# PROGRAMME NAME: **COMPUTER SCIENCE**

**PROGRAMME OBJECTIVE**

The core philosophy of overall syllabus is to:
1) Form strong foundation of Computer science.
2) Introduce emerging trends to the students in gradual way.
3) Groom the students for the challenges of ICT industry.
4) To develop an aptitude to engage in continuing professional development.
5) To develop theoretical foundation for higher studies and research.

## FYBSc Semester I

**Name of Course (Subject):Computer Organization and Design**
**Objectives:**
To understand the structure and operation of modern processors and their instruction sets
**Expected Learning Outcomes:**
1)To learn about how computer systems work and underlying principles
2) To understand the basics of digital electronics needed for computers
3) To understand the basics of instruction set architecture for reduced and complex instruction sets
4) To understand the basics of processor structure and operation
5) To understand how data is transferred between the processor and I/O devices

**Name of Course (Subject): Programming with Python- I**
**Objectives:**
The objective of this paper is to introduce various concepts of programming to the students using Python.
**Expected learning outcomes:**
1) Students should be able to understand the concepts of programming before actually starting to write programs.
2) Students should be able to develop logic for Problem Solving.
3) Students should be made familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.
4) Students should be able to apply the problem solving skills using syntactically simple language i.e. Python (version: 3.X or higher)

**Name of Course (Subject): Free and Open Source Software**
**Objective:**
Open Source has acquired a prominent place in software industry. Having knowledge of Open Source and its related technologies is an essential for Computer Science student. This course introduces Open Source methodologies and ecosystem to students.
**Expected learning outcomes:**
1) Upon completion of this course, students should have a good working knowledge of Open Source ecosystem, its use, impact and importance.
2) This course shall help student to learn Open Source methodologies, case studies with real life examples.

**Name of Course (Subject): Database Systems**

**Objectives:**

The objective of this course is to introduce the concept of the DBMS with respect to the relational model, to specify the functional and data requirements for a typical database application and to understand creation, manipulation and querying of data in databases

**Expected learning outcomes:**

1) Students should be able to evaluate business information problem and find the requirements of a problem in terms of data.
2) Students should be able to design the database schema with the use of appropriate data types for storage of data in database.
3) Students should be able to create, manipulate, query and back up the databases.

**Name of Course (Subject): Discrete Mathematics**

**Objectives:**

The purpose of the course is to familiarize the prospective learners with mathematical structures that are fundamentally discrete. This course introduces sets and functions, forming and solving recurrence relations and different counting principles. These concepts are useful to study or describe objects or problems in computer algorithms and programming languages.

**Expected learning outcomes:**

1) To provide overview of theory of discrete objects, starting with relations and partially ordered sets.
2)Study about recurrence relations, generating function and operations on them.
3)Give an understanding of graphs and trees, which are widely used in software.
4) Provide basic knowledge about models of automata theory and the corresponding formal languages.

**Name of Course (Subject): Descriptive Statistics and Introduction to Probability**

**Objectives:**

The purpose of this course is to familiarize students with basics of Statistics. This will be essential for prospective researchers and professionals to know these basics.

**Expected learning outcomes:**

1)Enable learners to know descriptive statistical concepts
2) Enable study of probability concept required for Computer learners

**Name of Course (Subject): Soft Skills Development**

**Objectives:**

To help learners develop their soft skills and develop their personality together with their technical skills. Developing professional, social and academic skills to harness hidden strengths, capabilities and knowledge equip them to excel in real work environment and corporate life. Understand various issues in personal and profession communication and learn to overcome them

**Expected learning outcomes:**

1)To know about various aspects of soft skills and learn ways to develop personality
2) Understand the importance and type of communication in personal and professional environment.
3) To provide insight into much needed technical and non-technical qualities in career planning.
4) Learn about Leadership, team building, decision making and stress management

FYBSc Semester II

**Name of Course (Subject): Programming with C**

**Objectives:**

The objective of this course is to provide a comprehensive study of the C programming language, stressing upon the strengths of C, which provide the students with the means of writing modular, efficient, maintainable, and portable code.

