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Defined The Course

1. Understanding the Learning Process:

- **Learning New Words:**
  - The passage emphasizes that learning about system software and computing is similar to learning a new language. Just as you learned words and their meanings in English, you will now learn the specific terminology related to computers and IT.

  - **Example:** When you first learned English, you learned the word "apple" and associated it with the fruit. Similarly, in this course, you will learn terms like "operating system," "data," "information," etc., and associate them with specific concepts in computing.

2. Introduction to Information Technology (IT):

- **Information Technology:**
  - IT refers to the use of computers, software, and networks to store, retrieve, transmit, and manipulate data or information. It is a broad field encompassing various aspects of technology, including system software and computing concepts.

  - **Example:** Think of IT as a vast library where computers act as the librarians. The software helps to organize, retrieve, and manage the books (data) efficiently, ensuring that the right information is available when needed.

3. Key Concepts: Data and Information:

- **Data:**
  - Data is any raw, unprocessed fact. It can be a number, word, or symbol that, by itself, does not convey any meaningful information.
  - **Example:** The number "35" is data. It's just a number with no context or specific meaning attached to it.

- **Information:**
  - When data is organized or processed in a way that adds meaning, it becomes information. Information is what informs us or provides us with knowledge.
  - **Example:** If you combine "35" with the word "years," you get "35 years." Now, this phrase has meaning—it tells you about a period of time. If you further add "Mark is 35 years old," this sentence provides specific information about a person named Mark, informing you of his age.

4. System Software and Computing Concepts:

- **System Software:**
  - System software is a type of computer program that is designed to run a computer's hardware and application programs. It acts as a bridge between the hardware and the user, ensuring that everything functions smoothly.
  - **Example:** The operating system (OS) on your computer, like Windows or macOS, is system software. It manages the computer's resources and allows you to run other programs like word processors or web browsers.

- **Computing Concepts:**
  - Computing concepts refer to the fundamental ideas and principles that underlie the operation and use of computers. This includes understanding how data is processed, stored, and retrieved by a computer.
  - **Example:** One basic computing concept is the idea of binary code—the language that computers use to process data. Everything on your computer, from text to images, is ultimately represented in binary code (a series of 0s and 1s).

5. What is Technology?

Technology is a broad term that refers to anything humans create, whether it's a physical object or a method of doing something. Technology can be divided into two main categories:

- **Tools**: These are tangible objects that humans create.
- **Knowledge**: This refers to the methods or processes humans develop to do something.

5A. Tools (Tangible Technology)

Tools are physical objects that humans make. These can range from simple items like a table to complex machines like computers. The key idea is that these tools are things we create by taking resources from the natural world and transforming them into something new and useful.

Example of Tools: Imagine you're in the wilderness, and you decide to build a table. You cut down trees, shape the wood, and assemble it into a table. This table is now a piece of technology. Why? Because you've taken something natural (the trees) and converted it into a new form (a table) that serves a specific purpose. Anything that humans create, from a hammer to a smartphone, falls under the category of tools in technology.

5B. Knowledge (Intangible Technology)

Knowledge in the context of technology refers to the "how-to" of doing something. It's not something you can touch, but it's just as important. This knowledge can be about creating tools, solving problems, or developing new methods.

Example of Knowledge: Suppose you come up with a new recipe for baking a cake. The steps you take to bake this cake—the ingredients, the mixing process, the baking time—are all part of this knowledge. Once you write down these steps, you've created a piece of technology in the form of knowledge. This recipe is intangible; it’s information that can be shared, taught, and used by others.

5C. Technology as a Combination of Tools and Knowledge

Technology can be **tangible** (like tools) or **intangible** (like knowledge). Tangible technology includes physical objects we've created, like a car or a computer. Intangible technology includes information or methods, like a recipe or a computer algorithm.

6. What is Information Technology?

When we talk about **information technology (IT)**, we're focusing on the subset of technology that deals specifically with information. This includes both the tools and the knowledge that help us to:

- **Collect Data**: Tools like keyboards, scanners, or cameras help us gather data.
- **Process Data**: Computers and software applications process this data to make it useful.
- **Store Data**: Hard drives, cloud storage, and databases store this data for future use.
- **Distribute Data**: Networks, the internet, and other communication tools allow us to share information.

