Specialization Courses (CSS)

Course Title: ICT-CS1 Information and Communication Technology

Learning Objectives:

- Understand the basics of information and communication technology
- Learn how to use common ICT tools and software
- Develop skills in problem-solving, critical thinking, and digital literacy

Introduction:

Information and Communication Technology (ICT) has become an essential aspect of our lives. It encompasses a range of technologies that enable us to communicate, process, and store information. In this course, we will explore the basics of ICT, including common tools and software used in the field. We will also develop critical thinking, problem-solving, and digital literacy skills necessary in today's digital world.

Discussion:

1. Introduction to ICT

- Definition and scope of ICT
- ICT in the modern world
- Importance of ICT in education and society

2. Common ICT Tools and Software

- Operating systems (Windows, macOS, Linux)
- Office productivity tools (Microsoft Office, Google Suite)
- Collaboration tools (Slack, Trello, Asana)
- Graphic design software (Adobe Photoshop, Canva)
- Coding tools (Visual Studio Code, Atom)

3. Problem Solving and Critical Thinking

- Approaches to problem-solving
- Logical reasoning and analysis
- Decision-making and evaluation

4. Digital Literacy

- Digital citizenship and responsibility
- Online privacy and security
- Information literacy and source evaluation

Conclusion:

In conclusion, the ICT-CS1 course aims to provide students with a solid foundation in information and communication technology. Through an exploration of common ICT tools and software, problem-solving and critical thinking, and digital literacy, students will develop essential skills for success in the digital age.

Course Title: ICT-CS2 Technical Drawing 1

Learning Objectives:

- Understand the principles and concepts of technical drawing
- Develop basic skills in drawing orthographic and isometric projections
- Create technical drawings using appropriate tools and software

Introduction:

Technical drawing is an important skill for individuals pursuing careers in engineering, architecture, and other related fields. In this course, you will learn the fundamentals of technical drawing, including the principles and concepts of drawing orthographic and isometric projections. You will also be introduced to various tools and software used in technical drawing.

Discussion:

1. Principles and Concepts of Technical Drawing

- Understanding the importance and applications of technical drawing
- Learning the different types of technical drawing
- Knowing the basic principles of technical drawing, such as scale, dimensioning, and line types

2. Drawing Orthographic Projections

- Learning the basic rules of orthographic projection
- Developing skills in creating orthographic projections of simple objects
- Using appropriate tools and software to create accurate orthographic projections

3. Drawing Isometric Projections

- Understanding the basics of isometric projection
- Creating isometric projections of simple objects
- Using appropriate tools and software to create accurate isometric projections

4. Tools and Software for Technical Drawing

- Introduction to tools such as T-squares, compasses, and rulers
- Introduction to software such as AutoCAD and SolidWorks
- Hands-on practice using these tools and software

Conclusion:

By the end of this course, you will have a solid understanding of technical drawing principles and concepts, and the basic skills needed to create accurate orthographic and isometric projections. You will also be familiar with various tools and software used in technical drawing, giving you a competitive edge in pursuing careers in engineering, architecture, and other related fields.

Course title: ICT-CS3 Computer Hardware

Learning Objectives:

- Identify and describe the various components of a computer system
- Understand the functions and roles of each component in a computer system
- Learn how to troubleshoot and diagnose hardware problems
- Understand the importance of regular maintenance and upgrading of computer hardware

Introduction:

ICT-CS3 is an introductory course that focuses on the study of computer hardware. It is designed to provide learners with a foundational knowledge of computer hardware components, their functions, and how they work together to form a computer system. The course covers topics such as computer architecture, system units, input and output devices, storage devices, and peripheral devices.

Discussion:

The course begins with an overview of computer architecture and the components that make up a computer system. Learners will study the function and role of each component in the system, including the CPU, memory, motherboard, and power supply. The course also covers the different types of input and output devices, such as keyboards, mice, printers, and monitors.

The course then moves on to cover storage devices, including hard drives, solid-state drives, and optical drives. Learners will also study the various types of peripheral devices that can be connected to a computer system, such as scanners, cameras, and microphones.