**Expected learning outcomes:**

1) Students should be able to write, compile and debug programs in C language.
2) Students should be able to use different data types in a computer program.
3) Students should be able to design programs involving decision structures, loops and functions.
4) Students should be able to explain the difference between call by value and call by reference
5) Students should be able to understand the dynamics of memory by the use of pointers.
6) Students should be able to use different data structures and create/update basic data files.

**Name of Course (Subject): Programming with Python– II**

**Objectives:**

The objective of this paper is to explore the style of structured programming to give the idea to the students how programming can be used for designing real-life applications by reading/writing to files, GUI programming, interfacing database/networks and various other features.

**Expected learning outcomes:**

1)Students should be able to understand how to read/write to files using python.
2) Students should be able to catch their own errors that happen during execution of programs.
3) Students should get an introduction to the concept of pattern matching.
4) Students should be made familiar with the concepts of GUI controls and designing GUI applications.
5) Students should be able to connect to the database to move the data to/from the application.
6) Students should know how to connect to computers, read from URL and send email.

**Name of Course (Subject): Linux**

**Objectives:**

This course introduces various tools and techniques commonly used by Linux programmers, system administrators and end users to achieve their day to day work in Linux environment. It is designed for computer students who have limited or no previous exposure to Linux.

**Expected learning outcomes:**

1)Upon completion of this course, students should have a good working knowledge of Linux, from both a graphical and command line perspective, allowing them to easily use any Linux distribution.
2) This course shall help student to learn advanced subjects in computer science practically.
3) Student shall be able to progress as a Developer or Linux System Administrator using the acquired skill set.

**Name of Course (Subject): Data Structures**

**Objectives:**

To explore and understand the concepts of Data Structures and its significance in programming. Provide and holistic approach to design, use and implement abstract data types. Understand the

commonly used data structures and various forms of its implementation for different applications using Python.

**Expected learning outcomes:**

1)Learn about Data structures, its types and significance in computing

2) Explore about Abstract Data types and its implementation

3) Ability to program various applications using different data structure in Python

**Name of Course (Subject): Calculus**

**Objectives:**

The course is designed to have a grasp of important concepts of Calculus in a scientific way. It covers topics from as basic as definition of functions to partial derivatives of functions in a gradual and logical way. The learner is expected to solve as many examples as possible to a get compete clarity and understanding of the topics covered.

**Expected learning outcomes:**

1) Understanding of Mathematical concepts like limit, continuity, derivative, integration of functions.

2) Ability to appreciate real world applications which uses these concepts.

3) Skill to formulate a problem through Mathematical modeling and simulation.

**Name of Course (Subject): Statistical Methods and Testing of Hypothesis**

**Objectives:**

The purpose of this course is to familiarize students with basics of Statistics. This will be essential for prospective researchers and professionals to know these basics.

**Expected learning outcomes:**

1) Enable learners to know descriptive statistical concepts

2) Enable study of probability concept required for Computer learners

**Name of Course (Subject): Green Technologies**

**Objectives:**

To familiarize with the concept of Green Computing and Green IT infrastructure for making computing and information system environment sustainable. Encouraging optimized software and hardware designs for development of Green IT Storage, Communication and Services. To highlight useful approaches to embrace green IT initiatives.

**Expected learning outcomes:**

1)Learn about green IT can be achieved in and by hardware, software, network communication and data center operations.

2) Understand the strategies, frameworks, processes and management of green IT

## SYBSc Semester III

**Name of Course (Subject): Theory of Computation**

**Objectives:**

To provide the comprehensive insight into theory of computation by understanding grammar, languages and other elements of modern language design. Also to develop capabilities to design and develop formulations for computing models and identify its applications in diverse areas.

**Expected learning outcomes:**

1) Understand Grammar and Languages

2) Learn about Automata theory and its application in Language Design

3) Learn about Turing Machines and Pushdown Automata
4) Understand Linear Bound Automata and its applications.

