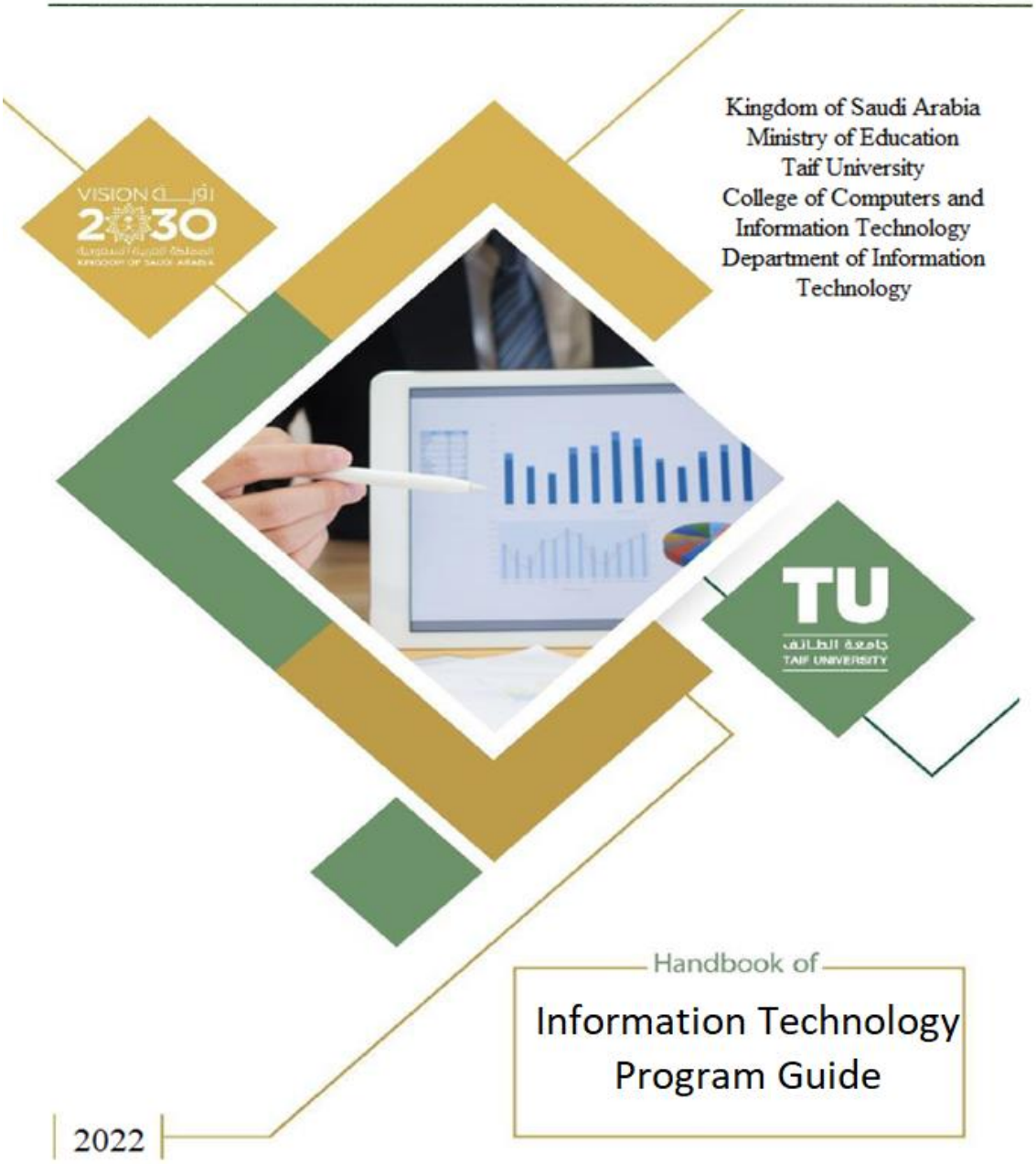
# Department of Information Technology

Kingdom of Saudi Arabia
Ministry of Higher Education
*Taif University*

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الطائف




Kingdom of Saudi Arabia
Ministry of Education
Taif University
College of Computers and Information Technology
Department of Information Technology

Handbook of

# Information Technology Program Guide

2022

# Department of Information Technology

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Year 2021-2022

# College of Computers and Information Technology

# Information Technology Program Guide

| | |
|---|---|
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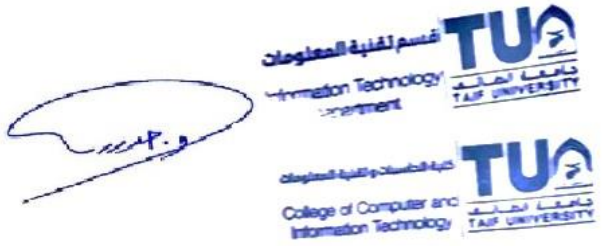

# Contents

# VISION

To be a world-class department and a pioneer in education, innovative research serving the community in information technology

# MISSION

The information technology program enables the graduates to apply best practices in emerging information technology fields, serve the community and pursue graduate studies.

# CORE VALUES

- Computer and information ethics of the academic community in line with Islamic law and morality
- Excellence in teaching and research
- Completeness and academic freedom
- Self-reliance and teamwork spirit within the ethics of Islam
- Innovation and creativity

# GOALS

1. **GIT1**: Improve the quality of teaching and the outcomes of learning.
2. **GIT2**: Apply appropriate and emergent teaching methods and promote lifelong learning and the pursuit of graduate work.
3. **GIT3**: Effectively use information technology research to contribute to community development
4. **GIT4**: Retain outstanding faculty and staff.
5. **GIT5**: Establish a relationship with the government, industry, and the local community.
6. **GIT6**: Improve infrastructure, facilities, and support services.

