Nagindas Khandwala College (Autonomous)

Name of the Programme: Bachelor of Science Information Technology (BSC IT)
Programme Code: USIT

PROGRAMME OBJECTIVES

PO-1: Learners will be able to demonstrate a fundamental and systematic or coherent understanding of the academic field of Information Technology and its linkages with related disciplinary areas/subjects;

PO-2: Learners will be able to apply procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Information Technology including software development and testing;

PO-3: Learners will be able to enrich skills in areas related to one's specialization within the disciplinary/subject area of Information Technology and current and emerging developments in the field.

PO-4: Learners will be able to demonstrate the ability to use the knowledge in formulating and tackling IT related problems and suggest software solution to them.

PO-5: Learners will be able to analyse and interpret data/information collected using appropriate methods, including the use of appropriate software such as programming languages and special-purpose packages, and report accurately the findings of the experiment/field investigations while relating the conclusions/findings to relevant theories.

PO-6: Learners will be able to demonstrate relevant global competencies such as problem solving skills that are required to solve different types of problems with well-defined solutions;

PO-7: Learners will be able to develop communication skills involving the ability to listen carefully, to read texts and research papers analytically and to present complex information in a concise manner to different groups/audiences;

PO-8: Learners will be able to develop (i) ICT skills such as presentation skills, documentation, etc; (ii) personal skills such as the ability to work both independently and in a group (iii) skills to manage IT infrastructure.

PO-9: Learners will be able to demonstrate professional behaviour such as (i) being objective, unbiased and truthful in all aspects of work and avoiding unethical behavior such as fabricating, falsifying or misrepresenting data or to committing plagiarism; (ii) the ability to identify the potential ethical issues in work-related situations;

PO-10: Learners will be able to inculcate the mentality for (i) the appreciation of intellectual property, environmental and sustainability issues; and (ii) promoting safe learning and working environment.

PROGRAMME OUTCOMES

After completion of three years Bachelor of Science Computer Science (BSC CS) Programme, the learner will:

PO-1: Demonstrate a fundamental and systematic or coherent understanding of the academic field of Information Technology and its linkages with related disciplinary areas/subjects;

PO-2: Procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Information Technology including software development and testing;

PO-3: Skills in areas related to one's specialization within the disciplinary/subject area of Information Technology and current and emerging developments in the field.

PO-4: Demonstrate the ability to use the knowledge in formulating and tackling IT related problems and suggest software solution to them.

PO-5: Analyse and interpret data/information collected using appropriate methods, including the use of appropriate software such as programming languages and special-purpose packages, and report accurately the findings of the experiment/field investigations while relating the conclusions/findings to relevant theories.

PO-6: Demonstrate relevant global competencies such as problem solving skills that are required to solve different types of problems with well-defined solutions;

PO-7: Develop communication skills involving the ability to listen carefully, to read texts and research papers analytically and to present complex information in a concise manner to different groups/audiences;

PO-8: Develop (i) ICT skills such as presentation skills, documentation, etc; (ii) personal skills such as the ability to work both independently and in a group (iii) skills to manage IT infrastructure.

PO-9: Demonstrate professional behaviour such as (i) being objective, unbiased and truthful in all aspects of work and avoiding unethical behavior such as fabricating, falsifying or misrepresenting data or to committing plagiarism; (ii) the ability to identify the potential ethical issues in work-related situations;

PO-10: Inculcate the mentality for (i) the appreciation of intellectual property, environmental and sustainability issues; and (ii) promoting safe learning and working environment.

Nagindas Khandwala College (Autonomous)

Semester I

1. COMMUNICATION SKILLS
2016UISCS

Course Objectives:

By the end of the course, learners will be able :

1. To develop effective listening skills in learner so as to enable them to comprehend instructions and become a critical listener
2. To develop effective oral skills so as to enable learner to speak confidently interpersonally as well as in large groups
3. To develop effective writing skills so as to enable learner to write in clear, concise, persuasive and audience centred manner
4. To demonstrate effective use of communication technology

Course Outcome:

After completing this course, learners will be able to:

CO1: Understand the concept, channels, objectives, methods and modes of communication. (Understand)

CO2: Differentiate obstacles to communication in the business world. (Evaluate)

CO3: Sharpen the business correspondence, language and writing skills of the learner.(Remember)

CO4: Effectively use communication technology.(Apply)

CO5: Demonstrate effective presentation, visual communication and impress stage.(Analyse)

2. DISCRETE MATHEMATICS I
2015UISDM

Course Objectives:

By the end of the course, learners will be able to:
1. Construct truth table and test the validity of statements.
2. Determine the domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions, find and/or graph the inverse of a function, and apply the properties of functions to application problems.
3. List the terms in a sequence, write a sequence in closed form, compute the sum of a finite sequence, compute the product of a finite sequence, and express sequences in terms of recursive or non-recursive forms.
4. Use elementary number theory including the divisibility properties of numbers to determine prime numbers and composites, the greatest common divisor, and the least common multiple; perform modulo arithmetic and computer arithmetic.
5. Recall sequences and mathematical induction.

Course Outcome:

After completing this course, learners will be able to:

CO1: Remember theory of discrete objects, starting with relations and partially ordered sets. (Remember)

CO2: Understand recurrence relations, generating function and their applications. (Understand)

CO3: Apply well-ordering principle for integers and check correctness of algorithm.(Apply)

CO4: Recall types of functions and find their applications.(Analyse)

CO5: Locate maximum and minimum elements for Lattices.(Evaluate)

3. INTRODUCTION TO PROGRAMMING

2011UISIP

Course Objectives:

On completing this course learners will be able to:

1. To enhance the logical thinking
2. To develop problem solving skills
3. To introduce the basic programming concepts
4. write programs in Python and Scratch

Course Outcome:

After successful completion of this course, learners will be able to:

CO1: Demonstrate the need of problem solving skills and demonstrate the solution to the standard problems (understand)

CO2: Analyse whether the given strategy is suitable for a given problem (evaluate)

CO3: Explain the basic programming structures in Python (understand)

CO4: Compare and suggest the suitable statements in Python for a given problem (analyze and apply)

CO5: Create animations in Scratch for a selected problem. (Create)

CO6: Write and demonstrate the working of basic programmes in Python (Apply)

4. FUNDAMENTALS OF COMPUTERS AND ELECTRONICS

2012UISFC

Course objectives:

By the end of the course, learners will be able to:

- Explain the concept of computer systems and get acquainted with number systems.
- Understand Boolean Algebra and Minimization concepts.
- Understand different types of logic gates.
- Explain different types of digital circuits.
- Code in 8085 Assembly Language.

