credit Hours: 3
Passing Grade: C	Level: Advnaced Diploma - Year3
No. Of Theory & Practical Hours (2:2)	
Course Goal: The course provides an overview of network management from both business and technical perspective	
Course Objectives: <ul style="list-style-type: none"> • Convey an informal understanding of the functions, tools, and activities that are associated with network management and how it operates by taking a glimpse at typical activities. • Discuss the basic components in network management and the roles they play. • Present the different aspects in network management that would help divide and conquer network management problems. • Provide an overview of management communication patterns and how management protocols are effectively applied in practice. 	
Learning Outcomes: <ol style="list-style-type: none"> 1. Explain the basic foundation and models that are needed to build various network management architectures and protocols. 2. Explain, demonstrate and apply different SNMP-based protocols with its specification that manage used over TCP/IP networks. 3. Illustrate and explain the Network Management using remote monitoring capabilities. 4. Illustrate and explain the architecture and features of some of the widely used Network Management systems and Tools 5. Explain and demonstrate the knowledge acquired on management and tools and systems, as well apply the practical applications in managing fault, configuration, performance, security, and accounting in Network Management 6. Explain the impact of emerging technologies in a Web based and object oriented management system 	



Course Name: Mobile Application Development (Updated)	Course Code: ITSE301
Pre-Requisite: 1) ITSE203-Object Oriented Programming AND 2) ITIS103-Web Technologies	Credit Hours: 3
Passing Grade: Depending on the Type of the course belongs to the Audit Degree.	Level: Year 3
No. Of Theory & Practical Hours : 0:4	
Goal: To equip students with technical and practical knowledge of Mobile Application Development.	
Objectives: The course should enable the student to: 1. Understand mobile operating systems. 2. Develop real time mobile applications. 3. Use database in mobile applications. 4. Use different types of views 5. Use service and fragments in applications	
Outcomes The students should be able to:	Method
1. Analyze mobile operating systems	Practical
2. Analyze different phases in mobile application development	Practical
3. Build mobile application.	Practical
4. Work with the various view layout controls including Listview	Practical
5. Use database to store and manage application data	Practical
6. Working with services and Fragments	Practical



Course Name: Computer System Architecture	Course Code: ITNT 303
pre-requisite: ITNT202- Logic Design	Credit Hours: 3
Passing Grade: C	Level: Year3
No. Of Theory & Practical Hours : 2:2	
Course Goal: This course introduces the concept of understanding the performance of the processor in the computer design.	
<p>Course Objectives:</p> <p>The course should enable the students to:</p> <ol style="list-style-type: none"> 1. Implement the concept of instruction set organization 2. Understand and analyze the concept of computer architecture and its effect on system performance. 3. Learn advance techniques in processor design 	
<p>Learning Outcomes:</p> <p>At the end of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Analyze the basic elements of hardware with its functions to form an architecture 2. Recognize and Understand instruction formats, instruction sets and their design to represent the data and its manipulation. 3. Illustrate the concept of ALU design with various computer arithmetic methods. 4. Describe the mode of transfer and concept of DMA 5. Describe the concept of control design in terms of hard wired control and micro programmed control. 6. Recognize PC and memory system architecture and shared memory / distributed memory multiprocessor systems 7. Analyze the use of standard performance metrics to compare the performance of different digital systems. 8. Identify the basic and intermediate concepts of pipelining 9. Outline the storage system architecture-RAID Architecture 10. Compare microprocessor and microcontroller. Case study of Arduino Micro-controller with basic programming. 	



