

Course Name: B-Tech Project I Constructed	Course Code: ITSE414
Pre-Requisite: ITSE306-Object Oriented Analysis and Design and ITIS304-Research Methodology	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours : 0:2	
Goal: To enable students to analyze and design original application/research work with creative ideas using the knowledge and skills acquired up to the bachelor level, leading to a good quality project in two (2) semester duration	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Apply critical thinking and software engineering knowledge to analyze a real scenario, problem or user requirements. 2. Create a proposal for the project based on a real scenario, problem solution or a research topic in IT with the proper literature review. 3. Apply the phases of requirement engineering process 4. Create a Software Requirement Specification and Design Document (SRSD)for the System 5. Apply professionalism and practice the code of Ethics in Information Systems, Software Engineering and the impact of diverse solutions to the society. 6. Apply the soft skills and project management skills in all phases of requirement engineering process 	
Outcomes The students should be able to:	Method
1. Practice in-depth exploration of a particular topic in computer and information system	Practical
2. Apply the general knowledge of IT, Software Engineering and the emerging technologies to solve an open-ended real-world problem with a critical manner.	Practical
3. Develop student's creativity and overall skills of problem formulation, development of appropriate methodologies, analysis & design for the proposed system	Practical
4. Practice requirement collection and analysis using different Software Engineering tools and methods.	Practical
5. Write a Software Requirement Specification and Design Document (SRSD) for a quality project.	Practical
6. Apply the professional and ethical practices in Information Systems, Software Engineering and the impact of diverse solutions to the society.	Practical
7. Present the Project requirement Engineering Phases orally in front external panel	Practical



Course Name: Software Design, Integration and Testing (Updated)	Course Code: ITSE402
Pre-Requisite: Object Oriented Analysis and Design	Credit Hours: 3
Passing Grade: Depending on the Type of the course belongs to the Audit Degree.	Level: Year 4
No. Of Theory & Practical Hours : 1:4	
Goal: To Cover the concepts of different system software design methods and testing the development process to recover bugs, ensure performance, enhance quality, and to lower the costs.	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Understand the concepts of different system software design methods. 2. Apply design patterns to produce effective system design with low cost. 3. Evaluate the fitness of testing activities into the entire software development life cycle. 	
Outcomes: The student should be able to:	Method
1. Identify the basic concepts of software design process, design techniques, design Quality and design principles.	Theory
2. Analyze design strategies and methodologies	Theory and Practical
3. Apply Design patterns(Expert, Creator, Low Coupling, High Cohesion and Controller Patterns – using Object Oriented Design Methodology)	Practical
4. Discuss various architectures (including embedded systems, client-server, n-tier, web, wireless, messaging, collaboration platforms etc.) and families of architectural styles	Theory
5. Construct the descriptions of Software Architecture (using visual notations)	Practical
6. Discuss the principles of software testing(glossary of testing terms, axioms and paradigms of testing ,Test plan and design)	Theory
7. Analyze Software Metrics and reliability modeling including JelinskiMoranda, Code metrics, McCabe Cyclomatic complexity, Halstead's Software Sciences and function points)	Theory and Practical
8. Design testing procedures and test cases	Theory and Practical
9. Apply the concepts of System Design and Testing into given case studies.	Theory and Practical



ثلاث ساعات معتمدة	التخاطب باللغة العربية	PHIL 3200
	لا يوجد	المتطلبات السابقة
	تقوية صلة الطالب بلغته العربية والأعزاز بها وتأكيد دورها في حياته العلمية والعملية لاستيعاب ما يتلقاه من معارف وعلوم.	الهدف العام
	الأهداف الخاصة	النتائج
<ol style="list-style-type: none"> ١. أن يمتلك الطالب المهارات الأساسية للتخاطب باللغة العربية حديثا وكتابة. ٢. أن يكتسب الطالب وسائل الإقناع لعرض ما يريد من أفكار و آراء بأسلوب واضح ومعاني دقيقة. ٣. أن يعمل الطالب على زيادة معرفته واهتمامه بلغته العربية لتنمية ذوقه الجمالي وزيادة مهاراته فيها. ٤. أن يتمكن الطالب من توظيف معلوماته اللغوية لصالح ما اكتسبه من علوم وخبرات. 	<ol style="list-style-type: none"> ١. قدرة الطالب على الكتابة والحديث بأسلوب علمي تفل فيه الأخطاء الإملائية والأسلوبية. ٢. المام الطالب بمهارات الاختصار والإيجاز في رسائل المخاطبات. ٣. احتفاظ الطالب بالكثير من المعلومات التي اكتسبها في ثقافته الأدبية واللغوية خلال تعليمه وتثقيفه الذاتي. ٤. زيادة مهارات الطالب في لغته العربية حديثا وكتابة. 	