**Name of Course (Subject): Core Java**
**Objectives:**
The objective of this course is to teach the learner how to use Object Oriented paradigm to develop code and understand the concepts of Core Java and to cover-up with the pre-requisites of Core java.
**Expected learning outcomes:**
1) Object oriented programming concepts using Java.
2) Knowledge of input, its processing and getting suitable output.
3) Understand, design, implement and evaluate classes and applets.
4) Knowledge and implementation of AWT package.

**Name of Course (Subject): Operation System**
**Objectives:**
Learners must understand proper working of operating system. To provide a sound understanding of Computer operating system, its structures, functioning and algorithms.
**Expected learning outcomes:**
1) To provide a understanding of operating system, its structures and functioning
2) Develop and master understanding of algorithms used by operating systems for various purposes

**Name of Course (Subject): Database Management System**
**Objectives:**
To develop understanding of concepts and techniques for data management and learn about widely used systems for implementation and usage.
**Expected learning outcomes:**
1) Master concepts of stored procedure and triggers and its use.
2) Learn about using PL/SQL for data management
3) Understand concepts and implementations of transaction management and crash recovery

**Name of Course (Subject): Combinatorics and Graph Theory**
**Objectives:**
To give the learner a broad exposure of combinatorial Mathematics through applications especially the Computer Science applications.
**Expected learning outcomes:**
1) Appreciate beauty of combinatorics and how combinatorial problems naturally arise in many settings.
2) Understand the combinatorial features in real world situations and Computer Science applications.
3) Apply combinatorial and graph theoretical concepts to understand Computer Science concepts and apply them to solve problems.

**Name of Course (Subject): Physical Computing and IOT programming**
**Objectives:**
To learn about SoC architectures; Learn how Raspberry Pi. Learn to program Raspberry Pi. Implementation of internet of Things and Protocols.
**Expected learning outcomes:**
1) Enable learners to understand System On Chip Architectures.

2) Introduction and preparing Raspberry Pi with hardware and installation.
3) Learn physical interfaces and electronics of Raspberry Pi and program them using practical's
4) Learn how to make consumer grade IoT safe and secure with proper use of protocols.

**Name of Course (Subject): Web Programming**
**Objectives:**
To provide insight into emerging technologies to design and develop state of - the art web applications using client-side scripting, server-side scripting, and database connectivity.
**Expected learning outcomes:**
1) To design valid, well-formed, scalable, and meaningful pages using emerging technologies.
2) Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites
3) To develop and implement client-side and server-side scripting language programs.
4) To develop and implement Database Driven Websites.
5) Design and apply XML to create a markup language for data and document centric applications.

## SYBSc Semester IV

**Name of Course (Subject): Fundamentals of Algorithms**
**Objectives:**
1) To understand basic principles of algorithm design and why algorithm analysis is important
2) To understand how to implement algorithms in Python
3) To understand how to transform new problems into algorithmic problems with efficient solutions
4) To understand algorithm design techniques for solving different problems
**Expected learning outcomes:**
1) Understand the concepts of algorithms for designing good program
2) Implement algorithms using Python

**Name of Course (Subject):Advance Java**
**Objectives:**
Explore advanced topic of Java programming for solving problems.
**Expected learning outcomes:**
1)Understand the concepts related to Java Technology
2) Explore and understand the use of Java Server Programming

**Name of Course (Subject):Computer Networks**
**Objectives:**
In this era of Information, its computation and its exchange techniques, Learner should be able to conceptualize and understand the framework and working of communication networks. And oncompletion, will be able to have a firm grip over this very important segment of Internet.
**Expected learning outcomes:**
1) Learner will be able to understand the concepts of networking, which are important for them tobeknown as a 'networking professionals'.
2) Useful to proceed with industrial requirements and International vendor certifications.

**Name of Course (Subject):Software Engineering**
**Objectives:**
To teach the scientific principles underlying the software design and development.

**Expected learning outcomes:**
1) To practically be able to apply the principles of software design and development
2) To learn some tools used in the development of a software.