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# CURRICULUM STRUCTURE

| Program learning Outcomes* | |
|---|---|
| **Knowledge** : | |
| **K1** | Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing-based systems [6] |
| **Skills** | |
| **S1** | Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. [1] |
| **S2** | Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline. [2] |
| **Competence** | |
| **C1** | Communicate effectively in a variety of professional contexts. [3] |
| **C2** | Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles [4] |
| **C3** | Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline [5] |

**The number at the end of each output indicates the corresponding number of the equivalent Student Outcome (SO) in ABET criteria.**

**Study Plan Structure**

| Program Structure | Required/ Elective | No. of courses | Credit Hours | Percentage |
|---|---|---|---|---|
| **Institution Requirements** | Required | **13** | **26** | **17%** |
| | Elective | | | |
| **College Requirements** | Required | **13** | **35** | **23%** |
| | Elective | **1** | **2** | **1%** |
| **Program Requirements** | Required | **28** | **85** | **54%** |
| | Elective | **3** | | |
| **Capstone Course/Project** | | **2** | **6** | **4%** |

| | | | | |
|---|---|---|---|---|
| **Field Experience/ Internship** | | **1** | **2** | **1%** |
| **Others** | | | | |
| **Total** | | **58** | **156** | **100%** |

**Program Study Plan**

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements (Institution, College or Department) |
|---|---|---|---|---|---|---|
| Level 1 | 990111-2 | Fundamentals of Islamic Culture | Required | None | 2 | Institution |
| | 202126-3 | Fundamentals of Mathematics | Required | None | 3 | College |
| | 999805-2 | Intensive English (1) | Required | None | 2 | College |
| | 501110-2 | Introduction to Problem Solving | Required | None | 2 | College |
| | 501112-2 | Computer Skills | Required | None | 2 | College |
| | 990311-2 | University Study Skills | Required | None | 2 | Institution |
| Level 2 | 990115-2 | History of the Kingdom | Required | None | 2 | Institution |
| | 999806-2 | Intensive English (2) | Required | 999805-2 | 2 | College |
| | 990211-2 | Arabic Language Skills | Required | None | 2 | Institution |
| | 503121-1 | Computer Aided Drawing | Required | None | 1 | College |
| | 501125-2 | Scientific Computing | Required | None | 2 | College |
| | 204124-2 | General Chemistry | Required | None | 2 | College |
| | 2011211-3 | General Biology | Required | None | 3 | College |

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements (Institution, College or Department) |
|---|---|---|---|---|---|---|
| Level 3 | 999807-2 | English for Specific Purposes (1) | Required | 999806-2 | 2 | College |
| | 990xxx-2 | TU Elective (1) | Elective | None | 2 | Institution |
| | 501215-3 | Discrete Structures | Required | None | 3 | College |
| | 501220-3 | Computer Programming (1) | Required | None | 3 | College |
| | 202261-3 | Calculus (1) | Required | None | 3 | College |
| | 203206-4 | Physics (1) | Required | None | 4 | College |
| Level 4 | 999808-2 | English Specific Purpose (2) | Required | 999807-2 | 2 | College |
| | 990112-2 | Islamic culture (Morals and Values) | Required | 990111-2 | 2 | Institution |
| | 503221-4 | Digital Logic Design | Required | 501215-3 | 4 | College |
| | 501222-3 | Computer Programming (2) | Required | 501220-3 | 3 | College |
| | 202263-3 | Calculus (2) | Required | 202261-3 | 3 | College |
| | 203207-4 | Physics (2) | Required | 203206-4 | 4 | College |
| Level 5 | 501323-3 | Objected-oriented Programming | Required | 501222-3 | 3 | College |
| | 501324-3 | Data Structures | Required | 501222-3 | 3 | College |
| | 502372-3 | Fundamentals of Database | Required | 501220-3 | 3 | Department |
| | 202262-3 | Linear Algebra | Required | None | 3 | College |
| | 202364-3 | Probability and Statistics | Required | 202261-3 | 3 | College |

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements (Institution, College or Department) |
|---|---|---|---|---|---|---|
| Level 6 | 502315-3 | Web Systems | Required | 501222-3 &502372-3 | 3 | Department |
| | 990313-2 | Islamic Culture (The Social system in Islam) | Required | 990112-2 | 2 | Institution |
| | 502321-3 | Fundamentals of Operating S ystems | Required | 501324-3 | 3 | Department |
| | 502361-3 | Systems Analysis & Design | Required | 501323-3 | 3 | Department |
| | 502373-3 | Database Management Syste ms | Required | 502372-3 | 3 | Department |
| | 999xxx-2 | TU Elective (2) | Required | None | 2 | Institution |
| Level 7 | 502420-3 | Systems Administration | Required | 502321-3 | 3 | Department |
| | 502435-3 | Software Engineering | Required | 502361-3 | 3 | Department |
| | 502333-3 | IT in Organizations | Required | None | 3 | Department |
| | 502478-3 | Data Warehouse | Required | 502372-3 & 202364-3 | 3 | Department |
| | 990114-2 | Islamic Culture (Mind and dialogue) | Required | 990113-2 | 2 | Institution |
| | 502482-3 | Fundamentals of Networks | Required | 502321-3 | 3 | Department |
| Level 8 | 502459-3 | Computer Systems Security | Required | 502482-3 | 3 | Department |
| | 502449-3 | Web Services | Required | 502315-3 | 3 | Department |
| | 502464-3 | Software Architecture | Required | 502435-3 | 3 | Department |
| | 500321-2 | Professional Ethics | Required | 990114-2 | 2 | Department |
| | 502462-3 | IT Project Management | Required | 502333-3 | 3 | Department |

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite Courses | Credit Hours | Type of requirements (Institution, College or Department) |
|---|---|---|---|---|---|---|
| | 502474-3 | Information Management | Required | 502333-3 | 3 | Department |
| Level 9 | 502536-3 | Human Computer Interaction | Required | 502435-3 | 3 | Department |
| | 502583-3 | Network Servers and Infrastructure | Required | 502482-3 | 3 | Department |
| | 502510-3 | System Integration and Architecture | Required | 502449-3 | 3 | Department |
| | **502598-3** | **Capstone Project (1)** | **Required** | **502315-3 &502361-3 &999810-2** | **3** | **Department** |
| | 502XXX-3 | Elective (1) | Elective | ** | 3 | Department |
| Level 10 | 502584-3 | Advanced Topics in Networks | Required | 502482-3 | 3 | Department |
| | 502599-3 | Capstone Project (2) | Required | 502598-3 | 3 | Department |
| | 502595-2 | Field Experience | Required | 111 credit | 2 | Department |
| | 502XXX-3 | Elective (2) | Elective | ** | 3 | Department |
| | 502XXX-3 | Elective (3) | Elective | ** | 3 | Department |