Course Name: LINUX System Administration-I	Course Code ITNT403
pre-requisite: ITSE102-Intr. To Operating System	Credit Hours: 3
Passing Grade: C	Level: B.Tech – Year4
No. Of Theory & Practical Hours (1:4)	
Goal: Be prepared to get LPIC-1: Junior Level Linux	
Objectives: The course should enable the student to : <ul style="list-style-type: none"> 1. Understand the architecture of a Linux system. 2. Install and maintain a Linux workstation, including X11 and setup it up as a network client. 3. Work at the Linux command line, including common GNU and UNIX commands. 4. Apply Shells, Shell Scripting, Data Management and X window system. 5. Handle files and access permissions as well as system security; and perform easy maintenance tasks: help users, add users to a larger system, backup and restore, shutdown and reboot. 	
Outcomes	Method
1. To understand the Linux OS, X Server installation, configuration and hardware architecture.	Theory / Practical
2. To understand the Linux Package Management concepts and their usability in various distributions	Theory / Practical
3. To demonstrate knowledge and understanding towards performing tasks using basic commands and shell.	Theory / Practical
4. To manage and control the Linux OS processes	Theory / Practical
5. To manage and control Partitions and file system attributes, permission, ownership, mounting, unmounting and quote management.	Theory / Practical
6. Demonstrate knowledge to control and manage the Linux OS run levels and other services.	Theory / Practical
7. Manage User and Group accounts using commands	Theory / Practical
8. Demonstrate Shell scripting knowledge to manage the automate services.	Theory / Practical
9. Manage and synchronize the system clock over NTP and understand the email server concept and Printing Service in Linux OS.	Theory / Practical
10. To understand and demonstrate network (Basic Configuration) and security management in Linux OS.	Theory / Practical
11. To understand and implement Troubleshooting, Data Encryption and DNS process in Linux OS.	Theory / Practical



Course Name: Advanced Object Oriented Programming (Updated)	Course Code: ITSE408
Pre-Requisite: ITSE203 Object Oriented Programming	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours : 0:4	
Goal: This course provides a practical knowledge to build web applications using Java Server Faces and have exposure to Java EE technologies.	
Objectives: The course should enable the student to : <ul style="list-style-type: none"> 1. Explain the JSF architecture. 2. Create web application using JSF. 3. Understand the refined event lifecycle. 4. Create Ajax applications with JSF. 5. Use databases in JSF applications. 	
Outcomes The students should be able to:	Method
1. Describe the JSF architecture	Theory
2. Build web applications using JSF's and its components	Practical
3. Use managed beans in form handling and server-side presentation logic	Practical
4. Create composite UI fragments, custom converters, validators, and components.	Practical
5. Implement JSF event listeners.	Practical
6. Build Ajax applications using JSF	Practical
7. Integrate Databases to JSF	Practical



Course Name: Introduction to Artificial Intelligence Updated	Course Code: ITSE407
Pre-Requisite: ITSE205- Data Structure and Algorithms	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours: 1:4	
Goal: This course covers the fundamentals of Artificial Intelligence and the implementation of AI techniques.	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Understand the concepts of AI 2. Use search methods in problem solving. 3. Examine the constraint satisfaction problems. 4. Implement Knowledge Representation and Reasoning 5. Develop agent planning to accomplish certain task. 6. Handle uncertainty. 7. Use programming languages to implement AI techniques. 	
Outcomes At the end of this course, students should be able to:	Method
1. Discuss the concept of AI.	Theory
2. Use Uninformed search and Informed search methods for problem-solving for single agent including Breadth First Search, Depth First Search, Depth Limited Search, Greedy Search and A* Search.	Theory & Practical
3. Use search game tree for problem solving for multi agents including Min-max and Alpha-Beta pruning algorithms.	Theory & Practical
4. Use techniques for solving Constraint Satisfaction Problems (CSPs) including Backtracking algorithm.	Theory & Practical
5. Use propositional logic and first order logic (FOL) for knowledge representation.	Theory & Practical
6. Create Inferences using Propositional Logic and First Order Logic Knowledge base.	Theory & Practical
7. Create execution plan and action schema.	Theory & Practical
8. Use probability theory to represent uncertainty.	Theory & Practical
9. Construct a Bayesian network for given problems.	Theory & Practical
10. Use Hidden Markov Models.	Theory & Practical
11. Implement AI techniques using programming languages.	Practical