Course Name: Cloud Computing	Course Code: ITNT304
pre-requisite: ITNT201(Routing Switching)	Credit Hours: 3
Passing Grade: C	Level Year3 , Advance Diploma
No. Of Theory & Practical Hours (2:2)	
Goal: This under-graduate-level course investigates cloud computing models, techniques, and architectures. Cloud computing has evolved as a very important computing model, which enables information, software, and other shared resources to be provisioned over the network as services in an on-demand manner. Students will be exposed to the current practices in cloud computing.	
Course Objectives: <ul style="list-style-type: none"> 1. Overview of Computing Paradigm 2. Introduction to Cloud Computing 3. Cloud Computing Architecture 4. Infrastructure as a Service(IaaS) from networking point of view 5. Cloud Security fundamental 	
Learning Outcomes: <ul style="list-style-type: none"> 1. Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. 2. Explore Cloud computing architecture to understand the Cloud computing stack which involve IaaS, PaaS and SaaS 3. Apply fundamental concepts in cloud infrastructures (IaaS) to understand the networking side in comparison to the traditional networking through exploring one of the available IaaS platform. 4. To understand Service Management in Cloud Computing in terms of Service Level Agreements(SLAs), Billing & Accounting, Hardware Scalability Comparison (Traditional vs. Cloud) and Managing Data. 5. Explore Cloud Security in terms of Infrastructure Security that involves Network level security, Host level security, Application level security 6. Analyze case study of Open Source or Commercial Clouds 	



Course Name : Network Perimeter Security	Course Code : ITSY 304
Pre Requisite : Introduction to Cryptography (ITSY301)	Credit Hours : 3
Passing Grade : C	Level : Advanced Diploma
No. of Theory Hrs : 2	No. of Practical Hrs : 2
Goal: This course aims to acquaint students with the concepts and skills involved in securing network perimeter, by planning and implementing appropriate firewall.	
Objectives: Upon completion of this course, the students should be able to: 1. Understand fundamental concepts related to network security and firewalls. 2. Design appropriate firewall rule-set in accordance with security requirements of an organization 3. Secure organizational networks by configuring a suitable network-based firewall.	
Outcomes	Methodologies
Upon completion of this course, the students should be able to:	
1. Describe the terminology and fundamentals concepts related to firewalls and network perimeter defense.	Theory
2. Analyze the security concerns related to common protocols associated with different layers of TCP/IP model.	Theory
3. Categorize different type of firewalls in terms of their way of working and the layer of OSI and TCP/IP models at which they operate	Theory
4. Compare various DMZ architectures in terms of their strengths and limitations.	Theory
5. Comprehensively describe various features provided by network-based firewalls, including content filtering, virtual private network (including common VPN protocols such as PPTP, L2TP, IPSec and Socks), network address translation (NAT), load balancing and fault tolerance.	Theory
6. Configure suitable modern firewall products, in harmony with other security mechanisms employed in a network, and troubleshoot associated problems.	Practical
7. Design appropriate firewall rule-set in accordance with the requirements and network security policy of organization.	Practical
8. Describe other modern mechanisms used for network perimeter defense, including intrusion detection and prevention systems.	Theory
9. Explain various techniques commonly used to bypass firewalls, along with appropriate countermeasures.	Practical
Software & Hardware Tools: Any tool	



Course Name: Probability and Statistics for Information Technology	Course Code: MATH311
Pre-Requisite: MATH1102 OR MATH1103	Credit Hours: 3
Passing Grade : Depending on the type of the course belongs to the Audit Degree	Level : Year 3
No. of Theory & Practical Hours 2 : 2	
Course Goal(s)	The student will demonstrate the ability to apply probability and statistical methods for representing and interpreting data and communicating results, using technology when needed.
Course Objectives	Course Learning Outcomes
<p>This course should enable the student to:</p> <p>1. Demonstrate the aptitude to apply fundamental concepts in exploratory data analysis, probability theory and random variables</p>	1. Identify different kinds of survey methods, types of data, examples of methods for organizing and summarizing data sets, including common graphical tools and summary statistics
	2. Find probabilities of single events, complementary events and the unions, intersections of collections of events, and other related probabilities using laws and counting rules
<p>2. Understand the definitions of discrete and continuous random variables including the of the moments of these random variables</p>	3. Contrast normal, binomial and Poisson random variables, their probability density and distribution functions, and general properties of the expectation
	4. Find probabilities for distributions over finite set based on normal distributions for which probabilities can be found without the use of calculus
<p>3. Demonstrate knowledge on statistical methods and probability theory in practical situations.</p>	5. Discriminate between a population and a sample; between a parameter and a statistic; and, between a confidence interval and a confidence level
	6. Identify the components of a traditional hypothesis test, including the parameter of interest, the null and alternative hypotheses and the test statistic and the p-value of a test statistic for one sample mean and difference of two sample means problems.
<p>4. Establish understanding of how to translate real-world problems into linear models</p>	7. Perform linear regression analysis for bivariate dataset
	8. Perform the F-test for situations where one-way ANOVA is appropriate
<p>5. Adapt a statistical package for data analysis</p>	9. Generate reports on exploratory data analysis, test of hypothesis, correlational analysis and one-way ANOVA using Microsoft R Open with RStudio as primary IDE