**(**) Electives**:

| Year | Course code | Course title | Elective/Required | * Pre-Requisite Courses | Credit hours | College/Dept. |
|---|---|---|---|---|---|---|
| 5TH | 502551-3 | Network Security | Elective (1) | 502459-3 | 3 | Department |
| 5TH | 502552-3 | Software Security | Elective (1) | 502459-3 | 3 | Department |
| 5TH | 502553-3 | Wireless System Security | Elective (1) | 502459-3 | 3 | Department |
| 5TH | 502570-3 | Advance Topics in Database | Elective (1) | 502478-3 | 3 | Department |
| 5TH | 502571-3 | Data Mining | Elective (1) | 502478-3 | 3 | Department |
| 5th | 502554-3 | Computer Crimes and Forensics | Elective (2&3) | 502551-3 or 502552-3 or 502553-3 | 3 | Department |
| 5th | 502555-3 | Advanced Topics in Security | Elective (2&3) | 502551-3 or 502552-3 or 502553-3 | 3 | Department |
| 5th | 502575-3 | Non-Traditional Database | Elective (2&3) | 502570-3 or 502571-3 | 3 | Department |
| 5th | 502576-3 | Special Purpose Database | Elective (2&3) | 502570-3 or | 3 | Department |

| Year | Course code | Course title | Elective/Required | * Pre-Requisite Courses | Credit hours | College/Dept. |
|---|---|---|---|---|---|---|
| | | | | 502571-3 | | |
| 5th | 502556-3 | Information Security Policies | Elective (2&3) | 502551-3 or 502552-3 or 502553-3 | 3 | Department |
| 5rd | 502577-3 | Big Data | Elective (2&3) | 502570-3 or 502571-3 | 3 | Department |
| 5th | 502575-3 | Non-Traditional Database | Elective (2&3) | 502478-3 or 502576-3 | 3 | Department |
| 5th | 502577-3 | Big Data | Elective (2&3) | 502478-3 or 502576-3 | 3 | Department |

**Course Specifications**

https://taifedusa-my.sharepoint.com/:f:/g/personal/accreditation_tu_edu_sa/En-UakH0EX1MnHXm5J6GCh4BHciyibIVDtk9uxrtnxtK8g?e=HvCVvP

# COURSE DESCRIPTIONS

**IT in Organization 502333-3**

This course concentrates on the following knowledge and skills, What is an information system and what are its management, organization, and technology dimensions? Why are information systems so essential in businesses today? Why are systems for collaboration and teamwork so important? How can information systems help businesses become more competitive? What broader ethical and social issues are raised by widespread use

of information systems? . This course answers questions such as: What technologies do businesses today need to accomplish their work? What do I need to know about these technologies to make sure they enhance the performance of the firm? How are these technologies likely to change in the future? What technologies and procedures are required to ensure that systems are reliable and secure?

**Fundamentals of database 502372-3**

This course will introduce the basic concepts in database systems and architectures, including data models, database design, and database implementation. It emphasis on topics in ER model and relational databases, including relational data model, SQL, functional dependency and normalization, database design process. On completing the course students will be able to: Learn, basics of databases and approaches to store data using databases, describe the data modelling concepts and notation of the entity-relationship model, including their use in data modelling, Design and construct relational databases using the concept of relational data model, express database queries in relational algebra and implement using SQL and Apply normalization rules for designing databases and Hand-on development of database.

**Database Management Systems 502373-3**

This course provides the students with knowledge needed to understand the internals of database management systems (DBMSs). Students acquire knowledge about each component of a DBMS including Transaction Management (Concurrency Control and Recovery), Query Processing and Optimization and Database Security & Administration.

**Fundamentals of Operating Systems 502321-3**

This course focuses on fundamental concepts of operating system design and implementation. Overview of operating system components; concurrency; mutual exclusion and synchronization; implementation of processes; deadlock; scheduling algorithms; memory management; input/output and file systems; protection and security.

**Information management 502374-3**

This course builds on what the students learnt in IT in organization course. This course examines the core information system applications businesses are using today to improve operational excellence and decision making. These applications include enterprise systems; systems for supply chain management, customer relationship management, collaboration, and knowledge management; e-commerce applications; and decision-support systems. This course answers questions such as: How can enterprise applications improve business performance? How do firms use e-commerce to extend the reach of their businesses? How can systems improve collaboration and decision making and help companies make better use of their knowledge as sets?. This course focuses on building and managing systems in organizations. This course answers questions such as: What activities are required to build a new information system? What alternative approaches are available for building system solutions? How should information systems projects be managed to ensure that new systems provide genuine business benefits and work successfully in the organization? What issues must be addressed when building and managing global systems?

**Systems Analysis & Design 502363-3**

This course help the student to possess and understand the fundamental knowledge and skills in various system development methodologies, techniques and tools. Have the necessary educational foundation to apply both traditional and object oriented approaches in system development environments. Have a good understanding and working knowledge for commonly used analysis and design tools in traditional system development approach like data flow diagram, data dictionary, entity relationship diagram, structure chart and process specifications. Apply development methodologies, tools and techniques discussed in classroom in a real life group project.

**Web Systems 502261-3**

This course helps the students to understand and use Web programming technologies to create static and dynamic Web pages using databases. Topics include web servers, HTML, CSS3, HTTP protocols, JavaScript language, and PHP using MySQL database.

**Fundamentals of networks 502482-3**

This course provides a good understanding of the basic concepts of data transmission: Analog/digital data, digitization process, digital data transmission, transmission medium, multiplexing. This course presents the concept of Open Systems and gives an overview of the Open System Interconnection (OSI) Model: open systems interconnection (motivations, requirements), OSI model, concepts of communication protocol and communication interface. The students have a close view of the Data link layer: Architecture (MAC, LLC), LLC sub-layer: services, functionalities (Data framing, Error control, ARQ schemes), MAC sub-layer: MAC protocols (, CSMA/CD, Token Passing, etc.), HDLC protocol: and an overview about Local Area Networks (LANs): Motivations, Standards (IEEE 802.x), and Ethernet technology, Wireless LANs, security issues in LANs.