Course Name: B-Tech Project II Constructed	Course Code: ITSE404
Pre-Requisite: ITSE414- B-Tech Project I	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours : 0:2	
Goal: To enable the student to deliver a complete and fully integrated application / publish a research paper	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Complete the development, implementation, integration and maintenance of the project designed in B-Tech Project – Phase 1 2. Apply the software skills and project management skill in all phases of development, implementation, integration and maintenance of the project 	
Outcomes The students should be able to:	Method
1. Finalize the requirement engineering process initiated in Course Project – Phase 1 via team-work or contribution from peers	Practical
2. Construct a quality system and test it using the knowledge learned in the previous semesters	Practical
3. Apply the methodologies and tools of project management needed to maintain the system during all the phases of development, integration, update and maintenance	Practical
4. Construct a quality documentation and reports for the system developed.	Practical
5. Apply the professional and ethical practices in Information Systems, Software Engineering and the impact of diverse solutions to the society.	Practical
6. Present the increments and the final integrated system in front of panel of experts.	Practical



Course Name: Fundamentals of Big Data	Course Code: ITDB304
Pre-requisite: ITDB101-Introduction to Database	Credit Hours: 3
Passing Grade: C	Level: Advanced Diploma
No. of Theory Hrs.: 1	No. of Practical Hrs: 4
Goal: To adequately prepare the students to understand the fundamentals concepts of big data and its technologies.	
Objectives: Upon completion of this course, the students should be able to: <ol style="list-style-type: none"> 1. Understand the Big data concepts, development and components of Hadoop Ecosystem 2. Use big data technologies for data extraction and querying 3. Use NoSQL database in Hadoop applications 	
Outcomes	Methodologies
Upon completion of this course, the students should be able to:	
1. Explain the concepts of Big Data, its characteristics and big data domains.	Theory
2. Describe the brief history of Hadoop, HDFS architecture, MapReduce framework and other Hadoop Ecosystem components.	Theory
3. Discuss the characteristics of NoSQL databases and its different types such as a key-value store, column store, document databases and graph databases.	Theory
4. Work with HDFS and basic MapReduce programs with text and numeric data use cases.	Practical
5. Demonstrate the skill on how to import data from external sources and store them to HDFS	Practical
6. Use big data tools such as HIVE to query the data in HDFS.	Practical
7. Manage large data sets with HBase in Hadoop applications.	Practical
Software & Hardware Tools: Cloudera	



Course Name: Applied Data Science (Constructed)	Course Code: ITSE415
Pre-Requisite: MATH311 Probability and Statistics for IT AND ITSE201 Programming II	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours : 1:4	
Goal: Provide insights into the Data Analytics and Machine Learning	
Objectives: The course should enable the student to :	
<ol style="list-style-type: none"> 1. Understand data science concepts. 2. Perform data analytics. 3. Create effective data visualization. 4. Apply machine learning in data analytics 5. Apply natural language processing methods. 	
Outcomes The students should be able to:	Method
1. Discuss data science concepts	Theory
2. Use data representation for data analytics	Theory & Practical
3. Apply techniques for cleaning and preprocessing of data	Theory & Practical
4. Perform sampling and statistical modeling	Theory & Practical
5. Create effective data visualization	Theory & Practical
6. Describe approaches for creating machine learning models	Theory
7. Evaluate supervised and unsupervised machine learning models on data	Theory & Practical
8. Apply natural language processing methods	Theory & Practical