6A. The Most Important Tool in Information Technology: The Computer

In the realm of information technology, the computer is the most crucial tool. It allows us to collect, process, store, and distribute data efficiently. The knowledge of how to use computers, create software, and manage data is also an essential part of IT.

6B. Summary

- **Technology** refers to anything humans create, either as physical objects (tools) or as methods/knowledge.
- **Tools** are tangible objects we create, like tables, computers, or cars.
- **Knowledge** is the intangible "how-to" for doing something, like a recipe or a method for solving a problem.
- **Information Technology (IT)** specifically focuses on tools and knowledge related to handling information, including data collection, processing, storage, and distribution.

Example: A smartphone is a piece of technology that serves as a tool (a physical object). The operating system it runs on and the knowledge to use its features are examples of the knowledge aspect of technology. When used for managing information, such as sending emails or storing photos, it becomes a part of information technology.

7. Definition Of A Computer

Let’s break down the definition of a computer to understand the details it’s communicating:

- **Electronic Device**:
  - **What It Means**: A computer is a device that operates using electricity. This means it relies on electrical power to function.
  - **Example**: Just like a television, a smartphone, or a PlayStation uses electricity to function, a computer does too. When you plug in your computer and turn it on, you're providing it with the electricity it needs to operate.

- **Accepts Input**:
  - **What It Means**: A computer can receive information from the outside world through various devices.
  - **Example**: Consider a keyboard or a mouse. When you type on the keyboard or move the mouse, you're sending signals (input) to the computer. These signals are then processed to perform actions, like displaying text on the screen or moving the cursor.

- **Processes Input via a Set of Instructions**:
  - **What It Means**: After receiving input, the computer uses a set of instructions (software) to process that information. Instructions tell the computer how to interpret and act on the input it receives.
  - **Example**: When you type "2 + 2" into a calculator app on your computer and press "Enter," the calculator software (which contains a set of instructions) processes this input. It understands that you're asking it to perform an addition operation and provides the result.

- **Generates Output**:
  - **What It Means**: After processing the input, the computer produces a result, which is sent to an output device.
  - **Example**: Continuing from the previous example, when the calculator app processes "2 + 2" and determines the result is "4," this result is then displayed on the screen. The screen is the output device that shows you the result of the operation.

7A. Understanding Through Analogy

Let's use an analogy to better understand these concepts:

- **Electronic Device**: Think of a computer like a chef in a kitchen. The kitchen has appliances (stove, oven, mixer) that operate using electricity. Just like these appliances need power to work, a computer needs electricity to function.

- **Accepts Input**: Imagine you hand the chef a recipe and the ingredients. The recipe is your instruction (input), and the ingredients are the data the chef will work with. The chef needs these to start cooking.

- **Processes Input via a Set of Instructions**: The chef follows the steps in the recipe to prepare the meal. This is like the computer processing the input using software instructions. Each step in the recipe tells the chef what to do with the ingredients, just as software tells the computer how to handle data.

- **Generates Output**: After cooking, the chef presents the finished dish to you. This is the output. The dish is the final product, just like the result shown on your screen after the computer processes data.

7B. Deeper Dive into Key Concepts

- **Input Devices**: These are the tools or peripherals you use to feed data into the computer. Common examples include:
    - **Keyboard**: For typing text.
    - **Mouse**: For selecting and interacting with items on the screen.
    - **Microphone**: For voice input.
    - **Scanner**: For digitizing physical documents.

- **Processing**: This is where the "thinking" happens inside the computer. The central processing unit (CPU) is often referred to as the "brain" of the computer. It interprets and executes instructions from software. The CPU performs calculations, runs programs, and manages data flow.

- **Software**: The set of instructions that the CPU follows. Software can be divided into two main types:
    - **System Software**: This includes the operating system (like Windows, macOS, Linux) that manages the computer's resources and hardware. It's like the chef's knowledge of cooking techniques and how to use kitchen tools.

    - **Application Software**: These are programs that perform specific tasks for users, like word processors, games, or web browsers. They're like individual recipes that the chef follows to prepare different dishes.

- **Output Devices**: These are the devices that the computer uses to communicate the result of its processing. Common examples include:
    - **Monitor**: Displays visual output like text, images, and videos.
    - **Printer**: Produces a physical copy of documents or images.
    - **Speakers**: Output sounds, such as music or voice.