**IT Project Management 502462-3**

This course presents the students to apply modern tools, techniques, and technology, study and evaluate business processes for re-eng./ automation, plan, coordinate, monitor, and control MIS development Projects, able to work in team environment and learn group dynamics and apply theory to practice through industry-based learning

**Computer Systems Security 502459-3**

This course introduces the basic security attacks against computer systems and the different techniques to overcome these attacks. Besides, this course explains the different encryption mechanisms and protocols (private and public key cryptography). Moreover, it examines the different security services such as digital signatures and authentication. Finally, this course introduces an overview to network security and the tools used to secure networks such as the firewall, proxy and intrusion detection systems. Students will learn about tools for defending against attacks, and methods for designing secure systems

**Software Engineering 502435-3**

This course focuses on techniques, processes and tools used throughout the software development life cycle. Software processes at the requirements elicitation, design, verification and validation phases are emphasized. UML diagrams are used to model software. The students are also introduced to project management concepts. A group project is required, where students develop software requirements, design software, develop a prototype and perform testing. The project gives students hands on experience designing software using CASE tools

**Data warehouse 502478-3**

Data warehousing has drawn increasing interest within the software enterprises to gain critical insights of daily business analytic operations. Data warehouse as a tool provides comprehensive analysis of operational data and to identify patterns. This course provides an introduction to fundamental techniques and novel applications of data warehouse. Issues covered by this learning experience include data warehouse fundamentals, planning, business analytics modeling, data warehouse design and implementation. In particular, the role of data warehouse in supporting business intelligence and effective decision making is emphasized through labs, projects and case studies. Further, it involves an in-depth study of various concepts needed to design and develop a data warehouse. This course is designed to expose students to concepts, enabling methods and hands-on usage and problem solving in an integrated way. As one of IS depth electives, it provides a good balance between theory and practice. The participants will explore applications and have great opportunity for hands-on experimentation with data warehousing and reporting tools.

**System Integration and Architecture 502463-3**

This course is designed to provide students with an understanding of Systems Integration (SI) process, approaches, drivers, tools and techniques required for successful SI, critical success factors, and best practices. The course focuses on how a proposed system will be integrated with other existing or planned systems. It addresses the System Integration problem using architectures as the basis and then addresses the evaluation of the architectures in terms of the capabilities they provide. Case studies and examples from the Information Technology (IT), energy, and financial services industry will be used to

illustrate the concepts discussed. The students will learn the theory and practice of business process integration, legacy integration, new systems integration, business-to-business integration, integration of commercial-off-the-shelf (COTS) products, interface control and management, testing, integrated program management, integrated Business Continuity Planning (BCP). Specific focus will be given to issues of interface integration and interoperability of systems.

**Software Architecture 502464-3**

This course introduces basic concepts and principles about software design and software architecture. It starts with discussion on design issues, followed by coverage on design patterns. It then gives an overview of architectural structures and styles. Practical approaches and methods for creating and analysing software architecture are presented. The emphasis is on the interaction between quality attributes and software architecture. Students will also gain experiences with examples in design pattern application and case studies in software architectures.

**System Administration 502420-3**

This course is an introduction to systems administration for Linux/UNIX family of operating systems. There will be hands on labs on Debian Gnu/Linux.

**Human Computer Interaction 502536-3**

The term “Human factors” relates to both how people interact with technology, and the ways in which technology can affect people’s performance. This course provides an introduction to human factors related to the design of information systems. The emphasis is on the human component of human-computer interaction (HCI), and the process of user-centered design and evaluation. In general, lectures will be interactive, combining in-class discussions with small group problem-solving exercises.

**Network Servers & Infrastructures 502583-3**

This course focuses on the design of complex network infrastructures. Students are exposed to hardware LAN and WAN technologies, the design of a complete network, its evaluation and optimization.

**Capstone Project 1 502598-3**

This course trains the students to analyze problems and understand issues, develop detailed design and system architecture, choose appropriate technologies to solve real-life problems, produce requirements and specifications documents, work in a team to accomplish an IT project and understand ethical and professional issues.

**Advanced Topics in Networks 502584-3**

This course presents the main concepts related to Networks interconnection: Motivations, Interconnection equipments repeater, Bridge, Router), wide area network technologies: X25, FR, ATM, DSL, PPP, etc. TCP/IP technology: TCP/IP and networks interconnection, TCP/IP main characteristics, TCP/IP Architecture: TCP/IP vs. OSI, TCP/IP layers, TCP/IP main protocols (IP, TCP, UDP, etc.), etc. IP protocol: Main characteristics, IP addressing, IP datagram, Address resolution protocols (ARP, RARP), ICMP protocol, IP Routing, Routing protocols (RIP, OSPF, BGP), IPv6. UDP Protocol: Application identification (port, socket), UDP characteristics, UDP Datagram, UDP Applications, etc. TCP Protocol: TCP characteristics, TCP services (error control, flow control, sequencing, etc.), TCP Segment, TCP Applications, etc. IP network security: Security issues (DoS: Deny of Service, Intrusion, etc.) , security mechanisms: Proxy , NAT ( Network Address Translation), Traffic filtering ( Router Access-List, firewall), Intrusion detection.

**Capstone Project 2 502599-3**

This course provides students with the opportunity to apply the knowledge acquired during their studies. The students extend their academic experiments of leadership into areas of personal interest and demonstrate their ability to work as a team to accomplish the project. The teams demonstrate their ability to analyze, synthesize, design and evaluate information. During the second semester, the software and/or hardware implementation takes place followed by the testing and verification phases. Finally, the

students should submit a comprehensive report about their achievements to the IT department.

**Advance Topics in Database 502570-3**

This course provides the students with knowledge needed to understand the internals of advanced database management systems (DBMSs). In this course, students acquire knowledge about each component of the advanced DBMS including Transaction Management (Concurrency Control and Recovery), Query Processing and Optimization, Database Security and different architectures of advanced DBMSs.