Course Name : Human-Computer Interaction	Course Code : ITIS401
Pre Requisite : None	Credit Hours : 3
Passing Grade : Depending on the Type of the course belongs to the Audit Degree	Level: Year IV (Bachelor)
No. of Theory Hrs: 2	No. of Practical Hrs : 2
Goal: To introduce to students the principles, issues, tools and techniques of Human Computer Interaction which enable them to design, implement and evaluate interactive systems.	
Objectives: Upon completion of this course, the students should be able to: <ol style="list-style-type: none"> 1. Understand Human Computer Interaction and its importance in the design of interactive systems. 2. Produce prototypes of interactive systems using appropriate tools and technologies with the focus on HCI principles, methods, interaction styles, and techniques. 3. Recognize HCI issues such as Universal Design, Accessibility, Cultural Marker, and Usability. 4. Appreciate the importance of HCI in everyday lives. 	
Outcomes	Methodologies
Upon completion of this course, the students should be able to:	
1. Discuss the basics of Human Computer Interaction and its related fields.	Theory
2. Discuss the concepts of user differences, user experiences and collaboration as well as how to design contextually.	Theory/Practical
3. Apply the concepts and principles of Human-Computer interaction.	Theory/Practical
4. Evaluate the different devices used for input and output and the issues/opportunity associated with these devices.	Practical
5. Apply user modeling techniques and user interface principles and guidelines in the design of interactive systems to effectively meet users' needs.	Theory/Practical
6. Use different methods and techniques in HCI to carry out a complete user-centered design process.	Practical
7. Design prototypes of interactive systems using the latest tools and technologies.	Practical
8. Evaluate interactive systems using the latest techniques.	Practical
9. Discuss the new HCI innovations and emerging technologies.	Theory/Practical



Course Name: Theory of Computation (Updated)	Course Code: ITSE405
Pre-Requisite: MATH2200 Discrete Structures AND ITSE205 Data Structures and Algorithms	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours : 1:4	
Goal: Provides students the concepts of theory of computation, abstract models of computation, complexity of languages and compilation of programming languages.	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Explain formal definitions of machine models. 2. Construct finite state machines and the equivalent regular expressions. 3. Construct pushdown automata and the equivalent context free grammars. 4. Construct Turing machines and Post machines. 5. Prove the equivalence of languages described by finite state machines, regular expressions, pushdown automata, context free grammars, Turing machines and Post machines 6. Demonstrate decidability, reducibility and complexity of languages 7. Discuss different phases of compiler and translate programming language involving lexical analysis, syntax specification and parsing. 	
Outcomes The students should be able to:	Method
1. Identify the formal relationships among machines, languages and grammars	Theory
2. Apply finite state machines to solve problems in computing	Theory & Practical
3. Convert between finite automata and regular expressions	Theory & Practical
4. Construct regular expressions and context-free grammars for simple languages	Theory & Practical
5. Apply normal forms on Context Free Grammar	Theory & Practical
6. Construct Push Down Automata and Turing Machines to solve simple recognition problems	Theory & Practical
7. Apply the pumping lemma to prove that a language is not regular	Theory & Practical
8. Define Polynomial(P), Nondeterministic Polynomial time (NP) and NP-complete problems	Theory
9. Demonstrate the concepts and phases of a compiler.	Theory
10. Employ lexical analysis, syntax analysis and parsing techniques.	Theory & Practical



Course Name: Introduction to Blockchain	Course Code: ITDB409
Pre-requisite: None	Credit Hours: 3
Passing Grade: C	Level: B.Tech
No. of Theory Hrs: 1	No. of Practical Hrs: 4
Goal: To understand and deploy a blockchain business network application.	
Objectives: Upon completion of this course, the students should be able to: <ol style="list-style-type: none"> 1. Describe the concepts of Blockchain Technology 2. Use Hyperledger composer tool to deploy a blockchain business network on online playground / local Hyperledger fabric. 3. Set up a REST API to access the blockchain. 	
Outcomes	Methodologies
Upon completion of this course, the students should be able to:	
1. Explain Blockchain technologies, frameworks and tools	Theory
2. Explain the concepts of Hyperledger fabric and composer	Theory
3. Setup the prerequisite and development environment for Hyperledger fabric	Practical
4. Implement domain model, ACL rules, queries and transactions for a blockchain business network	Practical
5. Manage Hyperledger data with REST Client API such as Insomnia and Postman	Practical
6. Generate Angular application/ PHP Application based on REST Server application	Practical
Software & Hardware Tools: Ubuntu Linux 14.04 / 16.04 LTS (both 64-bit), or Mac OS 10.12	