7C. Putting It All Together

When you use a computer, you're engaging in a cycle of input, processing, and output. For instance, when you type a document:

- **Input**: You press keys on the keyboard, sending characters to the computer.
- **Processing**: The word processor software processes your input, arranging the characters into words and sentences according to the rules of grammar and formatting you've chosen.
- **Output**: The text appears on the monitor, and if you choose to print it, the printer produces a physical copy.

This cycle is at the heart of what makes a computer a powerful and versatile tool. It can take various types of input, process them according to complex sets of instructions (software), and provide meaningful output in many forms.

8. Hardware & Software

By understanding the two primary components of a computer: **hardware** and **software**.

8A. Hardware

Hardware refers to the physical parts of a computer that you can touch and see. These are the tangible components that make up the computer system. Hardware can be further divided into several categories:

- **Input Devices:** These are devices that allow you to interact with the computer by inputting data. Examples include the keyboard, mouse, microphone, and scanner.
    - ***Example**:* When you type on your keyboard, the keys you press are registered as inputs that the computer will process.

- **Processing Devices:** These are the components that process the data input from the user. The central processing unit (CPU) is the primary processing device.
    - ***Example**:* The CPU processes the instructions to run a program like Microsoft Word, making it possible to create and edit documents.

- **Output Devices:** These devices display or produce the results of the computer's processing. Common output devices include monitors, printers, and speakers.
    - ***Example**:* When you type in Microsoft Word, the text you input is processed and displayed on the monitor.

- **Storage Devices:** These are used to store data permanently or temporarily. Examples include hard drives, SSDs, USB flash drives, and RAM (which is a type of temporary storage).
    - ***Example**:* When you save a Word document, it is stored on your hard drive or SSD for future access.

- **Communication Devices:** These devices enable your computer to communicate with other devices or networks. Examples include network interface cards (NICs), modems, and routers.
    - ***Example**:* Your Wi-Fi card connects your computer to the internet, allowing you to browse the web.

8B. Software

Software refers to the set of instructions or programs that tell the computer what to do. It's the invisible part of the computer system that operates in the background, controlling the hardware and enabling you to perform tasks. There are two main types of software:

- **System Software:** This is the software that manages and controls the hardware so that the application software can perform its tasks. The most common example of system software is the operating system (OS), such as Windows, macOS, or Linux.
    - ***Example:*** The OS manages the computer's memory, processes, and all of its software and hardware. It also provides a user interface so that you can interact with the computer.

- **Application Software:** This is software designed to help users perform specific tasks. Examples include word processors like Microsoft Word, web browsers like Google Chrome, and games.
    - ***Example:*** When you use Microsoft Word to write a document, the application software is running on top of the system software to perform that task.

i. Example to Illustrate Software Instructions

Imagine you're in your kitchen, wanting to make tea. To make the tea, you follow a set of instructions, like boiling water, adding tea leaves, letting it steep, and then pouring the tea into a cup. This set of instructions is similar to how software works on a computer.

- **Software as Instructions:** Just like the recipe for making tea, software is a collection of instructions written in code that tells the computer how to perform a specific task. For example, a web browser like Google Chrome has a set of instructions that it follows to load a web page.

- **Following the Instructions:** When you type a URL into the web browser and press enter, the browser doesn't just magically know what to do. It has been programmed with a series of steps:
    - **Retrieve the URL**: The browser knows it needs to take the text you typed and use it to locate the web page.
    - **Send Request**: The browser sends a request to a server over the internet using the network interface card.
    - **Resolve the Domain**: The browser might need to resolve the domain name (like www.example.com) to an IP address, which is how computers locate each other on the internet.
    - **Receive Data**: The server sends the data back, which the browser then processes to display the web page.

These steps are all part of the software's instructions, which the hardware executes.

ii. Software in Communication

When it comes to communication devices, both hardware and software are involved. For instance, your network card is a piece of hardware that connects to the internet, but it works with networking software (like the drivers and protocols) to transmit data.

- **Networking Software:** This type of system software manages data exchange over the network, ensuring that the information you send and receive (such as a web page request) is correctly processed and transmitted.

In summary, **hardware** is the physical machinery of the computer, while **software** is the set of instructions that tells the hardware what to do. Both are essential for a computer to function, just like how a recipe (software) and kitchen tools (hardware) are both necessary to make a meal.

