# Noorul Islam Centre for Higher Education

**(Deemed to be University u/s 3 of the UGC Act 1956)**

**Kumaracoil, Thuckalay, Kanyakumari District - 629 180**

**Accredited by NAAC with 'A' Grade**

IT22 BTECH INFORMATION TECHNOLOGY

## Student Performance and Learning Outcomes

**IT22 BTECH INFORMATION TECHNOLOGY**

| Programme Outcome (PO) | |
|---|---|
| PO-A | Apply the knowledge of mathematics, science and engineering principles to the problems related to the domain of Information Technology. |
| PO-B | Select and apply modern engineering and IT tools to tackle and solve complex computing and communication problems. |
| PO-C | Design and develop secure computing systems and infrastructure to meet the industry and society needs with suitable consideration for the public health and safety and environmental considerations. |
| P0-D | Apply reasoning acquired through contextual knowledge to assess the public, legal, and security issues relevant to the professional engineering practice. |
| PO-E | Demonstrate the knowledge of contemporary issues for sustainable development in the field of IT. |
| PO-F | Commit to professional ethics and responsibilities and norms of the engineering practice. |
| PO-G | Work effectively as an individual and also a member/leader in multidisciplinaryteams. |
| PO-H | Effectively communicate with engineering community and society about their field of expertise to write reports, design documentation and make presentations. |
| PO-I | Demonstrate and apply the knowledge of information technology and management principles to manage projects in multidisciplinary environments. |
| PO-J | Recognize the technology changes completely and enrich the knowledge by life-long learning. |

| PROGRAMME SPECIFIC OUTCOMES (PSO) | |
|---|---|
| PSO1 | Demonstrate the ability of analyzing the common business problems to design and develop appropriate technical solutions in Information Technology field |
| PSO2 | Ability to organize an IT Infrastructure, manage and monitor resources and safeguard data. |
| PSO3 | Practice and promote Information technologies for societal needs. |

| Sl.No | SUBJECT CODE | SUBJECT NAME |
|---|---|---|
| SEMESTER II | | |
| 1. | EG2102 | Technical English – II |
| 2. | MA2102 | Engineering Mathematics – II |
| 3. | BS2103 | Environmental Science |
| 4. | IT2201 | Object Oriented Programming Using C++ |
| 5. | EC2222 | Principles Of Communication |
| 6. | EC2223 | Digital Principles And Design |
| 7. | EC2286 | Digital Laboratory |
| 8. | IT2271 | Object Oriented Programming Using C++ Laboratory |
| SEMESTER IV | | |
| 9. | MA2204 | Statistics and Numerical Methods |
| 10. | IT2206 | Principles of Compiler Design |
| 11. | IT2207 | Design and Analysis of Algorithms |
| 12. | IT2208 | Software Engineering Principles |
| 13. | IT2209 | Operating Systems |
| 14. | IT2210 | Data Communication and Computer Networks |
| 15. | MA2204 | Statistics and Numerical Methods |
| 16. | IT2206 | Principles of Compiler Design |
| SEMESTER VI | | |
| 17. | IT1212 | Cyber Security |
| 18. | IT1213 | Web Technology |
| 19. | CS1212 | Computer Graphics |
| 20. | IT1214 | Information Storage and Management |
| 21. | IT12A2 | Internet Of Things |
| 22. | IT12B4 | Data Analytics |
| 23. | IT1277 | Web Technology Lab |
| 24. | CS1278 | Computer Graphics Laboratory |
| SEMESTER VIII | | |
| 25. | IT1218 | Cloud Computing Concepts |
| 26. | IT12A9 | Data Warehousing & Data Mining |
| 27. | IT12A6 | Software Testing |
| 28. | IT12P5 | Main Project |