**Name of Course (Subject):Linear Algebra with Python**
**Objectives:**
To offer the learner the relevant linear algebra concepts through computer science applications.
**Expected learning outcomes:**
1) Appreciate the relevance of linear algebra in the field of computer science.
2) Understand the concepts through program implementation
3) Instill a computational thinking while learning linear algebra.

**Name of Course (Subject):.NET Technologies**
**Objectives:**
To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications.
**Expected learning outcomes:**
1) Understand the .NET framework
2) Develop a proficiency in the C# programming language
3) Proficiently develop ASP.NET web applications using C#
4) Use ADO.NET for data persistence in a web application

**Name of Course (Subject): Android Development Fundamentals**
**Objectives:**
To provide the comprehensive insight into developing applications running on smart mobile devices and demonstrate programming skills for managing task on mobile. To provide systematic approach for studying definition, methods and its applications for Mobile-App development.
**Expected learning outcomes:**
1) Understand the requirements of Mobile programming environment.
2)Learn about basic methods, tools and techniques for developing Apps
3) Explore and practice App development on Android Platform
4) Develop working prototypes of working systems for various uses in daily lives.

## TYBSc Semester V

**Name of Course (Subject): Artificial Intelligence**
**Objectives:**
Artificial Intelligence (AI) and accompanying tools and techniques bring transformational changes in the world. Machines capability to match, and sometimes even surpass human capability, make AI a hot topic in Computer Science. This course aims to introduce the learner to this interesting area.
**Expected learning outcomes:**
After completion of this course, learner should get a clear understanding of AI and different search algorithms used for solving problems. The learner should also get acquainted with different learning algorithms and models used in machine learning.

**Name of Course (Subject): Linux Server Administration**

**Objectives:**
Demonstrate proficiency with the Linux command line interface, directory& file management techniques, file system organization, and tools commonly found on most Linux distributions. Effectively operate a Linux system inside of a network environment to integrate with existing service solutions. Demonstrate the ability to troubleshoot challenging technical problems typically encountered when operating and administering Linux systems.
**Expected learning outcomes:**
Learner will be able to develop Linux based systems and maintain. Learner will be able to install appropriate service on Linux server as per requirement. Learner will have proficiency in Linux server administration.

**Name of Course (Subject): Information and Network Security**
**Objectives:**
To provide students with knowledge of basic concepts of computer security including network security and cryptography
**Expected learning outcomes:**
Understand the principles and practices of cryptographic techniques. Understand a variety of generic security threats and vulnerabilities, and identify & analyze particular security problems for a given application.

**Name of Course (Subject): Architecting of IoT**
**Objectives:**
Discovering the interconnection and integration of the physical world. Learner should get knowledge of the architecture of IoT.
**Expected learning outcomes:**
Learners are able to design & develop IoT Devices. They should also be aware of the evolving world of M2M Communications and IoT analytics.

**Name of Course (Subject): Game Programming**
**Objectives:**
Learner should get the understanding computer Graphics programming using DirectX or OpenGL. Along with the VR and AR they should also aware of GPU, newer technologies and programming using most important API for windows.
**Expected learning outcomes:**
Learner should study Graphics and gamming concepts with present working style of developers where everything remains on internet and they need to review it, understand it, be a part of community and learn.

## TYBSc Semester VI

**Name of Course (Subject): Wireless Sensor Networks and Mobile Communication**
**Objectives:**
In this era of wireless and adhoc network, connecting different wireless devices and understanding their compatibility is very important. Information is gathered in many different ways from these devices. Learner should be able to conceptualize and understand the framework. On completion, will be able to have a firm grip over this very important segment of wireless network.
**Expected learning outcomes:**

After completion of this course, learner should be able to list various applications of wireless sensor networks, describe the concepts, protocols, design, implementation and use of wireless sensor networks. Also implement and evaluate new ideas for solving wireless sensor network design issues.

**Name of Course (Subject): Cyber Forensics**

**Objectives:**

To understand the procedures for identification, preservation, and extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered

**Expected learning outcomes:**

The student will be able to plan and prepare for all stages of an investigation - detection, initial response and management interaction, investigate various media to collect evidence, report them in a way that would be acceptable in the court of law.