9. System Software: An Overview

System software is the essential software that manages and controls the hardware components of a computer, ensuring they work together smoothly. It includes the **operating system (OS)**, which is the most critical part of system software.

9A. Understanding a "System"

A **system** is a group of interrelated components that work together to achieve a specific function. Systems are everywhere around us:

- **Biological Systems**: For example, the **respiratory system** in the human body includes the nose, throat, and lungs. These organs work together to facilitate breathing.

- **Mechanical Systems**: An **aeroplane** is a system composed of various parts like wings, engines, and the tail. These components work together to enable the aeroplane to fly.

9B. System Software in Computers

In the context of computers, when we refer to a "system," we usually mean **computer hardware**. The hardware consists of components like input devices (keyboard, mouse), processors (CPU), output devices (monitor, printer), storage (hard drives, SSDs), and communication devices (network cards, modems).

System software is like the pilot of an aeroplane. Just as a pilot controls the plane's hardware to ensure it flies correctly, system software controls and coordinates the computer's hardware components to perform tasks, such as processing data.

9C. Operating System (OS)

The **operating system** is the most significant part of system software. It is responsible for managing and coordinating the hardware components so that they can work together efficiently. Without an operating system, the computer's hardware wouldn't be able to function in a coordinated manner, just as an aeroplane without a pilot wouldn't be able to fly properly.

Example:

- When you're using an application like **Microsoft Teams** for an online class, you see it working on the screen. However, behind the scenes, the operating system is managing various hardware components like the network connection, camera, microphone, and keyboard. The OS ensures that all these components work together so that you can have a smooth online class experience.

9D. Application Software

Application software is different from system software. While system software controls and manages the hardware, application software is added to the system to perform specific tasks that extend the computer's functionality.

Example

- Imagine you want your computer to be able to edit photos. You would install an application like **Adobe Photoshop**. Photoshop is application software that allows you to perform a new function (photo editing) on your computer. However, Photoshop cannot run on its own; it needs the operating system to function.

Conclusion

- **System Software**: Controls and coordinates hardware, ensuring the computer operates smoothly. The most important part is the operating system (OS).
- **Application Software**: Extends the computer's functionality by adding new features or capabilities, but it needs the system software (OS) to run.

Understanding these concepts helps us appreciate how computers work at a fundamental level, allowing us to perform various tasks efficiently.

Introduction & Overview

In this module, you'll dive into the fascinating world of **system software**, which is essentially the backbone of a computer. Think of a computer as a complex machine, and system software is like its brain—coordinating all the different parts to work together smoothly. The system software consists of a set of instructions that control the hardware, meaning it manages the physical components of the computer like the processor, memory, and storage devices.

Example: Imagine your computer as a well-organized kitchen. The system software is like the head chef, who instructs the kitchen staff (hardware) on what to do. The chef decides how much heat to use, what ingredients to mix, and in what order to prepare the dishes (tasks) so that everything is ready at the right time. Without the chef (system software), the kitchen staff (hardware) wouldn't know how to operate efficiently, leading to chaos.

In this module, you'll learn how this "chef" (system software) works, how it manages resources, and how it interacts with the "ingredients" (applications and users) to keep everything running smoothly.

1. Lecturer Information

- **Lecturer Name:** [redacted]
- **Email:** [redacted]
- **Telephone Extension:** ---- (available via MS Teams)
- Mr. Santuraki is your guide through this journey into system software. If you need to reach out to him, email is the best way, but there are some important points to keep in mind.

2. Caution and Best Practices for Communication

Mr. Santuraki has a large number of students under his care—about 1,000 at any given time. Because of this, he advises on how best to communicate with him:

- **Ask Questions in Class:**
  - **Why?** Asking questions during class is the most effective way to get answers. If you have a question, chances are others might have the same one. By asking in class, you help not only yourself but also your peers.
  - **Example:** Let's say you're unsure about how the system software manages memory. Instead of sending an email, ask during class. Mr. Santuraki can explain the concept in real time, maybe even drawing diagrams or giving examples that help everyone understand.

- **Avoid Personalized Messages:**
  - **Why?** Mr. Santuraki may not reply promptly to individual messages due to the sheer volume he receives. It's more efficient for both him and the students to address questions collectively in class.
  - **Example:** If you have a specific question about an upcoming assignment, bring it up during class rather than sending a message. This way, the lecturer can clarify any confusion for the entire group, ensuring everyone is on the same page.