| EG2102 TECHNICAL ENGLISH - II | |
|---|---|
| CO1 | The Students will be able to improve their vocabulary and use articles and prepositions effectively in sentences. |
| CO2 | The students will be able to understand grammatical items like phrases and verbs, derivatives, relative pronouns etc. and thereby enhance their linguistic competence. |
| CO3 | The students will be able to acquire the essentials of writing skills relating to resume writing, E-mail writing and also the essential components of essay writing. |
| CO4 | The students will be able to learn the basics of letter writing and the formalities involved in writing formal and business letters. |
| CO5 | The students will be able to learn English Phonemes such as vowels, Diphthongs and consonants. |

| MA2102 ENGINEERING MATHEMATICS -II | |
|---|---|
| CO1 | Understand the linear differential equation with constant and variable coefficients. To solve the Cauchy's and Legendre equations and solve the differential equations by variation of parameters. |
| CO2 | Know about functions of a complex variable, analytic functions, Cauchy's Riemman equations. To prove the properties of analytic functions. To find the analytic function and bilinear transformation. |
| CO3 | Study about Cauchy's integral formula and Cauchy's integral theorem, Laurent's expansion. Know about singular point, Cauchy's integral theorem. To evaluate the integral by contour integration. |
| CO4 | Know about gradient, divergence, curl, directional derivatives, irrotational and solenoidal vector field. To verify the vector integration by Green's theorem, Gauss divergence theorem and Stoke's theorem. |
| CO5 | Obtain the Laplace transform of elementary functions. Transform of derivatives and integrals and periodic functions. To find the inverse Laplace transform using convolution theorem and solve the differential equations. |

| BS2103 ENVIRONMENTAL SCIENCE | |
|---|---|
| CO1 | Students are able to understand the different types of natural resources, its sources and importance. |
| CO2 | Students are able to understand how interactions between organisms and their environments drive the dynamics of individuals, populations etc. |
| CO3 | Students gain skills required to research and analyze environmental issues and learn how to overcome them. |
| CO4 | Students are able to reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex interconnected world. |
| CO5 | Students can analyze the consequences of population growth and how it affects the environment. |

| IT2201 OBJECT ORIENTED PROGRAMMING USING C++ | |
|---|---|
| CO1 | Understand the basic concepts of Object Oriented Programming. |
| CO2 | Map an object oriented program design into classes and template model of C++ |
| CO3 | Program low-level input and output routines and streaming input and output operators in C++ |
| CO4 | Design, implement, test, debug, and document programs in various application |
| CO5 | Apply good programming style and understand the impact of style on developing and maintaining programs. |

| EC2222 PRINCIPLES OF COMMUNICATION | |
|---|---|
| CO1 | The students will be able to describe the principles of amplitude modulated and angle modulated communication systems. |
| CO2 | The students will be able to describe the principles of various modulation schemes including modulation, demodulation and bandwidth requirements. |
| CO3 | The students will be able to describe the principles of analog to digital conversion. |
| CO4 | The students will be able to explain various spread spectrum modulation techniques and multiple access method in wireless communication. |
| CO5 | The students will be able to explain the basic working principles of existing and advanced communication technologies such as satellite and optical communications. |

| EC2223DIGITAL PRINCIPLES AND DESIGN | |
|---|---|
| CO1 | Understand and examine fundamental concepts of digital logic design including number systems, code conversions and basic universal gates which are used in digital communication and computer systems. |
| CO2 | Employ techniques like karnaugh map and tabulation method to minimize logical expressions and these techniques can be used in the design and analysis of digital circuits. |
| CO3 | Ability to understand, analyze and design various combinational and sequential logic circuits. |
| CO4 | Ability to study various types of memory devices and model memory array for any Boolean function. |
| CO5 | Knowledge and use of hardware description languages (HDL) for simulation and implementation of combinational and sequential circuits. |

| EC2286DIGITAL LABORATORY | |
|---|---|
| CO1 | Student will be able to understand and analyze the working of basic logic gates. |
| CO2 | Student will be able to construct and design basic combinational and sequential circuits |
| CO3 | Student will be able to analyze, build, and troubleshoot counters |
| CO4 | Student will be able to analyze, build, and troubleshoot shift registers |
| CO5 | Student will be able to describe the behaviour of digital circuits by using hardware description languages |