Course Name : Enterprise Resource Planning Systems	Course Code : ITIS403
Pre Requisites : Introduction to Business (BAMG1100)	Credit Hours : 3
Passing Grade : Depending on the Type of the course belongs to the Audit Degree	Level: Year IV (Bachelor)
No. of Theory Hrs: 2	No. of Practical Hrs : 2
Goal: To introduce to students with an understanding of the theoretic and practical issues related to the application of enterprise systems within organizations.	
Objectives:	
Upon completion of this course, the students should be able to:	
<ol style="list-style-type: none"> 1. Understand the concepts, theories, tools, and techniques of Enterprise Resource Planning. 2. Acquire knowledge and skills on how an enterprise system integrates information and organizational processes across functional areas with a unified system comprised of a single database and shared reporting tools. 3. Demonstrate knowledge on business processes. 4. Develop an enterprise system using any of the products of the enterprise systems vendors (such as SAP or Oracle, SSA Global, Microsoft (Axapta, Great Plains and Solomon), Intuit, or Minicom). 5. Appreciate the importance of integrated systems to support business processes of organizations. 	
Outcomes	Methodologies
Upon completion of this course, the students should be able to:	
1. Discuss the ERP concepts, ERP models, tools, and techniques for both private and public business sectors.	Theory
2. Evaluate the importance of enterprise system in an organization.	Theory
3. Analyze issues related to acquisition and implementation of enterprise systems.	Practical
4. Evaluate the costs and benefits of implementing an enterprise system.	Practical
5. Discuss how an organizational process often spans different functional areas.	Practical
6. Discuss current trends and best practices related to enterprise systems.	Theory
7. Discuss how an enterprise system develops a single enterprise-wide information system.	Theory
8. Analyze how an integrated business processes increases organizational efficiencies.	Theory
9. Evaluate the major enterprise system software providers and their packaged systems.	Practical



BAAC 1102 - Principles of Accounting

BAAC1102	Principles of Accounting	3 Credit Hours
Prerequisites	None	
Goal	A principle of Accounting is an introductory course intended to develop an understanding of the environment, role, and basic principles of accounting, primarily from the standpoint of the user of financial information.	
Objectives	Outcomes	
<p>To provide the student with an understanding of:</p> <ol style="list-style-type: none"> 1. The preparation and understanding of financial reporting for users external to the firm. 2. The concepts and standards underlying the accounting procedures used to measure business performance. 3. The use of accounting information for business decisions and as a basic language of business 	<p>The students should be able to:</p> <ol style="list-style-type: none"> 1. Analyze business transactions using accounting and financial terms. 2. Record business transactions as entries in general, special, and multi-column journals. 3. Post journal entries to the general and subsidiary ledger accounts. 4. Balance the general and subsidiary ledgers. 5. Use work sheets to aid in adjusting and closing ledger accounts, and preparing financial statements. 6. Prepare classified financial statements with supporting schedules. 7. Prepare end-of-period adjusting, closing, and reversing journal entries. 8. Account for a merchandising business, including its inventories and receivables. 9. Account for partnership and corporate businesses. 10. Control cash transactions and prepare bank reconciliation. 11. Prepare basic payroll forms and entries 	



BAMG 1100 - Introduction to Business

BAMG1100	Introduction to Business	3 Credit Hours
Prerequisites	None	
Goal	To provide students with the general knowledge of the modern business environment to enhance their understanding of the characteristics and activities of a business environment.	
Objectives	Outcomes	
<p>The course will enable the students to:</p> <ol style="list-style-type: none"> 1. Be familiar with the characteristics and activities of current, local, national, and international business. 2. Explore the internal and external forces that effect business. 3. Investigate the functions of management, marketing, production, accounting and finance 	<p>The students should be able to:</p> <ol style="list-style-type: none"> 1. Define business terms and concepts. 2. Recognize the functions of any business organization. 3. Differentiate between the different types of business organizations and recognize the advantages and disadvantages of each one. 4. Analyze practical cases in order to apply the fundamental business concepts. 5. Examine the way business operate in the major functional areas of production and operation, marketing, accounting, information and control and to apply some of these basic practices to given situations. 6. Evaluate economic, social, legal and ethical systems that affect the business. 7. Recognize regional and global business environments. 8. Define management terms and concepts including planning, organizing, coaching, supervising and controlling. 9. Demonstrate leadership skills by participating in individual and group activities 	