Course Outcome:

After completing this course learner will be able to:

CO1: Understand and perform conversion between different number systems. (Understand, Apply)

CO2: Understand and analyse different Boolean theorems and laws and implement it in reduction of logic expression. (Apply)

CO3: Analyse different logic gates, minimize the given logical expression and create circuits from it. (Analyse)

CO4: Understand the Combinational and Sequential circuits and its application in designing circuits. (Evaluate)

CO5: Learners will also be able to create code using 8085 Assembly language. (create)

5. OPERATING SYSTEMS

2013UISOS

Course Objective:

By the end of the course learners will be able to:

1. Understand the services provided by and the design of an operating system.
2. Recognise what a process is and how processes are synchronized and scheduled.
3. Differentiate between different approaches to memory management.
4. Learn virtual memory and secondary memory management.
5. Learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system

Course Outcome:

After completing this course, learners will be able to:

CO1: Understand the structure of OS and basic architectural components involved in OS design. (Understand)

CO2: Analyze and design the applications to run in parallel either using process or thread models of different OS (Apply)

CO3: Differentiate various device and resource management techniques for time sharing and distributed systems. (Evaluate)

CO4: Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system (Understand)

CO5: Conceptualize the components involved in designing a contemporary OS (Create)

6. WEB PROGRAMMING I

2014UISWP

Course Objectives:

By the end of the course, learners will be able to:

1. Identify and learn the Internet World with working of a website using HTML.
2. Identify the creation of dynamic websites using different components of HTML.
3. Define and describe the javascript usage.
4. State and Explain the different document object models.
5. Explain jQuery and bootstrap components.

Course Outcome:

After completing this course learners will be able to:

CO1: Apply a structured approach to identifying needs, interests, and functionality of a website. (Apply)

CO2: Design dynamic websites that meet specified needs and interests.(Create)

CO3: Design appropriate HTML, CSS, and JavaScript code from public repositories of open-source and free scripts that enhances the experience of site visitors.(Create)

CO4: Analyze the existing HTML, CSS, and JavaScript code to extend and alter its functionality, and to correct errors and cases of poor practice. (Analyse)

CO5: Create a website which is functional with all the basics and advanced HTML,CSS, Javascript alongwith jQuery and Bootstrap.(Apply)

Semester II

1. PROGRAMMING AND APPLICATION DEVELOPMENT IN PYTHON
2021UISPP

Course Objectives :

By the end of the course, learners will be able to:

- Design UI and program python UI applications.
- Connect database in a python program.
- Read and write files and file operations.
- Write a program on regular expressions.
- Program web applications and implement web scraping in python .
- Learn network connectivity.

Course Outcome:

After completing this course, learner will be able to:

CO1: Implement UI Applications using Python Tkinter. (Apply)

CO2: Apply the Knowledge of Database Connection in Python Application. (Apply)

CO3: Understand the working of different File Operations. (Understand)

CO4: Analyse the data obtained using Web Scraping and Develop Network Connectivity Applications. (Analyse)

CO5: Create a small application showing the implementation of topics learned. (create)

2. OBJECT ORIENTED PROGRAMMING

2022UISOO

Course Objectives :

By the end of the course, learners will be able to:

1. Study the principles of object-oriented paradigms.
2. Understand how real-world objects can become part of fundamental elements in the code.
3. Understand the difference between classes, prototypes, and instances.
4. Learn to organize data in the blueprints and create a hierarchy of blueprints that generate objects.
5. Develop basic object-oriented code using object-oriented languages.
6. Implement all concepts of OOP in Program development.

Course Outcome:

After completing this course, learners will be able to:

CO1: Define various concepts of Object Oriented Programming. (Remember)

CO2: Identify real-world objects and design Class diagram to organize data.(Understand)

CO3: Generate blueprints to create objects. (Create)

CO4: Apply standards and principles to write truly readable code. (Apply)

CO5: Develop and test basic programs.(Understand)

CO6: Demonstrate the concepts of object-oriented design, polymorphism, information hiding, and inheritance.(Apply)

3. DATABASE MANAGEMENT SYSTEMS I

2023UISDS

Course Objective:

By the end of the course, learners will be able to:

- Understand the basic concepts and the applications of database systems.
- Master the basics of SQL and construct queries using SQL.
- Familiar with the basic issues of transaction processing and concurrency control.
- Understand the concept of Normalization, Transaction and Concurrency Control.
- Understand the concept of PL/SQL procedures and construct.

Course Outcome:

After completing this course, learners will be able to:

CO1: Explain the basic elements of a relational database management system(Understand)

CO2: Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data into RDBMS and formulate SQL queries on the data. (Analyze, Create)

CO3: Apply various Normalization techniques (Apply)

CO4:Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers (Create)

CO5: Understand the principles of Transaction Processing & Locking using the concept of Concurrency control. (Understand)

4. WEB PROGRAMMING II

2024UISWP

Course Objectives:

By the end of the course, learners will be able to:

1. Analyze and evaluate the working of XML.
2. Apply how server-side programming works on the web.

3. Understand the working of web application with php as a server side scripting language.
4. Develop web applications using MySQL database
5. Apply the maintenance of MySQL database.

Course Outcome:

After completing this course learners will be able to:

CO1: Design a structured approach to identify needs, interests, and functionality of a website. (Apply)

CO2: Describe POST and GET in form submission using PHP(Understand)

CO3: Design website with php sessions and cookies. (Create)

CO4: Design and develop a full-fledged website using php with MySQL database. (Create)

CO5: Apply and Analyze the working of website with Php and MySql. (Analyse)

5. DISCRETE MATHEMATICS II

2025UISDM

Course Objective:

By the end of the course, learners will be able to:

1. To build a mathematical foundation for the computing applications

2. To build a foundation for data structures
3. Recall matrices, properties, rank and understand its linear transformation.
4. Understand application of counting principle.
5. Define graphs and trees and their traversing.