| IT2271OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY | |
|---|---|
| CO1 | Understand relative merits of C++ as an object oriented programming language |
| CO2 | Understand how to produce object oriented software using C++ |
| CO3 | Apply the concepts of class, method, constructor, instance, data abstraction, function abstraction, inheritance, overloading, and polymorphism |
| CO4 | Analyze the usefulness of Inheritance paradigm. |
| CO5 | Understand the use of template classes,exception and STL library in c++ |

| MA2204 STATISTICS AND NUMERICAL METHODS | |
|---|---|
| CO1 | Recognize a Partial Differential Equation and formulate a Partial Differential Equation from a given solution, solve linear Partial Differential Equation of both first and second order with differential method. |
| CO2 | Derive a Fourier series of a given periodic function by evaluating Fourier coefficient and expand Fourier cosine and Sine series for given function, also find the Fourier series for a given numerical methods. |
| CO3 | Classify the second order Partial Differential Equation and solve a second order Partial Differential Equation in Wave, diffusion and Laplace with boundary and initial conditions using Fourier series. |
| CO4 | Know fundamental mathematical properties of a Fourier transform, calculate the Fourier transform and its inverse transform of function, also know to apply Parseval's and convolution theorem. |
| CO5 | Understand the characteristics and properties of Z-transform, compute Z-transform and inverse transform and apply Z-transform for solving difference equation. |

| IT2206-PRINCIPLES OF COMPILER DESIGN | |
|---|---|
| CO1 | Student will be able to remember the design principles of a Compiler, including its phases and components. |
| CO2 | Student will be able to master lexical analyzer concepts. |
| CO3 | Student will gain knowledge on various parsing techniques. |
| CO4 | Student will understand the purpose of translation to intermediate code in the compilation process. |
| CO5 | Student will gain knowledge on different types of run time environments, optimizatuion techniques and generation of machine code. |

| IT2207 - DESIGN AND ANALYSIS OF ALGORITHM | |
|---|---|
| CO1 | Ability to design algorithms using basic design concepts (e.g., pseudocode, specifications, top-down design) |
| CO2 | Ability to analyze time and space complexity of algorithms. |
| CO3 | Ability to analyze asymptotic runtime complexity of algorithms including formulating recurrence relations. |
| CO4 | Ability to design algorithms and solve problems by applying greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch and bound. |
| CO5 | Ability to understand string matching , parallel algorithms and knowledge about NP – completeness and Polynomial time algorithms helps in designing efficient algorithms. |

| IT2208SOFTWARE ENGINEERING PRINCIPLES | |
|---|---|
| CO1 | Acquire strong fundamental knowledge in the life cycle models and in system engineering concepts. |
| CO2 | Understands the concepts of software requirements and modelling techniques. |
| CO3 | Analyze the design concepts and mapping techniques. |
| CO4 | An ability to be familiar with types, levels, and strategies of testing. |
| CO5 | Evaluate the security practices in architecture, design, coding and testing |

| IT2209-OPERATING SYSTEMS | |
|---|---|
| CO1 | Able to learn about process management, threads, multiprogramming concepts with CPU scheduling algorithms. |
| CO2 | Able to understand the storage and memory deadlocks management concepts with page replacement and gain knowledge about how kernel memory is allocated. |
| CO3 | Able to understand the concepts of I\O directory and disk structure and analyze how the data is mounted in the file system. |
| CO4 | Able to learn about the Linux operating system, their requirements and setting up of Linux OS which is useful for them in context of industrial needs. |
| CO5 | Able to get awareness about the virtualization Xen and VMware concepts.<br>concepts along with page replacement and also gain knowledge about how allocation of kernel memory is done. |

| IT2210-DATA COMMUNICATION AND COMPUTER NETWORKS | |
|---|---|
| CO1 | Understanding the basics of database systems and the related concepts. |
| CO2 | Gaining knowledge regarding the transactions done with the help of database and applying it in the real world. |
| CO3 | Understanding the basic concepts of database security. |
| CO4 | Analyzing the requirements to provide secure database systems. |
| CO5 | Applying the methods to ensure safety and security of the database systems. |