Course Name: Fundamentals of Big Data	Course Code: ITDB304
Pre-requisite: ITDB101-Introduction to Database	Credit Hours: 3
Passing Grade: C	Level: Advanced Diploma
No. of Theory Hrs.: 1	No. of Practical Hrs: 4
Goal: To adequately prepare the students to understand the fundamentals concepts of big data and its technologies.	
Objectives: Upon completion of this course, the students should be able to: <ol style="list-style-type: none"> 1. Understand the Big data concepts, development and components of Hadoop Ecosystem 2. Use big data technologies for data extraction and querying 3. Use NoSQL database in Hadoop applications 	
Outcomes	Methodologies
Upon completion of this course, the students should be able to:	
1. Explain the concepts of Big Data, its characteristics and big data domains.	Theory
2. Describe the brief history of Hadoop, HDFS architecture, MapReduce framework and other Hadoop Ecosystem components.	Theory
3. Discuss the characteristics of NoSQL databases and its different types such as a key-value store, column store, document databases and graph databases.	Theory
4. Work with HDFS and basic MapReduce programs with text and numeric data use cases.	Practical
5. Demonstrate the skill on how to import data from external sources and store them to HDFS	Practical
6. Use big data tools such as HIVE to query the data in HDFS.	Practical
7. Manage large data sets with HBase in Hadoop applications.	Practical
Software & Hardware Tools: Cloudera	



Course Name: Advanced Mobile Application Development (Updated)	Course Code: ITSE403
Pre-Requisite: Mobile Application Development	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours : 1:4	
Goal: To equip students with knowledge of cross platform Mobile Application Development including accessing Web Services and content providers.	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Understand the cross platform mobile application development environment. 2. Enhance the user experience using animations and gesture-based interaction. 3. Access the native capabilities of the mobile devices. 4. Access the data 5. Build cross platform mobile applications with a single codebase 6. Test and deploy your application for a production-ready environment. 	
Outcomes The students should be able to:	Method
1. Describe cross platform mobile application development framework	Theory and Practical
2. Use UI elements in designing the various views	Practical
3. Enhance the user experience using animations and gesture-based interaction.	Practical
4. Access the local storage	Practical
5. Access the cloud/remote databases.	Practical
6. Use Plugins to access the native capabilities of the mobile devices	Practical
7. Use location based services	Practical
8. Work with notifications services	Practical
9. Test and deploy your application in multiple mobile platforms	Practical



Course Name: LINUX System Administration-I	Course Code ITNT403
pre-requisite: ITSE102-Intr. To Operating System	Credit Hours: 3
Passing Grade: C	Level: B.Tech – Year4
No. Of Theory & Practical Hours (1:4)	
Goal: Be prepared to get LPIC-1: Junior Level Linux	
Objectives: The course should enable the student to : 1. Understand the architecture of a Linux system. 2. Install and maintain a Linux workstation, including X11 and setup it up as a network client. 3. Work at the Linux command line, including common GNU and UNIX commands. 4. Apply Shells, Shell Scripting, Data Management and X window system. 5. Handle files and access permissions as well as system security; and perform easy maintenance tasks: help users, add users to a larger system, backup and restore, shutdown and reboot.	
Outcomes	Method
1. To understand the Linux OS, X Server installation, configuration and hardware architecture.	Theory / Practical
2. To understand the Linux Package Management concepts and their usability in various distributions	Theory / Practical
3. To demonstrate knowledge and understanding towards performing tasks using basic commands and shell.	Theory / Practical
4. To manage and control the Linux OS processes	Theory / Practical
5. To manage and control Partitions and file system attributes, permission, ownership, mounting, unmounting and quote management.	Theory / Practical
6. Demonstrate knowledge to control and manage the Linux OS run levels and other services.	Theory / Practical
7. Manage User and Group accounts using commands	Theory / Practical
8. Demonstrate Shell scripting knowledge to manage the automate services.	Theory / Practical
9. Manage and synchronize the system clock over NTP and understand the email server concept and Printing Service in Linux OS.	Theory / Practical
10. To understand and demonstrate network (Basic Configuration) and security management in Linux OS.	Theory / Practical
11. To understand and implement Troubleshooting, Data Encryption and DNS process in Linux OS.	Theory / Practical