Course Name: Internet of Things Fundamentals	Course Code: ITNT309
Pre-Requisite: ITSE203 - Object Oriented Programming	Credit Hours: 3
Passing Grade: C	Level: Advanced Diploma -- Year 3
No. Of Theory & Practical Hours : 2-2	
Goal: To explore things and their connection to the IoT	
Objectives: The course should enable the student to: <ul style="list-style-type: none"> 1. Explain the concepts of the things and connections that make up the IoT 2. To Build sensor / actuator systems using Arduino Microcontroller 3. Create Python Programs to provide functionality to Raspberri Pi. 4. Create an end-to-end IoT system 	
Outcomes At the end of this course, students should be able to:	Method
Understand the things and connections that make up the IoT.	Theory
Build sensor/actuator systems using the Arduino microcontroller	Practical/ Theory
Develop programs in Python that provide IoT functionality to the Raspberri Pi	Practical/ Theory
Explain the use of Cloud and Fog Technology in an IoT system.	Practical/ Theory
Understand the IoT systems that can solve global problems	Practical/ Theory
Design and Build an IoT prototype	Practical/ Theory



Course Name: Distributed Computing	Course Code: ITNT305
pre-requisite: ITNT 103, ITSE 203	Credit Hours: 3
Passing Grade: C	Level Year3 , Advance Diploma
No. Of Theory & Practical Hours (1:4)	
Goal: To be able to design, develop and attain problem solving skills using servers, applications and scenarios	
Course Objectives:	
Upon completion of this course, the students will be able to:	
<ol style="list-style-type: none"> 1. Understand fundamental concepts, principles, technical challenges and the requirements underlying modern distributed systems. 2. Appreciate distributed system technologies and their applications in solving highly computation extensive problems. 3. Apply the knowledge and skills learnt. to design a distributed systems' environment using available technologies/systems 	
Learning Outcomes:	
Upon completion of this course, the students will be able to:	
<ol style="list-style-type: none"> 1. Explain the relevant concepts, terminology and fundamental architectures underlying modern distributed systems 2. Explain the challenges in multi-level interoperability across heterogeneous distributed environment 3. Explain the properties and characteristics of advanced distributed systems, including communication, naming, synchronization, replication, fault tolerance and security 4. Describe the principles underlying the function of distributed systems and their extension to cluster, grid and cloud computing, and virtualization techniques. 5. Compare and contrast modern distributed system technologies and applications in terms of design, benefits, drawbacks, and limitations (including Clusters, Grids, Clouds and Virtualization based infrastructures) 6. Describe the operations of distributed technology in various applications such as Sensor Networks, Web Services, Internet of Things, Distributed File Systems etc 7. Design an appropriate distributed system's environment using available technologies/systems. 	



Course Name: Wireless Communication	Course Code: ITNT306
Pre-Requisite: ITNT103 Network Fundamental II	Credit Hours: 3
Passing Grade: C	Level: Advanced Diploma – Year3
No. Of Theory & Practical Hours : 2-2	
Goal: Wireless and mobility technologies are essential skills for a networking career in today's Digital Transformation. Mobility Fundamentals builds upon skills taught routing and switching concepts, providing learners foundational wireless knowledge and skills.	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Understand wireless networking technology basics (1,2) 2. Configure wireless LAN components (3) 3. Understand wireless LAN security 4. Design mobile networks and set up a home Internet access 5. Understand mobile networking applications, like BOYD 	
Outcomes At the end of this course, students should be able to:	Method
1. Understand Wireless Technologies and Understand Wireless LAN Standards	Practical/ Theory
2. Understand Wireless LAN components, Understand how Wireless LAN works and Understand how to plan a Wireless LAN deployment	Practical/ Theory
3. configure a wireless AP and Router, configure wireless Clients, and set up a home network	Practical/ Theory
4. Understand Wireless Threats and Vulnerabilities, Wireless Security Protocols for Authentication and Encryption, Mitigation Technologies, and Understand how to secure Enterprise Wireless LANs	Practical/ Theory
5. Comprehend what BYOD is, its benefits and challenges, BYOD adoption considerations, and BYOD design and solutions	Practical/ Theory
6. Recognize types of wireless interference , how to use tools to detect and manage interference, and troubleshooting wireless LAN connectivity	Practical/ Theory