**Name of Course (Subject): Digital Image Processing**

**Objectives:**

To study two-dimensional Signals and Systems. To understand image fundamentals and transforms necessary for image processing. To study the image enhancement techniques in spatial and frequency domain. To study image segmentation and image compression techniques.

**Expected learning outcomes:**

Learner should review the fundamental concepts of a digital image processing system. Analyze the images in the frequency domain using various transforms. Evaluate the techniques for image enhancement and image segmentation. Apply various compression techniques. They will be familiar with basic image processing techniques for solving real problems.

**Name of Course (Subject): Data Science**

**Objectives:**

Understanding basic data science concepts. Learning to detect and diagnose common data issues, such as missing values, special values, outliers, inconsistencies, and localization. Making aware of how to address advanced statistical situations, Modeling and Machine Learning.

**Expected learning outcomes:**

After completion of this course, the students should be able to understand & comprehend the problem; and should be able to define suitable statistical method to be adopted.

**Name of Course (Subject): Ethical Hacking**

**Objectives:**

To understand the ethics, legality, methodologies and techniques of hacking.

**Expected learning outcomes:**

Learner will know to identify security vulnerabilities and weaknesses in the target applications. They will also know to test and exploit systems using various tools and understand the impact of hacking in real time machines.

# PROGRAMME NAME**: INFORMATION TECHNOLOGY**

**PROGRAMME OBJECTIVE**

The main objectives of the course are:
1) To think analytically, creatively and critically in developing robust, extensible and highly maintainable technological solutions to simple and complex problems.
2) To apply their knowledge and skills to be employed and excel in IT professional careers and/or to continue their education in IT and/or related post graduate programs.
3) To be capable of managing complex IT projects with consideration of the human, financial and environmental factors.
4) To work effectively as a part of a team to achieve a common stated goal.
5) Toadhere to the highest standards of ethics, including relevant industry and organizational codes of conduct.
6) To communicate effectively with a range of audiences both technical and non-technical.
7) To develop an aptitude to engage in continuing professional development.

## FYBSc Semester I

**Name of Course (Subject): Imperative Programming**
**Objectives:**
The objective of this course is to provide a comprehensive study of the C programming language, stressing upon the strengths of C, which provide the students with the means of writing modular, efficient, maintainable, and portable code.
**Expected learning outcomes:**
1) Students should be able to write, compile and debug programs in C language.
2) Students should be able to use different data types in a computer program.
3) Students should be able to design programs involving decision structures, loops and functions.
4) Students should be able to explain the difference between call by value and call by reference
5) Students should be able to understand the dynamics of memory by the use of pointers.
6) Students should be able to use different data structures and create/update basic data files.

**Name of Course (Subject): Digital Electronics**
**Objectives:**

**Expected learning outcomes:**

**Name of Course (Subject): Operating Systems**
**Objectives:**
Learners must understand proper working of operating system. To provide a sound understanding of Computer operating system, its structures, functioning and algorithms.
**Expected learning outcomes:**
1) To provide a understanding of operating system, its structures and functioning
2) Develop and master understanding of algorithms used by operating systems for various purposes

**Name of Course (Subject): Discrete Mathematics**
**Objectives:**

The purpose of the course is to familiarize the prospective learners with mathematical structures that are fundamentally discrete. This course introduces sets and functions, forming and solving recurrence relations and different counting principles. These concepts are useful to study or describe objects or problems in computer algorithms and programming languages.

**Expected learning outcomes:**

1) To provide overview of theory of discrete objects, starting with relations and partially ordered sets.
2) Study about recurrence relations, generating function and operations on them.
3) Give an understanding of graphs and trees, which are widely used in software.
4) Provide basic knowledge about models of automata theory and the corresponding formal languages.