**Data Mining 502571-3**

The intended audience for this course is anyone who would like to be able to competently apply data analysis methods to real-world problems, which in my opinion requires a minimal rigorous mathematical understanding of the underpinnings of the methods. These mathematical basics will also serve as a good foundation for taking more advanced courses in this area. This course provides a comprehensive understanding of methods of collecting, cleaning, organizing, filtering classifying and clustering data to get valuable information as well as methods of presenting and summarizing this extracted information.

**Special purpose database 502576-3**

The course offers an introduction to the concepts, principles and theories behind Geographic Information Systems and Science (GIS), with emphasis on the nature of geographic information, data models and structures for storing geographic information, geographic data input, data manipulation and simple spatial analysis and modeling techniques. The course is composed of two components: Lectures and labs. The lectures will present the theories and concepts, while the labs will reinforce them through hands-on exercises and projects. Students must be clear that this is not a class on any specific GIS software. It is a course on the underpinning theory and concepts in GIS. However, students will be exposed to some of the open source GIS software i.e Quantum GIS,

Geoda, PostGIS with Postgresql and may be a commercial GIS software package in their labs.

**Web services 502516-3**

The aim of the course n this course, we study the major concepts and techniques for enabling Web service based interactions on the Web. The objective is to familiarize the students with the recent trends in industry and academia to address Web service research issues. The course will address various aspects of Web services including the reference model for Web services (UDDI, SOAP, WSDL), Web service composition, semantic Web services, security/privacy in Web services, and overview of Web service standards (BPEL4WS, WS-Security, etc

**Software Security 502552-3**

This course introduces students to fundamental tools to secure an IT infrastructure. Topics to be covered include but not limited to: Firewalls, Proxy, Network Intrusion Detection Systems (NIDS), Anti-Viruses, Anti-spams, Honey Pots … etc.

**Network Security – 502551-3**

This course will explore the International Standards Organizations Open System Interconnect (ISO OSI) network stack and discuss common security weaknesses, vulnerabilities, attack methods, and mitigation approaches. This course will provide a comprehensive list of security issues related to general networking design and development.

**Wireless System Security - 502553-3**

This course focuses on the basic concepts in security of wireless systems. First, this course will introduce the wireless systems and its components to students. Second, It gives students a good understanding of common threats and attacks that can affect wireless systems. Finally, the course introduces students to the fundamental techniques and

technologies used in designing a wireless system that is robust against attacks. The student will have some practical experience in defending wireless systems.

**Web Services 502516-3**

The aim of this course is to introduce n this course, we study the major concepts and techniques for enabling Web service based interactions on the Web. The objective is to familiarize the students with the recent trends in industry and academia to address Web service research issues. The course will address various aspects of Web services including the reference model for Web services (UDDI, SOAP, WSDL), Web service composition, semantic Web services, security/privacy in Web services, and overview of Web service standards (BPEL4WS, WS-Security.

**Computer Crimes and Forensics 502554-3**

This course introduces computer crimes and legal issues related to its investigation. In this course, the student will learn procedures on tracking, analyzing, and patching security holes after an incident has occurred. This will include seizure of equipment, analysis of confiscated materials, and follow up procedures relating to the incident.

**Advanced Topics in Security 502555-3**

This course will introduce students to the current state-of-the-art topics in the field of security. Also, this course will train the student to read and present modern scientific research papers in the field of security by their own. This course will provide a comprehensive list of issues related to both data and network security.

**Information Security Policies 502556-3**

This course studies some case in computer security. The student will be able to develop Information Technology security policies for small and large organizations with specific regard to components such as email, web servers, web browsers, firewalls, personal applications, passwords, etc. The student will have a sound understanding of the areas of

Information Technology where policy development and implementation may help in reducing the effects of attack.

**Non-Traditional Database 502575-3**

This course aims to impart skills in alternative data storage mechanisms of handling ever-growing data volumes of data. The concept of all non-traditional databases is to leverage the commodity hardware to support large volume of data and parallel processing. This course aims to build on the foundations of understanding various types of non-traditional databases that support large volume of data and parallel processing.

**Big Data 502577-3**

Big data is the description used to encompass the huge amounts of data that is common to many businesses. The course aims to build on the principles upon which serious Big data resources are built. All of the data held in Big Data resources must have a form that supports search, retrieval, and analysis. In addition analytical methods must be available for review and the analytical results must be available for validation. The course aims to provide analytical skills to study big data and to provide a solid foundation for developing solutions and applications that need to manipulate big data. Students will be introduced to a range of tools and techniques to manipulate and manage big data sets which will be used to develop a range of big data applications. It aims to establish a strong working knowledge of concepts, techniques, and products associated with Big data. Students learn to store, manage, process and analyze massive amounts of unstructured data for competitive advantage, select and implement the correct Big Data stores. Big data can be characterized by the V's: volume (large amounts of data), variety (includes different types of data), velocity (constantly accumulating new data), Vision( having purpose and plan), Verification (ensuring that the data conforms to a set of specifications) and Validation (Checking that its purpose is fulfilled).

# Student Admission and Support:

**Student Admission Requirements**

Requirements for admission to Taif University is available at http://deanships.tu.edu.sa/AR/Rules_and_Regulations/Pages/default.aspx, an online resource managed by the deanship of admission and registration, designed to help students and their families learn about TU, select a program and a campus, search for information and regulations, and apply for admission.

An applicant for admission to an undergraduate program at TU must satisfy a number of requirements, including:

1) The student must be a Saudi citizen at the time of application or an immediate Saudi matrilineal descendent.
2) The student must possess a Saudi high school certificate or its foreign equivalent.
3) The student must successfully pass a skills test with a mark of at least 70%. Such tests are administered by the National Assessment Center for Higher Education and carried out in a large number of centers across the Kingdom.
4) The student is required to take an entrance exam, the result of which must be 70% or better. Such an exam is administered and managed by the Deanship of Admission and Registration at TU.
5) For each candidate for admission, the deanship of Admission and Registration assigns a weighted average of the student's scores in high school, skills test and entrance test. The assigned weights are 40%, 30% and 30% to the high school grades, skills test and entrance test, respectively.
6) Admission to the College of Computers and Information Technology at TU is highly competitive. The number of students accepted is limited to the number of seats available as decided by the University Council and based on the capacity of resources of the College of Computers and Information Technology.
7) The number of students joining the department of Information Technology and studying towards BSIT may vary on a yearly basis, depending on the availability of resources.