Course Name: Mobile Application Development (Updated)	Course Code: ITSE301
Pre-Requisite: 1) ITSE203-Object Oriented Programming AND 2) ITIS103-Web Technologies	Credit Hours: 3
Passing Grade: Depending on the Type of the course belongs to the Audit Degree.	Level: Year 3
No. Of Theory & Practical Hours : 0:4	
Goal: To equip students with technical and practical knowledge of Mobile Application Development.	
Objectives: The course should enable the student to: <ul style="list-style-type: none"> 1. Understand mobile operating systems. 2. Develop real time mobile applications. 3. Use database in mobile applications. 4. Use different types of views 5. Use service and fragments in applications 	
Outcomes The students should be able to:	Method
1. Analyze mobile operating systems	Practical
2. Analyze different phases in mobile application development	Practical
3. Build mobile application.	Practical
4. Work with the various view layout controls including Listview	Practical
5. Use database to store and manage application data	Practical
6. Working with services and Fragments	Practical



Course Name: Introduction to Software Engineering	Course Code: ITSE202
Pre-Requisite: None	Credit Hours: 3
Passing Grade: Depending on the Type of the course belongs to the Audit Degree	Level: Diploma Year 2
No. Of Theory & Practical Hours : 1:4	
Goal: This course covers the fundamental concepts of software engineering.	
Objectives: The course should enable the students to <ol style="list-style-type: none"> 1. Explain the basic concepts of Software Engineering methodologies and process models. 2. Discuss phases of the Software Development Life Cycle. 3. Discuss the basic principles of Software Project Management 4. Develop skills to construct high quality software. 	
Outcomes	Method
At the end of this course, students should be able to:	
1. Explain the Software Engineering and the role of a software engineer.	Theory
2. Explain phases of the Software Development Life Cycle (requirements, design, implementation, testing, deployment, maintenance).	Theory
3. Compare software process standards and processes (like waterfall, incremental, spiral, prototyping, agile methods ...etc).	Theory
4. Examine the requirements activities such as elicitation, analysis, and specification.	Theory
5. Differentiate functional and non-functional requirements.	Theory
6. Analyze the decision-making logic and Process Specification	Theory and Practical
7. Analyze the requirements using structured approaches such as data flow diagrams.	Theory and Practical
8. Construct Software Requirements Specifications (SRS) Document.	Theory and Practical
9. Discuss how to build high-quality products.	Theory
10. Examine cost estimation techniques, software project scheduling, software configuration management and risk management for software projects.	Theory and Practical
11. Discuss Software design principles, coupling and cohesion.	Theory
12. Work as a team in the software development lifecycle.	Theory and Practical
13. Use Case Tools and Project Management Tools.	Practical



Course Name: Internet of Things Fundamentals	Course Code: ITNT309
Pre-Requisite: ITSE203 - Object Oriented Programming	Credit Hours: 3
Passing Grade: C	Level: Advanced Diploma – Year 3
No. Of Theory & Practical Hours : 2-2	
Goal: To explore things and their connection to the IoT	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Explain the concepts of the things and connections that make up the IoT 2. To Build sensor / actuator systems using Arduino Microcontroller 3. Create Python Programs to provide functionality to Raspberri Pi. 4. Create an end-to-end IoT system 	
Outcomes At the end of this course, students should be able to:	Method
Understand the things and connections that make up the IoT.	Theory
Build sensor/actuator systems using the Arduino microcontroller	Practical/ Theory
Develop programs in Python that provide IoT functionality to the Raspberry Pi	Practical/ Theory
Explain the use of Cloud and Fog Technology in an IoT system.	Practical/ Theory
Understand the IoT systems that can solve global problems	Practical/ Theory
Design and Build an IoT prototype	Practical/ Theory