Course Outcome:

After completing this course, learners will be able to:

CO1: Find a mathematical solution to the problems.(Apply)

CO2: Link the mathematical concepts with application in the computing domain.(Analyse)

CO3: Find Normal form of matrix, similarity and its applications.(Evaluate)

CO4: Solve problems on counting principle. (Remember)

CO5: Identify graphs and trees, their traversing and operations on binary search tree.(Understand)

6. IT platforms, Tools and Practices

2026UISTP

Course Objectives:

By the end of the course, learners will be able to:

- To prepare students according to the industry standards.
- To give an awareness on industry practices and ethics.
- To encourage the use of IT Tools so as to enable students to improve their skills and knowledge.
- To impart skills that can enable students to approach business problems analytically.
- To understand what Green IT is and How it can help improve environmental Sustainability.

Course Outcome:

After completing this course, learners will be able to:

CO1: Follow the industry standards and practices in coding.(Apply)

CO2: Illustrate various green IT services and its roles.(Understand)

CO3: Describe the importance of IT enabled services and challenges.(Understand)

CO4: Evaluate various IT tools and services for betterment of knowledge.(Evaluate)

CO5: Use and Examine different computing services.(Analyze)

Semester III

1. CORE JAVA

2031UISCJ

Course Objectives:

By the end of the course, learners will be able to:

1. Understand the importance of Object Oriented paradigm in Application development.
2. Study Java language Basics.
3. Implement Object oriented concepts using Java.
4. Understand concepts of packages and Multithreading in Java.
5. Explore the importance of Exception handling in program design.
6. To develop GUI Applications using AWT.

Course Outcome:

After successful completion of this course, learners will be able to:

CO1: Acquire knowledge about Java language.(Understand)
CO2: Apply Object Oriented paradigm in Application development.(Apply)
CO3: Develop user defined packages.(Understand)
CO4: Implement Single threaded and Multithreaded programs in Java language.(Apply)
CO5: Create programs using Exception Handling.(Understand)
CO6: Integrate important concepts of OOP to develop GUI applications.(Create)

Nagindas Khandwala College (Autonomous)

2. DATA STRUCTURES

2032UISDS

Course Objectives:

By the end of the course, learners will be able to:

1. To introduce the fundamental concept of data structures.
2. To emphasize the importance of data structures in developing and implementing efficient algorithms.
3. To understand the implementation of different data structures
4. To gain knowledge with respect to complexities of different algorithms
5. To understand concept of Hashing

Course Outcomes:

After successful completion of this course, learners will be able to:

CO1: Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms (Understand)

CO2: Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs. (Apply)

CO3: Demonstrate different methods for traversing trees. (Apply)

CO4: Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.(Understand)

CO5: Compare and contrast the benefits of dynamic and static data structures implementations. (Analyse)

3. COMPUTER NETWORKS

2033UISCN

Course Objectives:

By the end of the course, learners will be able to:

1. Understand Networking Basics.
2. Explore Hardware and Software requirements for Communication Network.
3. Understand the framework of communication networks.
4. Do layer wise study of OSI Model and TCP/IP Model.
5. Compare OSI and TCP/IP Model.
6. Implement various protocols in communication.

Course Outcome:

After successful completion of this course, learners will be able to:

CO1**:** Define Data communication and Networking concepts.(Remember)

CO2: Acquire knowledge about common equipment, standard hardware and software requirements and communication protocols.(Understand)

CO3: Study functions of all layers in OSI Model and their requirements.(Analyze)

CO4: Understand the importance of TCP/IP Model in Communication Networks. (Understand)

CO5: Compare various protocols and their requirements in communication. (Analyze)

CO6: Simulate Communications systems using various protocols and understands its real-life applications. (Apply)

4. DATABASE MANAGEMENT SYSTEM – II

2034UISDB

Course Objectives:

By the end of the course, learners will be able to:

- Develop efficient PL/SQL programming skills
- Understanding Oracle database.
- Designing modular applications using packages.
- Creating triggers to solve business challenges and enforce business rules.
- Stepping stone for RDBMS and PL/SQL structures.

Course Outcomes:

After successful completion of this course, learners will be able to:

CO1: Explain the fundamental concepts of PL/SQL. (Understand)

CO2: Develop PL/SQL queries in real-time applications. (Create)

CO3: Design modular applications using packages. (Create)

CO4: Apply advanced SQL features like views, indexes, synonyms, etc. for database management. (Apply)

CO5: Analyze PL/SQL structures like functions, procedures, cursors and triggers for database applications. (Analyze)

5. DESCRIPTIVE STATISTICS

2035UISST

Course Objective:

By the end of this course, learners will be able to:

- understand the basic terminologies
- differentiate the types of data
- use visualization tools and to analyze the underlying pattern in the data
- model the data using the suitable polynomials
- demonstrate the association between the variables
- work independently on a given data set.

Course Outcome:

After completing this course the learner will be able to:

CO1: define the terms population, sample, univariate and multivariate data, correlation, regression and odds ratio.

CO2: differentiate the data into different categories

CO3: analyze a given dataset using statistical techniques.

CO4: use suitable visualization tools to get a better insight into the underlying dataset.

CO5: device a strategy to identify the associations between the variable

CO6: fitting lined and polynomials to model the given data.

CO7: analyze and develop a statistical model of the data collected.

Discipline Specific Elective (DSE) (Any *one* of group A)

6A. ADVANCED WEB PROGRAMMING – I

2036UISAW

Course Objective:

By the end of the course, learners will be able to:

1. Recall the JavaScript, bootstrap, jquery and learn the advanced technologies.

2. Define and describe Ajax working with partial refreshes.
3. Study the concept of json to store data.
4. Learn designing with bootstrap and jQuery
5. Develop website with latest ajax,bootstrap and jQuery and store data in json.