Throughout the course, learners will be introduced to different types of hardware problems that can occur in a computer system, such as hardware failure, driver problems, and system crashes. They will also learn how to troubleshoot and diagnose hardware problems and how to perform regular maintenance tasks to keep a computer system running smoothly.

Conclusion:

ICT-CS3 Computer Hardware is an essential course for anyone interested in the field of information technology. It provides learners with a solid foundation in computer hardware components and how they work together to form a computer system. By the end of the course, learners will have the skills and

knowledge necessary to diagnose and troubleshoot hardware problems and to perform regular maintenance and upgrading tasks to keep a computer system in optimal working condition.

Course Title: ICT-CS4 Software Applications and Multimedia Arts

Learning Objectives:

- Understand the fundamentals of software applications and multimedia arts
- Develop basic skills in software applications and multimedia arts
- Create multimedia projects using appropriate software applications

Introduction:

In today's digital age, software applications and multimedia arts have become essential tools for communication, education, and entertainment. This course aims to introduce students to the fundamental concepts and skills related to software applications and multimedia arts. The course will cover the basics of software applications such as word processing, spreadsheets, and presentation software, as well as multimedia applications such as graphic design, video editing, and animation.

Discussion:

1. Introduction to Software Applications

- Definition of software applications
- Types of software applications
- Introduction to word processing software
- Introduction to spreadsheets software
- Introduction to presentation software

2. Introduction to Multimedia Arts

- Definition of multimedia arts
- Types of multimedia arts
- Introduction to graphic design software
- Introduction to video editing software
- Introduction to animation software

3. Basic Skills in Software Applications and Multimedia Arts

- Basic skills in word processing software
- Basic skills in spreadsheets software
- Basic skills in presentation software
- Basic skills in graphic design software
- Basic skills in video editing software
- Basic skills in animation software

4. Creating Multimedia Projects

- Guidelines for creating multimedia projects
- Choosing appropriate software applications for specific projects
- Planning and executing multimedia projects
- Presenting multimedia projects

Conclusion:

By the end of this course, students will have a basic understanding of software applications and multimedia arts. They will have the skills and knowledge needed to use software applications and multimedia tools for creating simple projects. Students will also be able to choose the appropriate software application for a specific multimedia project and be able to present their work effectively. With the increasing demand for multimedia content, this course will provide students with a solid foundation in software applications and multimedia arts that can be applied in various fields.

Course Title: ICT-CS5 Operating Systems & Software Installations Laboratory

Learning Objectives:

- Understand the fundamentals of operating systems and software installations
- Learn the common installation procedures for various software applications
- Acquire knowledge of troubleshooting common software installation issues
- Develop skills in configuring operating systems and applications

Introduction:

ICT-CS5 Operating Systems & Software Installations Laboratory is a course designed to provide students with practical knowledge of installing, configuring, and troubleshooting software applications and operating systems. In this course, students will learn the basics of operating systems and software installations and will be exposed to various installation procedures for different software applications.

Discussion:

The course covers the different types of operating systems, including Windows and Linux, and their installation procedures. Students will learn how to create bootable USB devices, install operating systems on virtual machines, and configure network settings. The course also provides hands-on training on software installation for different applications such as productivity suites, graphic design software, and multimedia tools.

Furthermore, the course will discuss the common issues that may arise during software installation and how to troubleshoot them. This includes issues related to software compatibility, missing files, and installation errors. Students will learn how to diagnose these issues and resolve them using various troubleshooting techniques.

The course will also cover software configuration, which includes setting up user accounts, system preferences, and application settings. Students will learn how to customize the user interface of their operating system, and configure applications to meet specific user needs.

Conclusion:

ICT-CS5 Operating Systems & Software Installations Laboratory is an essential course for students interested in pursuing a career in information and

communication technology. The skills learned in this course will enable students to install, configure, and troubleshoot software applications and operating systems effectively. This course provides a solid foundation for students who wish to pursue further studies in computer science, information technology, or related fields.

Course title: ICT-CS6 Computer Organization and Assembling

Learning Objectives:

- Understand the fundamental components and structure of a computer system.
- Gain practical skills in assembling and disassembling a computer system.
- Identify and troubleshoot common hardware issues.
- Install and configure an operating system and software applications.