- **Timing:**
  - The beginning and end of each class are dedicated to attendance, but the end is also when you should bring up any questions you have. If you ask during this time, you'll get an instant response.

- **Delayed Responses:**
  - If you do send a message, be prepared to wait up to a week for a reply. This is simply due to the high volume of communications Mr. Santuraki manages.

In summary, to get the most out of this module and to communicate effectively with Mr. Santuraki, make sure to actively participate in class discussions. This will not only benefit you but also your classmates, and it ensures you get timely and thorough responses to your questions.

3. Pre-requisites For This Course

In any course, prerequisites are the foundational knowledge or skills that students need to have before starting the course. They are like the "building blocks" that help ensure that everyone is starting from a similar level of understanding. For example, before taking a calculus course, a student typically needs to know algebra and trigonometry. These subjects are the prerequisites because they provide the necessary background to understand calculus concepts.

In the context of this course, the prerequisites are quite minimal. It only requires a basic knowledge and understanding of what a computer is. This is like saying you need to know what a car is before learning how to drive one. You don't need to know how to fix the engine or how the car was built, but you should understand the basic idea that a car is a vehicle used for transportation.

Similarly, for this course, you don't need to be a computer expert or have in-depth technical knowledge. You just need to be familiar with the basic concept of a computer—knowing it’s a machine that can perform tasks like word processing, browsing the internet, or running software. This basic understanding will help you grasp the new concepts and skills introduced in the course.

4. Aims Of This Course

The aims or objectives of this course outline what the course intends to achieve by the end of the learning period. They provide a roadmap of the knowledge, skills, and competencies that students should develop through the course.

Let's break down the aims:

1. **Contribute to Learning Outcomes at Level 1**:
    - The course is designed to help you achieve certain learning outcomes that are expected at the first level of your study. These outcomes might include understanding basic concepts in system software and computing, developing problem-solving skills, and beginning to think critically about how software and computing systems work.

2. **Introduce System Software and Computing Concepts**:
    - The course aims to introduce you to the basics of system software, which is the software that helps run and manage a computer's hardware and software resources (like operating systems), and computing concepts, which are the foundational ideas in computer science (like algorithms, data structures, etc.).

3. **Prepare for Level 2 Modules**:
    - This course also serves as a preparatory step for more advanced courses you'll take in the next level of study. Think of it like learning to crawl before you walk—it builds the necessary foundation so you can handle more complex topics later on.

4. **Develop Skills in System Software and Computing Concepts**:
    - Beyond just introducing these topics, the course also begins to help you develop practical skills related to system software and computing concepts. This could involve hands-on practice with software tools, coding exercises, or analyzing how different systems operate.

5. **Develop Lifelong Learning Skills**:
    - The course encourages you to develop independent learning skills, which are essential for lifelong learning. This means you'll start learning how to study on your own, find information, and apply what you've learned to new situations—skills that will be valuable throughout your life.

6. **Equip Students with Relevant Knowledge and Techniques**:
    - By the end of the course, you should have a solid foundation of knowledge, skills, and techniques that are relevant to the study of system software and computing. This could involve understanding how software interacts with hardware, or how different computing concepts can be applied in real-world scenarios.

7. **Develop Analytical and Decision-Making Skills**:
    - You will learn how to analyze different situations or problems and make informed decisions based on your analysis. For instance, you might be given a case study where you need to choose the best software solution for a particular problem.

8. **Problem-Solving and Innovation**:
    - The course encourages you to think creatively and come up with innovative solutions to problems, whether they are simulated (hypothetical scenarios) or based on real case studies.

9. **Communication Skills**:
    - You'll also learn how to effectively communicate your ideas to different audiences. This could mean explaining a complex computing concept to a non-technical person or presenting your solutions to a team of peers.

10. **Quantitative Skills and Resource Management**:
    - The course aims to develop your ability to use quantitative (numerical) skills to allocate resources effectively within an organization. For example, you might need to determine how to distribute computing resources like memory or processing power to different tasks or applications.

11. **ICT Skills for Solution Development**:
    - Information and Communication Technology (ICT) skills are essential in today's digital world. This course will help you develop these skills, enabling you to manage and develop software solutions effectively.