Course Outcome:

After completing this course learners will be able to:

CO1: Discuss the concepts of object oriented concepts with JavaScript.(Understand)

CO2: Develop websites with bootstrap, Ajax technologies and jquery.(create)

CO3: Discuss json in web applications.(Understand)

CO4: Define and discuss major concepts, tools, techniques, and methods of web application development.(Create)

CO5: Apply the technologies learned in creation of websites.(Apply)

7A. HYBRID MOBILE APPLICATION DEVELOPMENT – I

2036UISMD

Course Objective:

1. Focus in this course is on the basic understanding of web frameworks.

2. Develop API's for user interface design by Angular JS and Ionic Framework for Mobile Application Development.
3. On the completion of the course, students will be able to develop Hybrid mobile applications.

Course Outcome:

On completion of the course, learners will be able to:

CO1: Create a fully functional HTML5 app for any of the three OSes. (Create)

CO2: Use PhoneGap to package HTML5 apps into native apps. (Apply)

CO3: Understand mobile application development and deployment process. (Understand)

CO4: Understand jQuery and jQuery Mobile architecture.(Understand)

CO5: Learn how to build apps with the Ionic framework. (Analyse)

Discipline Specific Elective (DSE) (Any *one* of group B)

8B. COMPUTER GRAPHICS AND ANIMATION

2037UISCG

Course Objectives:

By the end of the course, learners will be able to:

- Introduce the different graphics systems and become familiar with the working of graphics system components.
- Understand the working of different scan conversion algorithms.

- Learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
- Transform the object using various transformation techniques.
- Provide an understanding of mapping from world coordinates to device coordinates, clipping, and projections.
- Have a basic understanding of Animation and its principles.

Course Outcome:

After completing this course learner will be able to:

CO1: Understand different scan conversion algorithms, apply it using programming language and define their applications. (Apply)

CO2: Discuss 2D and 3D transformations and different transformation matrix used. (Understand)

CO3: Apply various 2D transformations on a 2D object. (Apply)

CO4: Discuss different shading models and Visible-Surface Determination techniques. (Understand)

CO5: Define Animations and apply the basic principles of animation. (Remember, Apply)

CO6: Create basic 2D animation using programming language. (Create)

9B. EMBEDDED SYSTEMS

2037UISES

Course Objectives:

By the end of the course, learners will be able :

1. To understand the meaning, components of a basic embedded systems
2. To understand the characteristics and quality attribute of an embedded systems
3. To understand the memory structure of embedded systems and its peripheral devices
4. To understand the different aspects of programming for developing embedded systems
5. To understand the EDLC

Course Outcome:

After successfully completing this course, learners will be able to:

CO1: Describe the components of an embedded system (Understand)

CO2: Explain the memory structure and peripherals required for embedded systems (Understand)

CO3: Illustrate the pin diagram of 8051 Microcontroller with its structure (Analyse)

CO4: Write programs for embedded systems (Apply)

CO5: Create basic Embedded Products for the market (Create)

Nagindas Khandwala College (Autonomous)

10B. PRINCIPLES OF MANAGEMENT

2037UISPM

Course Objectives:

By the end of the course, learner will be able to :

1. To relate, discuss, understand the management principles, processes and procedures in consideration of their efforts on individual actions.
2. Knowledge and understanding of the subject will enable the student to gain valuable insights into the working of business and other organization.

Course Outcomes:

After completion of this course the learner will be able to:

CO1: Describe the concepts of management. (Understand)

CO2: Apply principles of planning, decision making and controlling in organizations. (Apply)

CO3: Discuss organizational management strategies. (Understand)

CO4: Demonstrate understanding of business ethics, CSR and leadership. (Apply)

Nagindas Khandwala College (Autonomous)

Semester IV

1. DESIGN PATTERNS

2041UISDP

Course Objectives:

By the end of the course, learners will be able to:

1. Understand design patterns.
2. Acquire basic understanding of commonly used to design patterns to solve problems.
3. Compare the object-oriented programming model with the standard structured programming.
4. Uses the basic design principles in solving real life problems.
5. Understand the necessity of dealing with change.
6. Learn to apply the pattern based analysis and design to the software to be developed.

Course Outcome:

After completing this course, learners will be able to:

CO1: Learn the role of design patterns in software development.(Understand)
CO2: Understands the pattern based design principle.(Understand)
CO3: Apply a fundamental set of design patterns utilizing object-oriented principles to solve real-world software design problems.(Apply)

CO4: Able to work individually as well as in teams to create reusable and cohesive software components.(Apply)
CO5: Create Design Patterns to solve real world problems.(Create)

2. DESIGN AND ANALYSIS OF ALGORITHMS

2042UISDA

Course Objective:

By the end of the course, learner will be able to:

1. understand algorithms

2. design efficient solutions for real-world problems.

3. analyze and compare various algorithms

4. understand and analyse the problems solvable in polynomial time and non-deterministic polynomial time.

Course Outcome:

After the completion of the course the learner will be able to:

CO1: Analyze the asymptotic performance of algorithms (analyze)

CO2: Write rigorous correctness proofs for algorithms. (apply)

CO3: Demonstrate familiarity with major algorithms and data structures and explain the NP completeness. (understand)

CO4: Apply important algorithmic design paradigms and methods of analysis. (apply)

CO5: Synthesize efficient algorithms in common design situations. (analyze)

CO6: develop suitable algorithm for a given problem. (create)

3. SYSTEM PROGRAMMING

2044UISSP

Course Objectives:

By the end of the course, learners will be able to:

1. Understand the basics of OS concepts efficient scripts and utilities are to be used.
2. Learn the concept of files and directories.
3. Describe the working of process and signals.
4. Describe the concept of IPC, semaphores, memory and sockets.
5. Design and implement code generators using C and gdb

Course Outcome:

After the completion of the course, the students would be able to

CO1: Understand and make effective use of Linux utilities and Shell scripting language (bash) to solve problems.(Apply)

CO2: Develop the skills necessary for systems programming including file system programming, process and signal management and inter-process communication.(Analyse)

CO3: Develop the basic skills required to write network programs using sockets.(Apply)

CO4: Design and implement system utility programs.(Create)

CO5: Describe UNIX file systems and process control.(Understand)

4. SOFTWARE ENGINEERING

2044UISSE

Course Objective:

By the end of the course, learners will be able to:

- Understand the basic theory of software engineering,
- Understand the software development life cycle
- Understand and apply the basic project management practices in real life projects.
- Understanding of approaches to verification and validation including static analysis, and reviews.
- Describe software measurement and software risks.