**Name of Course (Subject): Communication Skills**

**Objectives:**

To help learners develop their soft skills and develop their personality together with their technical skills. Developing professional, social and academic skills to harness hidden strengths, capabilities and knowledge equip them to excel in real work environment and corporate life. Understand various issues in personal and profession communication and learn to overcome them

**Expected learning outcomes:**

1) To know about various aspects of soft skills and learn ways to develop personality
2) Understand the importance and type of communication in personal and professional environment.
3) To provide insight into much needed technical and non-technical qualities in career planning.
4) Learn about Leadership, team building, decision making and stress management.

## FYBSc Semester II

**Name of Course (Subject): Object Oriented Programming**

**Objectives:**

**Expected Learning Outcomes:**

**Name of Course (Subject): Microprocessor Architecture**

**Objectives:**

To understand the structure and operation of modern processors and their instruction sets

**Expected Learning Outcomes:**

1) To learn about how computer systems work and underlying principles
2) To understand the basics of digital electronics needed for computers
3) To understand the basics of instruction set architecture for reduced and complex instruction sets
4) To understand the basics of processor structure and operation
5) To understand how data is transferred between the processor and I/O devices.

**Name of Course (Subject): Web Programming**

**Objectives:**

To provide insight into emerging technologies to design and develop state of - the art web applications using client-side scripting, server-side scripting, and database connectivity.

**Expected learning outcomes:**

1) To design valid, well-formed, scalable, and meaningful pages using emerging technologies.
2) Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites
3) To develop and implement client-side and server-side scripting language programs.
4) To develop and implement Database Driven Websites.
5) Design and apply XML to create a markup language for data and document centric applications.

**Name of Course (Subject): Numerical and Statistical Methods**

**Objectives:**

The purpose of this course is to familiarize students with basics of Statistics. This will be essential for prospective researchers and professionals to know these basics.

**Expected learning outcomes:**

1) Enable learners to know descriptive statistical concepts
2) Enable study of probability concept required for Computer learners.

**Name of Course (Subject): Green Computing**

**Objectives:**

To familiarize with the concept of Green Computing and Green IT infrastructure for making computing and information system environment sustainable. Encouraging optimized software and hardware designs for development of Green IT Storage, Communication and Services. To highlight useful approaches to embrace green IT initiatives.

**Expected learning outcomes:**

1) Learn about green IT can be achieved in and by hardware, software, network communication and data center operations.
2) Understand the strategies, frameworks, processes and management of green IT.

## SYBSc Semester III

**Name of Course (Subject): Python Programming**

**Objectives:**

The objective of this paper is to introduce various concepts of programming to the students using Python.

**Expected learning outcomes:**

1) Students should be able to understand the concepts of programming before actually starting to write programs.
2) Students should be able to develop logic for Problem Solving.
3) Students should be made familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.
4) Students should be able to apply the problem solving skills using syntactically simple language i.e. Python (version: 3.X or higher)

**Name of Course (Subject): Computer Networks**

**Objectives:**

In this era of Information, its computation and its exchange techniques, Learner should be able to conceptualize and understand the framework and working of communication networks. And on completion, will be able to have a firm grip over this very important segment of Internet.

**Expected learning outcomes:**
1) Learner will be able to understand the concepts of networking, which are important for them to be known as a 'networking professionals'.
2) Useful to proceed with industrial requirements and International vendor certifications.

**Name of Course (Subject): Data Structures**
**Objectives:**
To explore and understand the concepts of Data Structures and its significance in programming. Provide and holistic approach to design, use and implement abstract data types. Understand the commonly used data structures and various forms of its implementation for different applications using Python.
**Expected learning outcomes:**
1) Learn about Data structures, its types and significance in computing
2) Explore about Abstract Data types and its implementation
3) Ability to program various applications using different data structure in Python/C++/C.

**Name of Course (Subject): Applied Mathematics - I**
**Objectives:**
The course is designed to have a grasp of important concepts of Calculus in a scientific way. It covers topics from as basic as definition of functions to partial derivatives of functions in a gradual and logical way. The learner is expected to solve as many examples as possible to a get compete clarity and understanding of the topics covered.
**Expected learning outcomes:**
1) Understanding of Mathematical concepts like limit, continuity, derivative, integration of functions.
2) Ability to appreciate real world applications which uses these concepts.
3) Skill to formulate a problem through Mathematical modeling and simulation.