# GUIDANCE AND ORIENTATION PROGRAMS FOR NEW STUDENTS

- **Orientation through University:**

The university organizes days for orientation to inform fresh students about university life and to be engaged in this new experience. The students are informed by university systems, rules, and how to access all university services

- **Orientation through the college:**

The college organizes a day to learn the students about the college organization, college departments, and programs. Also, the college give information about activities and training.

**Orientation through the Program:**

Mainly the student's progress is monitored through advising. Students are required to meet with their academic advisor every regular semester at least once a semester for the purpose of course selection, graduation requirements, study plan, career development, and personal advising concerns that might occur. Taif University adopts a student registration tool, EREG (Electronic Registration System), (http://ereg.tu.edu.sa:7778), which helps advisors to identify students' academic records, study plan, and performance in any stage of a semester. Advisor ensures that that all program requirements are met, alert students in advance to potential problems, help students balance course loads from semester-to-semester and monitor the students' progress to avoid last minute problems in meeting the program graduation requirements.

Mainly, at the beginning of each semester registration, the academic advisor looks for academic record of a student to see if the student has not completed all courses in the prior semester. The advisor recommends changes and makes the needed changes in the registration. This process allows the advisor to monitor students' progress as they move toward graduation.

In order to graduate successfully, all students must complete 140 156-credit hours and are required to maintain a grade point average of at least 2.0 out of 4.0. Those who fail to maintain this average are placed on scholastic probation and given two semesters to raise their GPA to 2.0. If the GPA of 2.0 is not attained within the three semesters of probation, the student may then be dismissed from the CCIT. One last opportunity of a third semester to raise the GPA can be given to those who can attain the 2.0 GPA if they study at least 12 credit hours and score a B grade (36 EPs)

1- The student is considered an academic discontinued if he withdraws from a semester or fails to register, irrespective of a valid reason. It is permissible for a student to be on a discontinuing status for a maximum of two consecutive semesters, or a maximum of three non-consecutive semesters during his enrollment at TU. The student enrollment is terminated if he exceeds these limits.

2- Any student who loses his status as a student at TU due to the conditions mentioned in item (1) is entitled to appeal readmission based on the following conditions:

The student should satisfy all the admission conditions announced at readmission.

The student should keep the same university identification number and records he had prior to discontinuing his study.

The student's appeal should be approved by his college council. The council has the right to require the student to retake any course that he has passed.

If the student discontinuity exceeds four semesters, he can apply for admission as a fresh one, without looking into his previous record, provided his discontinuity was not due misconduct.

**Student Counseling Services**

(academic, career, psychological and social )

Academic advising and counseling of students is an important component of teaching; student academic advising is a mandatory requirement of College of Computers and Information Technology (CCIT). Appropriate student advising provides support needed for the student during times of difficulty. In addition, it helps the student to build a close relationship with his/her advisor and to provide student motivation and involvement with the institution.

Personal, academic and career counseling of students are provided by several different offices and individuals, depending on the nature of the counseling sought. All the students entering any program in CCIT are assigned advisors by the college from the full-time faculty members of the college. In addition to any need based advising, there are set days for advising at the start and end of each semester. In these days the advisors are expected to be in their offices to guide students on a wide range of issues including but not limited to the selection of courses; e.g. if courses have no space then the advisor finds and recommends alternate courses that the students may take to fulfill their degree requirements. Faculty members are available most of the time for consultation and advice to students during their office hours. The office hours for each course instructor are

provided in the syllabus given to students and instructors should be available in their offices during the time allocated for office hours. In addition, the students may request an appointment with their advisors anytime during the semester by e-mails and visit them in their offices.

To handle problems where an advisor is unable to solve a problem faced by a student, the student is referred to the college counselor. The college counselor is a trained faculty member who provides professional guidance to the student. Based on the recommendation by the expert the Vice Dean of Academic Affairs at the college takes appropriate action. The ranges of counseling services offered by Students Affairs Office are listed in the Student Handbook, which is distributed each year to all new students during the orientation week. These include:

- Offering students religious and social guidance in accordance with Islamic principles.
- Supporting students with academic problems (students on probation or who have failed their courses) and helping them overcome these educational difficulties.
- Helping students address their personal, social and family problems.

In addition, since faculty are usually the first to recognize that a student is having difficulty, faculty members play a key role in developing solutions for the students or referring them to appropriate services. Faculty members also participate in the formal student-mentoring program.

In the student-mentoring program, a faculty member is assigned to ten to fifteen students, as an academic advisor. Academic advisors meet with their assigned groups at least four times during the academic year. These meetings provide valuable opportunities for information exchange and suggestions as to how the student's educational experience could be improved.

Personal counseling is handled by the Vice Dean for Academic Affairs for male students and by the Vice Dean for female section for female students. Students requiring in-depth personal counseling are referred to the main Student Advisory office located at the Deanship for Student Affairs at male and female campus, where they can receive social, psychological and financial assistance.

Additional counseling is provided by course directors, who provide students with academic reinforcement and assistance and refer "at risk" students to the Vice Dean for Academic Affairs and the Vice Dean for female section.

**Special Support**

(low achievers, disabled, gifted and talented Students)

University Advising Administration designed a framework to manage the advising process through the levels of the programs, the college and the university. The center of the advising process is the advisor. The framework enables the advisor to organize the advising process for each individual's student. A complete report that shows the status of each student and his progress, activities, social problems…etc. This is submitted by each advisor to the advising chair. The advising chair summarizes the reports and submit his final report to university advising Administration .

The regulations for student appeals on academic matters come in two different ways: informal student appeal and the very formal one.

The informal student appeal is usually the first step: the student approaches the course instructor, then the department chair, and finally the vice dean for academic affairs. These constituents intervene in a sequential way and increasing hierarchy until the issue is resolved. When the issue is not resolvable for some reasonable reason, the student can make a formal appeal. Usually, the appeal is made to the Deanship of Students Affairs. The deanship studies the request and then decides or not to pursue the appeal process.