12. **Time Management for In-Course Assessments**:
    - Finally, the course emphasizes the importance of managing your own study time effectively, especially when it comes to completing assessments. Good time management skills will help you stay on track and meet deadlines.

4A. Example to Illustrate the Aims

Imagine you're training to become a chef. The course you're taking is your first step in culinary school.

- **Prerequisite**: You only need to know what a kitchen is and be familiar with basic kitchen tools—like a knife, a stove, and a pan.

- **Course Aims**:
    - You'll learn basic cooking techniques (like chopping, boiling, and sautéing).
    - You'll understand the fundamentals of food science (why bread rises, and how to balance flavours).
    - You'll start preparing simple dishes (building the skills you'll need for more complex recipes later on).
    - You'll be introduced to the concept of menu planning and begin developing the ability to manage a kitchen.
    - The course will also teach you how to work independently, finding recipes or techniques on your own and applying them in your cooking.

By the end of the course, you should be ready to move on to more advanced cooking techniques and recipes in the next level of study, with a solid foundation in basic culinary skills.

5. Course Learning Outcomes (CLOs)

At the end of this module, this course learning outcome is your exam schedule and **YOU** should be able to:

- Explain the basic principles of computer systems and how hardware components work together in computer systems. (C2, PLO1)
- You are also required to be able to use operating system concepts and functions to assist in choosing the suitable system based on the given scenario. (C3, PLO2)
- Work in a group to explore the features of system software and hardware performance of a chosen computer system using relevant tools. In other words, working well with other people, it's a very important skill that you have to understand and learn how to. (A3, PLO4)

6. Course Mapping

6A. Mapping of CLOs with MOEs Domain

	PL01	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11
CLO1											
CLO2											
CLO3											

6B. Course Learning Outcomes (CLO)

Course Learning Outcomes	Teaching Methods	Assessment Methods
CLO1	Lecture	Class Test 1
CLO2	Lecture	Class Test 2
CLO3	Tutorial / Case Study	Group Assignment

6C.Program Learning Outcome (PLO)

PLO 1 - Knowledge and Understanding	PLO 6 - Digital Skills
PLO 2 - Cognitive Skills	PLO 7 - Numeracy Skills
PLO 3 - Practical Skills	PLO 8 - Leadership, autonomy and responsibility
PLO 4 - Interpersonal Skills	PLO 9 - Personal Skills
PLO 5 - Communication Skills	PLO 10 - Entrepreneurial Skills
	PLO 11 - Ethics and professionalism

i. What Is Your Program Learning Outcome (PLO)?

Program Learning Outcomes (PLOs) are a set of key skills, knowledge, and attributes that a university program expects its students to develop and demonstrate by the time they graduate. These outcomes are designed to ensure that students are well-prepared for their future careers and personal lives. Each PLO corresponds to a specific area of development that is critical for success in both professional and personal contexts. Let's break down the PLOs mentioned and understand them with examples.

1. Knowledge and Understanding

- **Definition:** This involves the acquisition of factual and theoretical knowledge in your field of study. It's about knowing the essential concepts, terms, and theories that form the foundation of your degree.
- **Example:** If you're studying computer science, knowledge and understanding would involve learning programming languages, understanding how computers work, and knowing the principles of software development.

2. Cognitive Skills

- **Definition:** These are your mental abilities, including memory, problem-solving, and critical thinking. Cognitive skills are about how well you can process information, understand complex ideas, and apply your knowledge to solve problems.
- **Example:** Remembering algorithms and applying them to develop software solutions is a cognitive skill. If you're faced with a problem in your code, using logic to debug and fix the issue is also an application of cognitive skills.

3. Practical Skills

- **Definition:** Practical skills are the hands-on abilities you acquire that allow you to use tools, technology, and techniques specific to your field.
- **Example:** Knowing how to use Microsoft Excel to analyze data, or being able to operate a 3D printer in an engineering program, are examples of practical skills. In a software engineering program, using development environments like Eclipse or Visual Studio Code to write and test code is a practical skill.

4. Interpersonal Skills

- **Definition:** Interpersonal skills relate to how you interact with others. This includes communication, teamwork, empathy, and social intelligence.
- **Example:** Collaborating with classmates on a group project requires interpersonal skills. Showing empathy towards a classmate going through a tough time or resolving conflicts amicably during teamwork are key interpersonal abilities.