**Name of Course (Subject): Database Management Systems**
**Objectives:**
To develop understanding of concepts and techniques for data management and learn about widely used systems for implementation and usage.
**Expected learning outcomes:**
1) Master concepts of stored procedure and triggers and its use.
2) Learn about using PL/SQL for data management
3) Understand concepts and implementations of transaction management and crash recovery.

## SYBSc Semester IV

**Name of Course (Subject): Core Java**
**Objectives:**
The objective of this course is to teach the learner how to use Object Oriented paradigm to develop code and understand the concepts of Core Java and to cover-up with the pre-requisites of Core java.
**Expected learning outcomes:**
1) Object oriented programming concepts using Java.
2) Knowledge of input, its processing and getting suitable output.
3) Understand, design, implement and evaluate classes and applets.
4) Knowledge and implementation of AWT package.

**Name of Course (Subject): Introduction to Embedded Systems**
**Objectives:**

**Expected learning outcomes:**

**Name of Course (Subject): Computer Oriented Statistical Techniques**
**Objectives:**
The purpose of this course is to familiarize students with basics of Statistics. This will be essential for prospective researchers and professionals to know these basics.
**Expected learning outcomes:**
1) Enable learners to know descriptive statistical concepts
2) Enable study of probability concept required for Computer learners.

**Name of Course (Subject): Sotware Engineering**
**Objectives:**
To teach the scientific principles underlying the software design and development.
**Expected learning outcomes:**
1) To practically be able to apply the principles of software design and development
2) To learn some tools used in the development of a software.

**Name of Course (Subject): Computer Graphics and Animation**
**Objectives:**

**Expected learning outcomes:**

## TYBSc Semester V

**Name of Course (Subject): Software Project Management**
**Objectives:**

**Expected Learning Outcomes:**

**Name of Course (Subject): Internet of Things**
**Objectives:**
Discovering the interconnection and integration of the physical world. Learner should get knowledge of the architecture of IoT.
**Expected learning outcomes:**
Learners are able to design & develop IoT Devices. They should also be aware of the evolving world of M2M Communications and IoT analytics.

**Name of Course (Subject): Advance Web Programming**
**Objectives:**

To explore .NET technologies for designing and developing dynamic, interactive and responsive web applications.

**Expected learning outcomes:**

1) Understand the .NET framework
2) Develop a proficiency in the C# programming language
3) Proficiently develop ASP.NET web applications using C#
4) Use ADO.NET for data persistence in a web application.

**Name of Course (Subject): Linux System Administration**

**Objectives:**

Demonstrate proficiency with the Linux command line interface, directory & file management techniques, file system organization, and tools commonly found on most Linux distributions. Effectively operate a Linux system inside of a network environment to integrate with existing service solutions. Demonstrate the ability to troubleshoot challenging technical problems typically encountered when operating and administering Linux systems.

**Expected learning outcomes:**

Learner will be able to develop Linux based systems and maintain. Learner will be able to install appropriate service on Linux server as per requirement. Learner will have proficiency in Linux server administration.

**Name of Course (Subject): Enterprise Java**

**Objectives:**

**Expected learning outcomes:**

## TYBSc Semester VI

**Name of Course (Subject): Software Quality Assurance**

**Objectives:**

**Expected Learning Outcomes:**

**Name of Course (Subject): Security In Computing**

**Objectives:**

To provide students with knowledge of basic concepts of computer security including network security and cryptography

**Expected learning outcomes:**

Understand the principles and practices of cryptographic techniques. Understand a variety of generic security threats and vulnerabilities, and identify & analyze particular security problems for a given application.

**Name of Course (Subject): Business Intelligence**

**Objective:**

**Expected learning outcomes:**

**Name of Course (Subject): Geographical Information Systems**
**Objectives:**

**Expected learning outcomes:**

**Name of Course (Subject): Cyber Laws**
**Objectives:**

**Expected learning outcomes:**