Course Outcome:

After completing this course, learners will be able to:

CO1: Decompose the given project in various phases of a lifecycle. (Analyse)

CO2: Choose appropriate process model depending on the user requirements. (Evaluate)

CO3: Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.(Apply)

CO4: Know various processes used in all the phases of the product. (Understand)

CO5: Apply the knowledge, techniques, and skills in the development of a software product. (Apply)

5. PROBABILITY THEORY

2045UISPT

Course Objective:

On completing this course, learners will be able to:

1. understand the fundamentals of probability theory
2. explain the random variable and the underlying distribution
3. apply the chebychev's inequality and central limit theorem

Course Outcome:

After the completion of the course the learners will be able to:

CO1: Analyze a given dataset using statistical techniques. (analyse)

CO2: Demonstrate the probability distributions (understand)

CO3: Model the given data using a suitable distribution (apply)

CO4: Demonstrate the properties of the data in terms of the distribution. (analyse)

CO5: Apply chebychev's inequality and central limit theorem (apply)

CO6: work on a real data set and make a statistical model for analysis and prediction (create)

DISCIPLINE SPECIFIC ELECTIVE (Any ONE from GROUP A)

6A. ADVANCED WEB PROGRAMMING – II

2046UISAW

Course Objectives:

By the end of the course, learners will be able to:

1. Understand and learn Angular JS concepts and develop web applications with its components.
2. Understand and learn Node JS environment and develop web applications with MongoDB database.
3. Explain and implement the components of AngularJS.
4. Develop web applications with Node JS
5. Implement MongoDB with Node JS

Course Outcome:

After completing this course learners will be able to:

CO1: Understand the concept of Angular JS (Understand)

CO2: Describe the working of Angular JS with its components. (Understand)

CO3: Recognize the concept of Node JS usage in web application. (Analyse)

CO4: Ability to develop web application with Angular JS and Node JS.(Apply)

CO5: Create and develop node JS applications with MongoDB. (Create)

7A. HYBRID MOBILE APPLICATION DEVELOPMENT – II

2046UISMD

Course Objective:

1. Focus in this course is on the basic understanding of web frameworks and API's for user interface design by Angular JS and Ionic Framework for Mobile Application Development.
2. On the completion of the course, students will be able to develop Hybrid mobile applications.

Course Outcome:

On completion of the course learner will be able to:

CO1: Learn how to build single page applications with React JS (Understand)

CO2: Use and Install React-Native dependencies for MAC and Windows Run Android and IOS simulator (Apply)

CO3: Understand and Learn the key concepts of the NodeJS (Understand)

CO4: Understand Nodejs, learn rapidy growing web server technology, Nodejs & understand how NodeJS works with Node course! (Understand)

CO5: Learn how to Style with React-Native and flex-box rules (Analyse)

7A. ADVANCED JAVA

2046UISAJ

Course Objectives:

By the end of the course, learners will be able to:

- Learn to perform socket programming in java.
- Get an understanding on Enterprise Java and the servlet technology.
- Explain the database connection using JDBC.
- Understand the concept of cookies and session tracking in java.
- Work with JSP, EJB and implement it.

Course Outcome:

After completing this course learner will be able to:

CO1: Develop networking concept using Socket Programming. (Create)

CO2: Understand Enterprise Application and Java EE architecture. (Understand)

CO3: Explain the concept of servlet, JDBC and apply it through coding. (Understand, Apply)

CO4: Learn and analyse the concept of cookies and session tracking in Java. (Analyse)

CO5: Create applications using servlet, JSP, EJB along with implementation of database. (Create)

CO6: Basic understanding of JavaBean, Web services and their applications. (Understand)

DISCIPLINE SPECIFIC ELECTIVE (Any ONE from GROUP B)

8B. MULTIMEDIA SYSTEMS

2047UISMM

Course Objectives:

By the end of the course, learners will be able to:

- Become multimedia/graphics designers and engineers in their areas of expertise.
- Understand the basic components of multimedia and different compression techniques used.

- Get an understanding of Animation and Virtual Reality.
- Implement different techniques for creating animated videos and edit different images using softwares.
- Apply different effects and color coding on various objects.

Course Outcome:

After completing this course learner will be able to:

CO1: Use different compression techniques of text, audio, video and apply basics of animation. (Apply)

CO2: Understand different file formats used for text, image, audio and video and compare between them. (Understand, Analyze)

CO3: Apply different animation on character, object, etc. Apply text effects, color variations on objects. (Apply)

CO4: Use different software for animation purposes and create a small animation clip and enhance graphics images. (Create)

CO5: Create different logos, cards and websites using multimedia software. (Create)

CO6: Discuss the concept of Virtual reality and its applications. (Understand)

9B. INTERNET OF THINGS

2047UISIT

Course Objective:

1. To assess the vision and introduction of IoT.

2. To Understand IoT Market perspective.
3. To Implement Data and Knowledge Management and use of Devices in IoT Technology.
4. To Understand State of the Art - IoT Architecture.
5. To classify Real World IoT Design Constraints, Industrial Automation in IoT

Course Outcome:

After the successful completion of this course, learners will be able to:

CO1: Describe the meaning and different components of Internet of Things, also the principles of Internet (Understand)

CO2: Explain and prototype an embedded product. (Analyse)

CO3: Illustrate the physical design of the system and work with online components API for security, polling, etc. (Apply)

CO4: Describe the the memory management of an embedded system and write the codes for embedded product (Understand)

CO5: To create a small model representing the automation in IoT. (Create)

10B. PRINCIPLES OF MARKETING

2047UISPM

Course Objectives:

By the end of the course, learner will be able to:

1. Introduce the marketing concept and how we identify, understand and satisfy the needs of customers and markets.
2. Analyze companies and competitors and to introduce marketing strategy to increase awareness of the strategic and tactical decisions behind today's top performing brands.