| IT2275-OPERATING SYSTEM CONCEPTS LAB | |
|---|---|
| CO1 | Able to acquire knowledge about the UNIX shell programming system calls to overcome various complex problems. |
| CO2 | Able to create a process interprocess communication and enable to create a secure system. |
| CO3 | Able to get knowledge about various algorithms such as CPU scheduling algorithms, page replacement plus implement shared memory plus paging algorithms plus deadlock. |
| CO4 | Able to be familiar with various file system plus their allocation strategies to solve the security issues. |
| CO5 | Attain knowledge about virtual machine, VMware concepts which help to cope with the current industrial needs. |

| IT2276-ALGORITHMS ANALYSIS LAB | |
|---|---|
| CO1 | Ability to identify the problem given and design the algorithm using various algorithm design techniques and implement various algorithms in a high level language. |
| CO2 | Ability to implement and compare simple string matching and KMP algorithms. |
| CO3 | Ability to implement various problems using approximation algorithms |
| CO4 | Ability to analyze time and space complexity of algorithms |
| CO5 | Compare the performance of different algorithms for same problem |

| IT1212- CYBER SECURITY | |
|---|---|
| CO1 | Gives good idea to students and computer organization architecture,networking fundamentals. |
| CO2 | Exposure to security issues of cyber crimes, breaches, data loss/theft as obtaining at the National level and at the International level. |
| CO3 | Understand threats, variety and attack techniques, security requirements,e-commerce security, criticalInformation Infrastructure. |
| CO4 | Understand cyber laws crime investigation procedure and cyber forensics. |
| CO5 | Understand the cyber security problems, methods of implementation and about secure system. |

| IT1213WEB TECHNOLOGY | |
|---|---|
| CO1 | Understand the basics of Internetworking concepts to design a web page,to understand different protocols used over the Internet and to obtain good knowledge in Web programming. |
| CO2 | Apply html and Java script for designing web pages. |
| CO3 | Develop and incorporate dynamic capabilities in Web pages using DHTML. |
| CO4 | Create Web applications using server side scripting languages servlets and JSP. |
| CO5 | Gain knowledge on database basic related to develop dynamic web applications and apply JSP for designing web applications. |

| CS1212-COMPUTER GRAPHICS | |
|---|---|
| CO1 | Ability to understand and use the components of a graphics system and demonstrate various algorithms for scan conversion and filling of basic objects and their comparative analysis. |
| CO2 | Ability to use geometric transformations on graphics objects and their application in composite form. |
| CO3 | Extract scene with different clipping methods and its transformation to graphics display device and to explore projections and visible surface detection techniques for display of 3D scenes on 2D scenes. |
| CO4 | Render projected objects to naturalize the scene in 2D view and use of illumination models for this. |
| CO5 | Knowledge of animation graphics helps in designing animation sequences for real time applications and ability to use modern 3D computer graphics technology, models and algorithms helps to solve graphics problems. |

| IT1214-INFORMATION STORAGE AND MANAGEMENT | |
|---|---|
| CO1 | Understand the basic knowledge of storage technologies. |
| CO2 | Have a fundamental knowledge of physical and logical components of host environment and on different RAID levels. |
| CO3 | Analyze the components and topologies of FC-SAN, NAS and IP-SAN. |
| CO4 | Able to have a clear idea on BC,DR on replication technologies. |
| CO5 | Gets familiar on the storage security domains and storage virtualization. |

| IT12A2-INTERNET OF THINGS | |
|---|---|
| CO1 | Learning of IoT paradigm for the Internet environment. |
| CO2 | Providing technological solutions for tackling the issues in designing and developing the scalable architectures |
| CO3 | Understanding the concepts of IoT and applying it in collaboration with cloud and fog computing |
| CO4 | Learning the IOT frameworks to create solutions with IoT enable |
| CO5 | Ability to deal with the privacy and ethical issues in data sensing, storage, processing. |