Introduction:

ICT-CS6 is a course that aims to equip students with the knowledge and skills necessary for understanding the fundamental components and structure of a computer system. This course will also cover the process of assembling and disassembling a computer, troubleshooting hardware issues, and installing operating systems and software applications.

Discussion:

The course will cover the following topics:

- Computer components and structure
- Motherboard, CPU, memory, and storage devices
- Power supply unit and cooling systems
- Input/output devices and ports
- Assembling and disassembling a computer system
- Hardware troubleshooting and repair
- Operating systems installation and configuration
- Software applications installation and configuration

Students will have hands-on experience in assembling and disassembling a computer system, identifying and diagnosing common hardware issues, and installing and configuring operating systems and software applications. This course will also emphasize the importance of safety procedures and precautions when working with computer hardware.

Conclusion:

Upon completing the course, students will have gained a solid understanding of the fundamental components and structure of a computer system, practical skills in assembling and disassembling a computer, and the ability to identify and troubleshoot common hardware issues. They will also have the knowledge and skills to install and configure operating systems and software applications. This course provides a strong foundation for students who wish to pursue further

studies in computer science or related fields, or for those who wish to enter the workforce in technical support roles.

Course title: ICT-CS7 Electrical Wiring and Electronics Circuit Component

Learning objectives:

- Understand the basic concepts and principles of electrical wiring and electronics circuit components.
- Develop skills in assembling and troubleshooting electrical and electronic circuits.
- Identify the different types of electrical and electronic components and their functions.
- Analyze and interpret electrical and electronic diagrams.

Introduction:

ICT-CS7 is a course that provides students with the foundational knowledge and skills needed to work with electrical wiring and electronic circuit components. Students will learn how to identify, assemble, and troubleshoot various types of circuits, as well as gain an understanding of basic electrical principles.

Discussion:

The course covers a range of topics related to electrical wiring and electronic circuit components. Students will learn about the different types of electrical components and their functions, including resistors, capacitors, and diodes. They will also study various electronic circuit components, such as transistors, ICs, and LEDs. Additionally, the course will cover how to read and interpret electrical and electronic diagrams.

In the laboratory component of the course, students will gain hands-on experience with electrical wiring and electronic circuit components. They will learn how to use basic tools such as multimeters and soldering irons, as well as how to troubleshoot circuits and identify common issues.

Conclusion:

ICT-CS7 is an important course for students who are interested in working with electrical wiring and electronic circuit components. By the end of the course, students will have a solid understanding of basic electrical principles and the skills needed to assemble and troubleshoot circuits. This knowledge and experience will be valuable for future studies and careers in fields such as electronics, engineering, and computer science.

Course title: ICT-CS8L Computer and Systems Diagnostics

Learning objectives:

- Understand the principles and methods of computer and systems diagnostics
- Learn how to use diagnostic tools and techniques to troubleshoot computer hardware and software problems
- Develop problem-solving and critical thinking skills in the context of computer diagnostics

Introduction:

In the field of information and communication technology, computer and systems diagnostics are essential skills for identifying and resolving hardware and software issues. This course aims to provide students with a comprehensive understanding of computer and systems diagnostics, and to equip them with the tools and techniques necessary to diagnose and fix a wide range of computer problems.

Discussion:

The course will cover the following topics:

1. Introduction to computer and systems diagnostics

- Definition and importance of computer and systems diagnostics
- Overview of diagnostic tools and techniques

2. Hardware diagnostics

- Understanding computer hardware components
- Troubleshooting hardware problems
- Using diagnostic tools for hardware diagnostics

3. Software diagnostics

- Understanding software components and systems
- Troubleshooting software problems
- Using diagnostic tools for software diagnostics

4. Network diagnostics

- Understanding network components and systems
- Troubleshooting network problems
- Using diagnostic tools for network diagnostics

5. Advanced diagnostics

- Advanced diagnostic techniques for complex problems
- Using diagnostic tools for advanced diagnostics

Conclusion:

Upon completing this course, students will have gained a solid understanding of computer and systems diagnostics, and will be able to apply their knowledge to diagnose and solve hardware, software, and network problems. They will have developed problem-solving and critical thinking skills that are essential for success in the field of information and communication technology.