**Grievances**

The regulations and processes for student formal appeal are universal to all university students and proper documentation can be sought at the Deanship of Students Affairs. The following represent the standard operating procedures for addressing formal grievances in the CCIT:

**Student - Student conflict**

Conflict between students should be reported to the Vice Dean of Academic Affairs for male students and Vice Dean for Female Affairs for female students.

**Student - Teaching Assistant Conflict**

All cases are to be reported to the male and female Vice Deans for Academic Affairs.

**Student - Staff Conflict**

All cases are to be reported to the male and female Vice Deans for Academic Affairs.

Procedures have been developed to ensure that students are protected against subsequent punitive action or discrimination following grievance or appeal. The Appeal and Grievance Forms are specific for staff, teaching assistant, and student.

**4- Talented Students**:

Through the Deanship of Student Affairs (talent students club), the University offers opportunities for students to show their talents in various fields, providing opportunities for training, participating in competitions and selecting outstanding students to participate in the name of the university in international and local competitions in all scientific, fields.

**Outstanding students:**

The program offers many ways to interest outstanding students. Where they are encouraged by listing their names in the lists of distinguished and celebrate their achievement at the end of each semester and involve them in activities that drive them to further progress as a programming club.

# LEARNING RESOURCES, FACILITIES, AND EQUIPMENT

**Learning Resources.**

Mechanism for providing and quality assurance of learning resources (textbooks, references and other resource materials, including electronic and web-based resources, etc.)

Please follow the following link (https://drive.google.com/file/d/1MxozXbvN5DKswl4YtrVCxBjnv6IyoD5j/view?usp=sharing) to get more information about preparing and approving books in Taif university

The processes that are followed for planning and acquisition of textbooks, references, and other resource material by a curriculum committee formed from Department of Information Technology for:

- **Textbooks:** a list of the basic-IT textbooks has been developed according to a questionnaire distributed to the faculty members of the college. Also future new references are included annually as new books appear in the field of information technology.
- **References such as Journals:** a list of the information technology journals has been developed according to a questioner that has been distributed to the faculty members. A comprehensive search of the available journals according to their

scientific impact index has been carried out and a list from different publication is subscripted by the CCIT administration.

- **Other resource materials such as classic literature:** classic literature refers to articles before the year 1990. When such articles are needed by faculty members or students, CD ROM will be purchased if available or alternatively, a request through the British library will be made so they can be available as printable materials in about two weeks or as electronic materials within 24 hours (British working day).

CCIT is mainly served by one library located in the CIT Lab. building. The library consistently updates and tracks what comes new to the field in form of books, printed journals, electronic references, electronic databases, and media titles.

The process of recourse acquisition includes textbooks, electronic and web-based resources, educational CDs, and other media teaching resources; ensure that the library acts in response to the faculty members' and students' needs. The library recourses are available in various formats such as textbooks, electronic and web-based resources, educational CDs and DVDs, and other media teaching resources. Librarians assist faculty members to find information needed for teaching and research as well as with borrowing services and requesting articles in journals from the British library in England. Electronic resources are available - at any time – to faculty members using their access codes and during working hours via on-campus computers located at the library.

**Facilities and Equipment**

(Library, laboratories, medical facilities, classrooms, etc.).

There are 9 computer-equipped classrooms/labs in CCIT Boys section that are shared by three departments. Each lab is also equipped with projector systems with Internet access during lab demonstrations and/or lectures. The network consists of a switched gigabit Ethernet core and a wireless network that provides connectivity throughout the building. A summary of the computer-equipped laboratories in CCIT is given in Table 7-2(a).

Computer-equipped laboratories in CCIT for general courses

| Lab Room | No. of Computers | Operating System Supported | Specialized | Software |
|---|---|---|---|---|
| **02** | 18 | Windows-7 | Cisco Academy and Network Lab | Cisco Packet Tracer, MS-Office 2016, C++, Open SSL, Wireshark, Nmap, Hash generator |
| **03** | 18 | Windows-7 | General Programming | Dev C++, Visual studio,, ORACLE,, MS-Office- (Arabic and English version), |
| **04** | 24 | Windows-7 | MATLAB General Programming | MATLAB , XAMPP, Notepade++, Dev C++, Microsoft Silverlight, (Arabic and English version), Visual studio |
| **05** | 18 | Windows-7 | SQL General Programming | Matlab, ORACLE, XAMPP, FLASH PLAYER |
| **06** | 17 | iMAC | General Programming | Xcode, Office, OpenGL |
| **07** | 23 | Windows-10 | General Programming | Dev C++, MATLAB, Visual studio, Office-2016 |
| **08** | 24 | Windows-7 Linux (Dual Boot) | MATLAB General Programming | MATLAB, XAMPP, Notepade++, Dev C++, Microsoft Silverlight, (Arabic and English version), Visual studio , |
| **New lab1 (9)** | 17 | Windows-10 | General Programming Lab | MATLAB , Cygwin, Office-2016, Visual studio |
| **New Lab2 (10)** | 18 | Windows-10 | General Programming Lab | MATLAB , Cygwin, Office-2016 |

The CCIT has also a network lab.

| Items | Quantity |
|---|---|
| 56k FAX Modem | 1 |
| 10/100 Ethernet Switch | 1 |
| PCs Pro Intel Pentium 3.4 GHz | 11 |
| CISCO Router | 2 |
| CISCO Router | 3 |
| USB Modem | 6 |
| Media Converter(Fiber/Ethernet) | 2 |
| Router/Baseline switch | 1 |
| 10/100Mbps Converter | 1 |
| Wireless Router | 1 |
| Wireless 802.11g PCI Card | 8 |
| 54Mbps Wireless PCI Adaptor | 1 |
| Wireless 802.11g PCI Card | 1 |
| Server Rack | 1 |
| 24-patch panel | 1 |
| Networking Tool Kit | 7 |
| Faceplate | 16 |
| Jack | 16 |
| Coaxial Cable Cutter | 3 |
| Fiber patch cable | 1 |
| Coaxial Cable Crimper | 2 |
| 32-bit PCMCIA Network Card | 2 |
| Remote-Cable Tester | 1 |
| Roll of Coaxial Cable | 1 |
| Cabinet | 4 |
| Tables with Faceplates | 6 |
| Chairs | 11 |
| Punch tool | 20 |
| Cabling Crimp Tool(RJ45&Coaxial) | 2 |
| Projector with VGA cable | 1 |

| | |
|---|---|
| 2 point USB KVM switch | 1 |
| Network patch cable connectors | 1 packet |
| USB 2.0 cable | 2 |
| HDMI cable | 1 |
| ARUBAIAP | 1 |
| CISCO WIRELESS ROUTER | 3 |
| Netgear switches | 6 |
| Hawkin Wireless LAN Extender | 1 |

The CCIT has also a digital design lab.