Course Outcomes:

After completion of this course the learner will be able to:

CO1: Explain the core concepts of marketing. (Understand)

CO2: Apply concepts of segmentation, targeting, positioning and consumer behaviour. (Apply)

CO3: Analyse the elements of the marketing mix. (Analyse)

CO4: Compare and contrast the different strategies for promotion. (Analyse)

Semester V

1. SOFTWARE PROJECT MANAGEMENT

1851UITPM

Course Objectives :

By the end of the course, learners will be able to:

1. To understand the methods used to evaluate and select projects for investment of funds.
2. To gain knowledge on the principles and techniques of software project management.
3. To introduce organization behavior and general management techniques used for project management
4. Will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.
5. Analyze the architecture of a model based software and the process flow.

Course Outcomes:

After completing this course learners will be able to:

CO1: Identify the different project contexts and suggest an appropriate management strategy. (Remember)

CO2: Analyze and design the software architecture. (Analyze)

CO3: Have an exposure for organizing and managing a software project. (Create)

CO4: Apply, analyze, design and develop the software project. (Apply,Analyze,Create)

CO5: Design various estimation levels of cost and effort. (Create)

2. INTERNET OF THINGS

1852UITIT

Course Objective:

1. To assess the vision and introduction of IoT.
2. To Understand IoT Market perspective.
3. To Implement Data and Knowledge Management and use of Devices in IoT Technology.
4. To Understand State of the Art - IoT Architecture.
5. To classify Real World IoT Design Constraints, Industrial Automation in IoT

Course Outcome:

After the successful completion of this course, learners will be able to:

CO1: Describe the meaning and different components of Internet of Things, also the principles of Internet

CO2: Explain and prototype an embedded product.

CO3: Illustrate the physical design of the system and work with online components API for security, polling, etc.

CO4: Describe the the memory management of an embedded system and write the codes for embedded product

CO5: To work on Hardware circuits and also to create a mini-project based on IoT

3. ADVANCED WEB PROGRAMMING

1853UITWP

Course Objective:

By the end of the course, learners will be able to:

1. Understand basic building blocks of Dot Net.

2. Assimilate C# Fundamentals, Exception handling.Design Interfaces and Collections in C#.

3. Defines and discuss major concepts, tool, techniques, and methods of web application development.

4. Create web application using ASP.NET.

5. Implement the the database connectivity with ASP.NET.

Course outcome:

After completing this course learners will be able to:

CO1: Implement the basics of C#.(Apply)

CO2: Develop simple file test assembly.(Create)

CO3: Apply the different tools to create web applications.(Apply)

CO4: Design Web pages with ADO.NET.(Create)

CO5: Develop partial refreshes of web pages using ajax(Create)

Discipline Specific Elective (DSE) (Any *one* of group A)

Nagindas Khandwala College (Autonomous)

A. ARTIFICIAL INTELLIGENCE
1854UITAI

Course Objective:

To create appreciation and understanding of both the achievements of AI Students will able to:

- Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents and the theory underlying those achievements.
- To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
- To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
- To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.

Course Outcome:

CO1: Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.(Apply)

CO2: Analyse and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them. (Analyse)

CO3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing (Create)

CO4: Compare different AI algorithms in terms of design issues, computational complexity, and assumptions. (Analyse)

Nagindas Khandwala College (Autonomous)

A. LINUX SYSTEM ADMINISTRATION

1855UITLA

Course Objective:

By the end of the course learner will be able to:

1. Understand the services provided by and the design of an operating system.
2. Recognise what a process is and how processes are synchronized and scheduled.
3. Differentiate between different approaches to memory management.
4. Learn virtual memory and secondary memory management.
5. Learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system

Course Outcome:

After completing this course learner will be able to:

CO1: Understand the structure of OS and basic architectural components involved in OS design. (Understand)

CO2: Analyze and design the applications to run in parallel either using process or thread models of different OS (Apply)

CO3: Differentiate various device and resource management techniques for time sharing and distributed systems. (Evaluate)

CO4: Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system (Understand)

CO5: Conceptualize the components involved in designing a contemporary OS (Create)

Nagindas Khandwala College (Autonomous)

Discipline Specific Elective (DSE) (Any *one* of group B)

B. ENTERPRISE JAVA

1856UITEJ

Course objectives:

By the end of the course, learners will be able to:

- Understand how to develop applications using Java.
- Get an understanding on Enterprise Java and the servlet technology.
- Explain the database connection using JDBC.
- Understand the concept of cookies and session tracking in java.
- Work with JSP, EJB, JPA, Hibernate and implement it.

Course Outcome:

After completing this course learner will be able to:

CO1: Understand Enterprise Application and Java EE architecture. (Understand)

CO2: Explain the concept of servlet, JDBC and apply it through coding. (Apply)

CO3: Learn and analyse the concept of cookies and session tracking in Java. (Analyse)

CO4: Create applications using servlet, JSP, EJB along with implementation of database. (Create)

CO5: Basic understanding of JavaBean and their applications. (Understand)

CO6: Explain the concept of and create applications using JPA, Hibernate. (Apply)

B. NEXT GENERATION TECHNOLOGIES

1857UITNG

Course Objective:

- To introduce the emerging technologies
- To understand Big Data and NoSQL
- To understand working of MongoDB
- To work with SSD and jQuery, and JSON
- To increase the employability

Course Outcome:

After successful completion of the course, learners will be able to:

CO1: Explain the concepts of Big Data and MongoDB (Understand)

CO2: Illustrate MongoDB Architecture and Use the same for implementation (Analyse and Apply)

CO3: Explain the process of storage in MongoDB Storage Engine (Understand)

CO4: Work with SSD and jQuery (Create)

CO5: Write programs in JSON (Create)

Semester VI
1. SOFTWARE QUALITY ASSURANCE
1861UITSQ

Course Objectives :

By the end of the course, learners will be able to:
1. Present effective testing techniques (both black-box and whitebox) for ensuring high quality software
2. Learn metrics for managing quality assurance and understand capabilities of test tools.
3.Understand quality management processes
4. Distinguish between the various activities of quality assurance, quality planning and quality control.
5. Understand the importance of standards in the quality management process and their impact on the final product.