Course title: ICT-CS9 Technological Teamwork

Learning objectives:

- Develop the necessary skills to work effectively in a team in a technological setting.
- Learn how to communicate and collaborate with team members to achieve common goals.
- Explore different team structures and roles, and how they can be utilized to maximize productivity and efficiency.
- Gain an understanding of the importance of ethical and professional behavior in a team environment.

Introduction:

ICT-CS9 Technological Teamwork is a course designed to provide students with the skills and knowledge needed to effectively work in a team setting in a technological environment. In today's fast-paced and complex world, working in teams has become an essential part of modern-day organizations. The course aims to prepare students for the demands of the 21st-century workforce by teaching them how to communicate, collaborate, and work effectively with others.

Discussion:

The course covers a range of topics related to teamwork, such as team structures and roles, communication and collaboration, problem-solving, and conflict resolution. Students will learn how to identify their strengths and weaknesses and how to use these effectively within a team. They will also explore the importance of ethical and professional behavior in a team setting, including topics such as respect, trust, and accountability.

The course will be delivered through a combination of lectures, group discussions, and practical exercises. Students will have the opportunity to work in teams and apply their learning to real-world situations. By the end of the course, students will have developed a range of skills that are essential for working in a team environment, including communication, problem-solving, and conflict resolution.

Conclusion:

ICT-CS9 Technological Teamwork is a valuable course that provides students with the necessary skills and knowledge to work effectively in a team setting in a technological environment. The course covers a range of topics related to teamwork, including team structures and roles, communication and

collaboration, problem-solving, and conflict resolution. By the end of the course, students will have developed a range of skills that are essential for working in a team environment, including communication, problem-solving, and conflict resolution. The course aims to prepare students for the demands of the 21st-century workforce by teaching them how to communicate, collaborate, and work effectively with others.

Course title: ICT-CS10 Programming Languages

Learning objectives:

- Develop basic programming skills using a high-level programming language
- Understand the fundamentals of programming, including variables, data types, control structures, and functions
- Develop programs that use loops, conditionals, functions, and arrays
- Learn how to write programs that interact with users, files, and databases

Introduction:

ICT-CS10 Programming Languages is a course that aims to teach students the basics of programming using a high-level programming language. The course covers the fundamental concepts of programming, including variables, data types, control structures, and functions. Students will also learn how to develop programs that use loops, conditionals, functions, and arrays. Furthermore, the course will teach students how to write programs that interact with users, files, and databases.

Discussion:

The course is designed to provide students with a solid foundation in programming that they can build on in future courses. The programming language used in the course may vary, but it is typically a widely-used high-level language, such as Python or Java. Students will learn how to write programs from scratch and will be introduced to common programming tools, such as Integrated Development Environments (IDEs) and code editors.

The course will cover a range of programming concepts and topics, including variables, data types, control structures, functions, loops, conditionals, arrays, file input/output, and database connectivity. Students will also learn how to use debugging tools and techniques to troubleshoot errors in their code.

In addition to programming skills, the course will also emphasize teamwork and collaboration. Students will work on group projects and learn how to share and collaborate on code using version control tools such as Git.

Conclusion:

ICT-CS10 Programming Languages is an essential course for students who want to pursue a career in programming or software development. The course provides a solid foundation in programming skills and concepts that can be applied in a variety of settings. By the end of the course, students will have

developed the skills needed to write basic programs and work effectively in a programming team.

Course title: ICT-CS11 Database Management Systems

Learning objectives:

- Understand the fundamentals of database management systems (DBMS)
- Learn about the different types of DBMS and their features
- Gain practical skills in designing and creating databases using a popular DBMS software
- Learn how to use SQL to manipulate data in a database
- Understand the concepts of database security and backup and recovery

Introduction:

Database management systems (DBMS) are essential tools for organizations to manage their vast amounts of data. In this course, students will learn about the fundamentals of DBMS and how to design and create databases using a popular DBMS software. They will also learn how to use SQL to manipulate data in a database and understand the concepts of database security and backup and recovery.