Course Name: Theory of Computation (Updated)	Course Code: ITSE405
Pre-Requisite: MATH2200 Discrete Structures AND ITSE205 Data Structures and Algorithms	Credit Hours: 3
Passing Grade: C	Level: Year 4
No. Of Theory & Practical Hours : 1:4	
Goal: Provides students the concepts of theory of computation, abstract models of computation, complexity of languages and compilation of programming languages.	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Explain formal definitions of machine models. 2. Construct finite state machines and the equivalent regular expressions. 3. Construct pushdown automata and the equivalent context free grammars. 4. Construct Turing machines and Post machines. 5. Prove the equivalence of languages described by finite state machines, regular expressions, pushdown automata, context free grammars, Turing machines and Post machines 6. Demonstrate decidability, reducibility and complexity of languages 7. Discuss different phases of compiler and translate programming language involving lexical analysis, syntax specification and parsing. 	
Outcomes The students should be able to:	Method
1. Identify the formal relationships among machines, languages and grammars	Theory
2. Apply finite state machines to solve problems in computing	Theory & Practical
3. Convert between finite automata and regular expressions	Theory & Practical
4. Construct regular expressions and context-free grammars for simple languages	Theory & Practical
5. Apply normal forms on Context Free Grammar	Theory & Practical
6. Construct Push Down Automata and Turing Machines to solve simple recognition problems	Theory & Practical
7. Apply the pumping lemma to prove that a language is not regular	Theory & Practical
8. Define Polynomial(P), Nondeterministic Polynomial time (NP) and NP-complete problems	Theory
9. Demonstrate the concepts and phases of a compiler.	Theory
10. Employ lexical analysis, syntax analysis and parsing techniques.	Theory & Practical



Course Name: Computer Graphics (Updated)	Course Code: ITSE304
Pre-Requisite: ITSE201-Programming II	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 : 1: 4	
Goal: To apply the concept of computer graphics , modeling, animation techniques, and virtual reality (VR) and augmented reality (AR) Application	
Objectives: The course should enable the student to: <ol style="list-style-type: none"> 1. Apply the principles of 2D and 3D computer graphics. 2. Use graphic libraries to implement graphical applications. 3. Use a Graphic tool to practice 2D and 3D Modeling and Animation. 4. Create an appropriate virtual reality (VR) and augmented reality (AR) solution for an application. 	
Outcomes The students should be able to:	Method
1. Identify hardware components, software applications and technologies of interactive devices.	Theory
2. Describe the tools used in development of graphical systems.	Theory
3. Apply algorithms and techniques for generating 2D Attributes	Theory & Practical
4. Analyze the production of primitive graphical objects on a raster display.	Theory & Practical
5. Design graphics using two dimensional graphics, three dimensional graphics, graphics arts and animations.	Theory & Practical
6. Perform transformations on objects in the plane using suitable matrices and homogeneous coordinates.	Theory & Practical
7. Apply transformation to objects using functions and procedures.	Practical
8. Use a tool for 3D Modeling and Animation.	Practical
9. Explain the underlying technologies of VR systems and VR applications	Theory
10. Create an appropriate virtual reality augmented reality (AR) solution for an application.	Practical



Course Name : Human-Computer Interaction	Course Code : ITIS401
Pre Requisite : None	Credit Hours : 3
Passing Grade : Depending on the Type of the course belongs to the Audit Degree	Level: Year IV (Bachelor)
No. of Theory Hrs: 2	No. of Practical Hrs : 2
Goal: To introduce to students the principles, issues, tools and techniques of Human Computer Interaction which enable them to design, implement and evaluate interactive systems.	
Objectives: Upon completion of this course, the students should be able to: <ol style="list-style-type: none"> 1. Understand Human Computer Interaction and its importance in the design of interactive systems. 2. Produce prototypes of interactive systems using appropriate tools and technologies with the focus on HCI principles, methods, interaction styles, and techniques. 3. Recognize HCI issues such as Universal Design, Accessibility, Cultural Marker, and Usability. 4. Appreciate the importance of HCI in everyday lives. 	
Outcomes	Methodologies
Upon completion of this course, the students should be able to:	
1. Discuss the basics of Human Computer Interaction and its related fields.	Theory
2. Discuss the concepts of user differences, user experiences and collaboration as well as how to design contextually.	Theory/Practical
3. Apply the concepts and principles of Human-Computer interaction.	Theory/Practical
4. Evaluate the different devices used for input and output and the issues/opportunity associated with these devices.	Practical
5. Apply user modeling techniques and user interface principles and guidelines in the design of interactive systems to effectively meet users' needs.	Theory/Practical
6. Use different methods and techniques in HCI to carry out a complete user-centered design process.	Practical
7. Design prototypes of interactive systems using the latest tools and technologies.	Practical
8. Evaluate interactive systems using the latest techniques.	Practical
9. Discuss the new HCI innovations and emerging technologies.	Theory/Practical