| IT12B4-DATA ANALYTICS | |
|---|---|
| CO1 | Students should able to understand Big data systems and identify the main sources of Big Data in the real world |
| CO2 | Students should able to design algorithms to analyze Big data like streams, Web Graphs and Social Media data. |
| CO3 | Students should able to develop mining algorithms to mine data from data streams. |
| CO4 | Students should able to apply several newer algorithms for Clustering, Classifying and finding associations in Big Data. |
| CO5 | Students should able to use frameworks like Hadoop,NOSQL to efficiently store, retrieve and process Big data for analytics. |

| IT1277-WEB TECHNOLOGY LAB | |
|---|---|
| CO1 | Design a web page using HTML,CSS and JavaScript. |
| CO2 | Implement dynamic capabilities in Web pages and develop client side scripts for validating Web form controls using DHTML. |
| CO3 | Apply servlet concepts in developing web applications. |
| CO4 | Code programs in Java to create three-tier applications using JSP and Databases. |
| CO5 | Build a website using web technology concepts. |

| CS1278-COMPUTER GRAPHICS LABORATORY | |
|---|---|
| CO1 | Understand and implement the basic concepts of computer graphics and output primitive algorithms to draw object like line,circle,ellipse etc. |
| CO2 | Ability to implement basic geometric transformations(2D and 3D) on objects. |
| CO3 | Apply clipping and filling techniques for modifying an object and transform to graphics display device. |
| CO4 | Understand the practical implementation of modeling, rendering, viewing of objects in 2D. |
| CO5 | Basic knowledge of animation graphics helps in designing animation sequences for various real time applications. |

| IT1218-CLOUD COMPUTING CONCEPTS | |
|---|---|
| CO1 | Student should understand the fundamental concepts in the area of cloud computing by relating it with the traditional models of computing. |
| CO2 | Student should understand the fundamentals of cloud computing architectures based on current standards, protocols, and best practices intended for delivering Cloud based enterprise IT services and business applications. |
| CO3 | Students understand the key concepts of cloud storage and analyze different cloud programming models and have the capability to demonstrate proficiently in deploying, comparing and contrasting new generation cloud based storage systems. |
| CO4 | Student should understand the cloud computing environment risks to identify, assess, and prioritize the risks in order to decrease those risks, improve security, increase confidence in cloud services, and relieve organizations' concerns on the issue of using a cloud environment |
| CO5 | Student should understand cloud- based tools to get a close overview with Cloud Computing applications. |

| IT12A9-DATA WAREHOUSING & DATA MINING | |
|---|---|
| CO1 | Student will be able to clearly understand the different data warehouse and data mining architectures. |
| CO2 | Student will get knowledge of the role and function of data warehouse and data mining. |
| CO3 | Student will be able to assess raw input data, and process it to provide suitable input for a range of data mining algorithms. |
| CO4 | The candidate will get knowledge of various algorithms for data mining. |
| CO5 | Student will be able to design and implement data-mining application using sample, realistic data sets and modern tools. |

| IT12A6-SOFTWARE TESTING | |
|---|---|
| CO1 | Students should able to understand the basics of software testing process and acquire knowledge about defect and its prevention methods |
| CO2 | Students should able to design test cases for different types of testing |
| CO3 | Students should able to do different levels of testing and evaluate the performance of software by various performance tests. |
| CO4 | Students should able to plan the testing and manage the process effectively and design tools. |
| CO5 | Students should able to develop test automation and design tools for test automation |

| IT12P5- MAIN PROJECT | |
|---|---|
| CO1 | Demonstrate a sound technical knowledge of their selected project topic. |
| CO2 | Undertake problem identification, formulation and solution. |
| CO3 | Design engineering solutions to complex problems utilising a systems approach. |
| CO4 | Conduct an engineering project |
| CO5 | Demonstrate the knowledge, skills and attitudes of a professional engineer. |