**Total PC's:** 14 **Operating System(s):** Windows 7
**Software's installed:** Labview

| **Name/description** | **Quantity** |
|---|---|
| COM3 LAB MASTER UNIT | 5 |
| 70017 DIGITAL TECHNOLOGY COM3LAB | 5 |
| 70018 DIGITAL TECHNOLOGY COM3LAB | 5 |
| IDL-400 LOGIC TRAINER | 5 |
| LOGIC PROBE AND LOGIC PULSER(MODEL-610) | 2 |
| JUMP WIRE KITS | 14 |
| 70011 DC FUNDAMENTALS 1 | 1 |
| 70012 DC FUNDAMENTALS 2 | 2 |
| 70013 AC FUNDAMENTALS 1 | 1 |
| 70014 AC FUNDAMENTALS 2 | 2 |
| 70015 ELECTRONICS COMPONENTS 1 | 5 |
| 70016 ELECTRONICS COMPONENTS 2 | 6 |

| | |
|---|---|
| 70019 MICRO COMPUTER | 1 |
| 70074 MODEM TECHNOLOGY | 1 |
| 70081 OPERATIONAL AMPLIFIER | 5 |

In the girls campus IT program uses several labs that are mainly used by female students.

There is also a computer lab that is opened during and after the regular working hours for students to use them to gain hands on experience while studying.

The Information Technology program, as all other programs in CCIT, enjoy a wide range of computing resources that are used to support various activities in the college including teaching. These computing resources are managed by the Information Technology (IT) Unit. The IT Unit is one of the main supporting units in the CCIT. It is responsible to manage and serve the IT needs of all academic and non-academic units and personnel in the college.

**Services offered by the IT Unit**

1. Technical support for faculty and staff
2. Equipment purchasing and installation
3. Accounts for faculty members, students and staff
4. Remote access services
5. Manage LMS/ Blackboard System: Learning Management System

Starting from 2014, the University has been encouraging and recommending the use of LMS (Learning Management System)/Blackboard provided by the E-learning and distance learning deanship through the link https://lms.tu.edu.sa. Faculty members are expected to progressively use this Blackboard system to support their teaching for all courses. Training sessions on the use of the Blackboard system have been organized many times by the college and the deanship of E-learning and distance learning. Each faculty member has access to the Blackboard system (using their university username and password). All students have automatically access to the courses available on the Blackboard system in which they are registered.

The Deanship of Admission and Registration provides access to the e-academic services system (EduGate) to students and faculty members through the link https://edugate.tu.edu.sa/tu/init. Through the use of the EduGate system, students can perform online registration, monitor their academic progress, view transcripts/grades,

etc. while instructors can monitor their students/advisees, see their academic progress and results, insert marks and absences for students, edit their profile, etc.

Besides regular computing labs CCIT has following special labs for the students.

1. Linux environments
2. Apple Mac environments
3. Open lab

To provide appropriate guidance regarding the use of the tools, equipment, computing resources and laboratories. A copy of lab safety manual will be shown during on-site visit, if needed. General safety instructions are provided at the beginning of the semester for students enrolled in the college.

For other teaching and learning equipment, usually, the department chair collects all the needs in this matter and fills an order to be submitted to the dean of the college. Once approved by the dean, the request is deferred to the University Administration (usually the vice president) to be completed.

The processes that are followed by faculty for planning and acquisition of resources for:

- **Library and classroom:** Head of Departments contact faculty members for the selection of library recourses that are needed for teaching. Selection of materials is considered after the approval of the Head of the Department and according to the recommendations from experienced faculty members. The information is then provided to the Director of library, which in turn will acquire the resource from a trusted publisher.
- **Laboratories:** Head of Departments contacts faculty members for selection or any recommendations on laboratory recourses. Selection of laboratory material is considered after the approval of the Head of the Department and according to the recommendations of experienced faculty members. The information is then passed on to the director of laboratories to act in response to the needs. In addition, each course instructor prepares a laboratory manual. The manual is reviewed by experienced faculty members and approved by the Head of the Department. All courses materials are uploaded to college website.

**Arrangements to Maintain a Healthy and Safe Environment** (According to the nature of the program )

The maintenance and upgrading of the tools, equipment, computing resources and laboratories is administered by Department in coordination with the Dean. All

procurements for maintaining and upgrading the tools, equipment, computing resources, and laboratories in the Department must comply with the annual budget plan.

Each fiscal academic year, the IT Chair in collaboration with the Dean, writes and submits a budget proposal for supporting academic and research activities for the year ahead. This is based on the projection of needed improvements in the learning and research infrastructure.

Once the proposal is compiled, it is then submitted to the CCIT Dean for approval. The proposal is then sent for evaluation by VP of academic affairs.

**Safety and risk management procedures:**

In each lab, the instruction of use and safety procedures is published to the students:

- The instructor tells the students about the safety procedures of safety and instructions of use
- The instruction of use and safety instructions are posted in each lab in an access place for each student to see and access

Alarm bells, fire extinguishers and exits are available throughout the corridors of the college. There are signs and also notices of how to use next to each.

| | |
|---|---|
| **Council** | IT Council |
| **Reference No.** | 17 |
| **Date** | 14/5/2019 (9/9/1440) |
| **Date of review and update** | 3/4/2022 (2/9/1443) |