Course Outcomes:
After completing this course learners will be able to:
CO1: know the definition of quality, cost of quality, quality model (Understand)
CO2: apply white-box testing, black-box testing, and inspection techniques (Apply)
CO3: Understand how test tools can be used in the testing life cycle (Understand)
CO4: Design testing metrics for product and process (Create)
CO5: Understand how to do performance testing and usability testing (Understand)

2. SECURITY IN COMPUTING

1862UITSC

Course Objective:

By the end of the course learner will be able to:

1. Define key terms and critical concepts of information
2. Define risk management, risk identification and risk control
3. Describe a security blueprint and identify its major components.
4. Understand Secure Design Principles.
5. Describe security technology and Identify Security tools.
6. Describe cryptographic tools and techniques and identify the major protocols used for secure communications.
7. Understand the relationship between information security and physical security.

Course Outcome:

After completing this course learner will be able to:

CO1: Understands the basics of information security.(Understand)
CO2: Study various aspects of risk management.(Analyze)
CO3: Compare various Security Models.(Analyze)
CO4: Understand Different Security Layers.(Understand)
CO5: Design and Simulate different networks using Security protocols.(Apply)
CO6: Correlate information security and physical security.(Analyze)

CO7: Understand the importance of security in Virtualization. (Understand)

3. BUSINESS INTELLIGENCE

1863UITBI

Course objectives :

By the end of the course, learners will be able to:

- Create an understanding of the decision support systems
- Describe Business intelligence application models
- Understand and apply classification techniques
- Apply different operations on legacy data practically.
- Understand knowledge management.

Course Outcome:

After completing this course learner will be able to:

CO1: Create an understanding of Decision support systems, Mathematical models for decision making, Data envelopment analysis, Knowledge Management and AI and Expert systems. (Understand)

CO2: Analyse and describe Business intelligence application models. (Analyse)

CO3: Assess and identify the best model to solve a given business problem. (Evaluate)

CO4: Work with legacy data and perform various operations on it using Business Intelligence softwares. (Apply)

CO5: Apply different data mining algorithms to solve the given business problem. (Apply)

CO6: Create designs/solutions/algorithms to solve the given business problem. (Create)

Discipline Specific Elective (DSE) (Any *one* of group A)

A. PRINCIPLES OF GEOGRAPHIC INFORMATION SYSTEMS

1864UITGI

Course Objective:

1. To gain basic understanding of Geographic Information Systems
2. To understand the process and tools required for data management.
3. To perform the spatial georeferencing by understanding the positioning systems
4. To perform different analysis techniques on spatial data
5. To create a map.

Course Outcome:

After successfully completing this course, learners will be able to:

CO1: Describe the meaning and basic components of Geographic Information Systems. (Understand)

CO2: Execute different tools which will be used for managing and processing the data. (Analyse and Apply)

CO3: Perform Georeferencing (Analyse and Apply)

CO4: Write different queries or use different types of tools for spatial data analysis (Create)

CO5: Create Maps. (Create)

A. ENTERPRISE NETWORKING

1865UITEN

Course Objective:

By the end of the course learner will be able to:

- Understand and apply the networking knowledge in the industrial applications.
- Handle complicated networking problem.
- Differentiate between LAN and WAN design.

Course Outcome:

On completion of the course learner will be able to:

CO1: Implementing the computer network.(Apply)

CO2: Manage complicated networking problems. (Analyse)

CO3: Apply the knowledge in building secure networks. (Apply)

CO4: Understand WAN design. (Understand)

Discipline Specific Elective (DSE) (Any *one* of group B)

B. IT SERVICE MANAGEMENT

1866UITIS

Course Objectives:

- The objective of this course is to provide a foundational level of understanding of the ITIL 4 framework, key elements, concepts and terminologies associated with ITIL service lifecycle.
- Evaluate on how it has evolved to adopt modern technologies and operational processes.
- Examination of methods for designing and operating service delivery systems in the health care, financial, hospitality, telecommunication, and logistics industry.

- Discussion on service strategy, services for individual and corporate customers, service technologies, process and facility design, management of waiting lines, demand forecasting, demand and supply management, service quality, staffing and scheduling.

Course Outcome:

Learners will understand ITIL Framework and its components.On completion of the course learner will be able to:

CO1: Introduce basic postulates of IT Infrastructure Management and shows the correlation between system and service management process. (Understand)

CO2: Understand the strategic methods in Service Delivery Process & Service Support Process using different management trends. (Understand)

CO3: Know the Storage and database Management in Information Technology. (Remember)

CO4: Know the Security Management in IT. (Understand)

CO5: Provide detailed knowledge of IT recent trends in globally. (Apply)

B. CYBER LAWS

1867UITCL

Course Objective:

By the end of the course learner will be able to:

- Enable Learner To Understand, Explore, And Acquire A Critical Understanding Cyber Law.

- Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes For Example, Child Pornography Etc. That Are Taking Place Via The Internet.

Course Outcome:

On completion of the course learner will be able to:

CO1: Be Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace. (Understand)

CO2: Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace. (Analyse)

CO3: Develop The Understanding Of Relationship Between Commerce And Cyberspace. (Apply)

CO4: Get in depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection. (Understand)

CO5: Make Study On Various Case Studies On Real Time Crimes.(Create)

PO CO Mapping Matrix

Semester	Subject	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Sem 1	Communication Skills	2016UISCS	*			*			*	*	*	*
	Web Programming I	2014UISWP	*		*	*	*		*	*		*

	Introduction to Programming	2011UISIP	*	*		*	*	*			*	*
	Fundamentals of Computers and Electronics	2012UISFC	*	*	*	*		*				
	Operating Systems	2013UISOS	*	*	*	*			*	*		*
	Discrete Mathematics-I	2015UISDM	*	*				*				
	Web Programming I Practical	2014UISPR	*		*	*	*		*	*		*
	Introduction to Programming Practical	2011UISPR	*	*		*	*	*			*	*
	Fundamentals of Computers and Electronics Practical	2012UISPR	*	*	*	*		*				
	Operating Systems Practical	2013UISPR	*	*	*	*			*	*		*
Sem 2	IT platforms, Tools and Practices	2026UISTP	*	*		*	*		*	*	*	*
	Web Programming II	2024UISWP	*				*			*	*	*