Discussion:

The course will cover the following topics:

- Introduction to DBMS
- Relational model and ER diagrams
- Normalization and denormalization
- SQL language and syntax
- Advanced SQL queries and data manipulation
- Database security and access control
- Backup and recovery procedures
- Introduction to popular DBMS software

Through lectures, demonstrations, and hands-on exercises, students will gain practical skills in designing and creating databases, manipulating data using SQL, and managing database security and backup and recovery. They will also learn about the different types of DBMS, their features, and how to choose the right DBMS for a particular use case.

Conclusion:

ICT-CS11 Database Management Systems is an essential course for students who want to pursue a career in IT, database administration, or data analysis. By the end of the course, students will have a strong foundation in DBMS concepts and

practical skills in designing and managing databases. They will also understand the importance of database security and backup and recovery procedures.

Course Title: ICT-AN13 Information Systems, Analysis, Design and Engineering

Learning Objectives:

- Understand the concepts of information systems, analysis, design, and engineering.
- Learn the different types of information systems and their applications.
- Acquire skills in the analysis, design, and engineering of information systems.
- Learn about the different phases of the system development life cycle (SDLC) and the techniques and methodologies used in each phase.
- Develop the ability to design and implement database systems.
- Develop effective communication and teamwork skills in a technology project.

Introduction:

ICT-AN13 is a course that focuses on the study of information systems, analysis, design, and engineering. In today's digital age, businesses and organizations rely heavily on information systems to process, store, and retrieve data. As such, there is a high demand for professionals who have the knowledge and skills to design, develop, and maintain these systems. This course provides students with the foundational knowledge and skills needed to work in this field.

Discussion:

The course begins by introducing the basic concepts of information systems, including their types and applications. Students then learn about the different phases of the system development life cycle (SDLC) and the techniques and methodologies used in each phase. They also learn about data modeling, database systems, and database design.

The course covers topics such as business analysis, requirements gathering, and feasibility studies. Students will learn how to analyze and design an information system, including developing functional and technical specifications, designing system interfaces, and creating user documentation. They will also learn about software engineering principles, object-oriented analysis and design, and UML diagrams.

The course also emphasizes effective communication and teamwork skills, as students will work on a technology project in groups. They will learn how to work collaboratively to design, develop, and implement an information system.

Conclusion:

ICT-AN13 is a valuable course for students who are interested in pursuing a career in information systems, analysis, design, and engineering. By the end of the course, students will have acquired the foundational knowledge and skills needed to design and develop information systems. They will also have developed effective communication and teamwork skills, which are essential in the technology industry.

Course title: ICT-AN14 Introduction to Artificial Intelligence

Learning objectives:

- Understand the basic concepts and principles of artificial intelligence
- Learn about various AI technologies and their applications
- Develop basic programming skills for AI systems
- Understand ethical considerations and challenges related to AI

Introduction:

Artificial intelligence (AI) is an exciting field that has the potential to revolutionize the way we live and work. In this course, students will be introduced to the basic concepts and principles of AI, including machine learning, natural language processing, computer vision, and robotics. They will also learn about various AI technologies and their applications, including chatbots, virtual assistants, self-driving cars, and predictive analytics.

Discussion:

The course will cover the fundamental concepts of AI, such as supervised and unsupervised learning, neural networks, and deep learning. Students will also be introduced to programming languages and tools commonly used in AI development, such as Python and TensorFlow. They will learn how to create basic AI systems, such as chatbots, and explore the ethical considerations and challenges related to AI.

The course will also cover various AI applications in different industries, including healthcare, finance, and manufacturing. Students will learn about the impact of AI on society and the workforce and how to address the ethical concerns related to the use of AI.

Conclusion:

ICT-AN14 Introduction to Artificial Intelligence is a great course for students who are interested in learning about this exciting field. By the end of the course, students will have a solid understanding of the basic concepts and principles of AI, as well as the ability to develop basic AI systems. They will also be equipped with the knowledge to address ethical considerations and challenges related to AI.