	Programming and Application Development in Python	2021UISPP	*	*	*		*		*	*		*
	Object Oriented Programming	2022UISOO	*	*		*			*	*	*	*
	Database Management Systems I	2023UISDS	*		*	*			*	*		*
	Discrete Mathematics II	2025UISDM	*	*				*		*		
	Web Programming II Practical	2024UISPR	*				*			*	*	*
	Programming and Application Development in Python Practical	2021UISPR	*	*	*		*		*	*		*
	Object Oriented Programming Practical	2022UISPR	*	*		*			*	*	*	*
	Database Management Systems I Practical	2023UISPR	*		*	*			*	*		*
Sem 3	Core Java	2031UISCJ	*	*	*					*	*	*

	Data Structures	2032UISDS	*	*	*		*			*		*
	Computer Networks	2033UISCN	*	*	*				*	*		*
	Database Management Systems- II	2034UISDB	*	*	*					*	*	*
	Descriptive Statistics	2035UISST	*	*	*	*	*	*				
	Advanced Web Programming - I	2036UISAW	*	*	*					*		*
	Hybrid Mobile Application Development 1	2036UISMD	*	*	*	*				*	*	*
	Computer Graphics and Animation	2037UISCG	*	*	*	*	*	*		*		*
	Embedded Systems	2037UISES	*	*	*					*		*
	Principles of Management	2037UISPM	*			*			*	*	*	*
	Core Java Practical	2031UISPR	*	*	*					*	*	*

	Data Structures Practical	2032UISPR	*	*	*		*			*		*
	Computer Networks Practical	2033UISPR	*	*	*				*	*		*
	Database Management Systems- II Practical	2034UISPR	*	*	*					*	*	*
	Advanced Web Programming - I Practical	2036UISPR	*	*	*					*		*
	Hybrid Mobile Application Development 1 Practical	2036UISPR	*	*	*	*				*		*
	Computer Graphics and Animation Practical	2037UISPR	*	*	*	*	*	*		*		*
	Embedded Systems Practical	2037UISPR	*	*	*					*		*
	Principles of Manageme nt Practical	2037UISPR	*			*			*	*	*	*

	Design Patterns	2041UISDP	*	*	*	*		*		*		
	Design and Analysis of Algorithms	2042UISDA	*	*	*	*	*	*		*	*	*
	System Programming	2043UISSP	*	*	*	*				*		*
	Software Engineering	2044UISSE	*	*	*	*	*			*		*
	Probability Theory	2045UISPT	*	*	*	*	*	*		*		*
Sem 4	Advanced Web Programming - II	2046UISAW	*	*	*	*						*
	Hybrid Mobile Application Development II	2046UISMD	*	*	*	*				*	*	*
	Advanced Java	2046UISAJ	*	*	*					*		*
	Multimedia Systems	2047UISMM	*	*	*	*			*	*		*
	Internet of Things	2047UISIT	*	*	*	*				*		*
	Principles of Marketing	2047UISPM	*		*	*			*	*		*
	Design Patterns Practical	2041UISPR	*	*	*	*		*		*		

	Design and Analysis of Algorithms Practical	2042UISPR	*	*	*	*	*	*		*	*	*
	System Programming Practical	2043UISPR	*	*	*	*				*		*
	Software Engineering Practical	2044UISPR	*	*	*	*	*			*		*
	Advanced Web Programming - II Practical	2046UISPR	*	*	*	*						*
	Hybrid Mobile Application Development II Practical	2046UISPR	*	*	*	*				*	*	*
	Advanced Java Practical	2046UISPR	*	*	*					*		*
	Multimedia Systems Practical	2047UISPR	*	*	*	*			*	*		*
	Internet of Things Practical	2047UISPR	*	*	*	*				*		*
	Principles of Marketing Practical	2047UISPR	*		*	*			*	*		*
Sem 5	Software Project Management	1851UITPM	*	*	*	*				*	*	*

	Internet of Things	1852UITIT	*	*	*	*		*	*	*		*
	Advanced Web Programming	1853UITWP	*	*	*					*	*	*
	Artificial Intelligence	1854UITAI	*	*	*	*	*	*	*	*		*
	Linux System Administration	1855UITLA	*	*	*	*				*		*
	Enterprise Java	1856UITEJ	*	*	*	*			*	*		*
	Next Generation Technologies	1857UITNG	*	*	*				*	*		
	Project Dissertation	1851UITPR	*	*	*	*	*	*	*	*	*	*
	Internet of Things Practical	1852UITPR	*	*	*	*		*	*	*		*
	Advanced Web Programming Practical	1853UITPR	*	*	*					*	*	*
	Artificial Intelligence Practical	1854UITPR	*	*	*	*	*	*	*	*		*
	Linux System Administration Practical	1855UITPR	*	*	*	*				*		*
	Enterprise Java Practical	1856UITPR	*	*	*	*			*	*		*

	Next Generation Technologies Practical	1857UITPR	*	*	*				*	*		
Sem 6	Software Quality Assurance	1861UITSQ	*	*	*	*	*	*		*		*
	Security in Computing	1862UITSC	*	*	*	*	*			*		*
	Business Intelligence	1863UITBI	*	*	*	*	*	*	*	*		*
	Principles of Geographic Information Systems	1864UITGI	*	*	*					*		*
	Enterprise Networking	1865UITEN	*	*	*	*	*	*		*		*
	IT service Management	1866UITIS	*	*	*	*			*	*	*	*
	Cyber Laws	1867UITCL	*	*	*	*			*	*	*	*
	Project Implementation	1861UITPR	*	*	*	*	*	*	*	*	*	*
	Security in Computing Practical	1862UITPR	*	*	*	*	*			*		*
	Business Intelligence Practical	1863UITPR	*	*	*	*	*	*	*	*		*

	Principles of Geographic Information Systems Practical	1864UITPR	*	*	*					*		*
	Enterprise Networking Practical	1865UITPR	*	*	*	*	*	*		*		*
	Advanced Mobile Programming Practical	1866UITPR	*	*	*	*			*	*	*	*