5. Communication Skills

- **Definition:** Communication skills refer to your ability to convey information clearly and effectively, both in written and verbal forms.
- **Example:** Writing a clear and concise research paper, or giving a well-organized presentation to your class, demonstrates strong communication skills. If you're in a debate, your ability to articulate your points persuasively is another example.

6. Digital Skills

- **Definition:** Digital skills involve your ability to use technology tools and platforms effectively. This includes everything from basic computer literacy to advanced programming or data analysis.
- **Example:** Creating a professional presentation using PowerPoint, coding a website, or using statistical software to analyze data are examples of digital skills.

7. Numeracy Skills

- **Definition:** Numeracy skills are your ability to work with numbers, including basic arithmetic, statistical analysis, and logical reasoning.
- **Example:** In a business program, numeracy skills might involve calculating financial forecasts or analyzing market trends. In engineering, it might involve solving complex mathematical problems or using calculus in design.

8. Leadership, Autonomy, and Responsibility

- **Definition:** This involves your ability to take charge, work independently, and be accountable for your actions and decisions.
- **Example:** Leading a team project, managing your time effectively without needing constant supervision, or taking responsibility for the outcomes of your work are examples of these skills. In a workplace, it might mean stepping up to lead a new initiative or project.

9. Personal Skills

- **Definition:** Personal skills relate to how you manage yourself, including self-care, self-discipline, and emotional resilience.
- **Example:** Maintaining a healthy work-life balance, managing stress effectively, and practising self-discipline by consistently meeting deadlines are personal skills. Another example could be setting personal goals and working towards them with determination.

10. Entrepreneurial Skills

- **Definition:** Entrepreneurial skills involve the ability to think creatively, take risks, and develop new ideas or businesses.
- **Example:** If you start a small business or a side project while still in university, or if you come up with innovative solutions during your studies, you're demonstrating entrepreneurial skills. Participating in a startup competition and pitching a new business idea is another example.

11. Ethics and Professionalism

- **Definition:** Ethics and professionalism involve behaving in a manner that is respectful, responsible, and in line with the standards of your profession. This includes adhering to ethical guidelines and maintaining a professional demeanour.
- **Example:** If you're a medical student, professionalism might mean dressing appropriately and treating patients with respect, even in stressful situations. For a business student, it could involve handling customer complaints with dignity and patience, without retaliating when faced with rudeness.

ii. Summary with an Analogy

Imagine your university program as a toolkit that prepares you for life. Each PLO is a different tool in that toolkit. Knowledge and understanding are like the blueprint you study before you start building something. Cognitive skills are like the brainpower that helps you figure out what to do with that blueprint. Practical skills are the actual tools, like hammers or saws, you use to build. Interpersonal skills are your ability to work well with others on the construction site. Communication skills are how well you explain the building process to others. Digital skills might be the computer software you use to design the building. Numeracy skills help you measure and calculate the materials needed. Leadership, autonomy, and responsibility are about taking charge of the project and making sure it gets done right. Personal skills are about managing your time and energy to stay focused. Entrepreneurial skills are like coming up with a new design that no one else has thought of. Finally, ethics and professionalism ensure you build something safe, reliable, and respected by others.

By the time you finish your degree, you should have all these tools in your toolkit, ready to use them in your future career and life.

iii. Professionalism

Professionalism is a broad and essential concept that governs how individuals should conduct themselves in the workplace and other formal environments. It involves adhering to a set of standards, behaviors, and attitudes that reflect a high level of respect, competence, and integrity. Professionalism is not just about following rules; it's about embodying a mindset that values excellence, accountability, and ethical behavior.

Key Elements of Professionalism

- **Ethical Behavior**
    - **Integrity:** Being honest and having strong moral principles. Professionals are expected to do the right thing, even when no one is watching.
    - **Confidentiality:** Respecting the privacy of others and handling sensitive information appropriately. For example, a doctor maintaining patient confidentiality is a key aspect of professionalism.
    - **Fairness:** Treating everyone equally, without favouritism or discrimination. This means making decisions based on merit and ensuring that personal biases do not influence professional judgment.

- **Accountability**
    - **Responsibility:** Being reliable and taking ownership of your duties and actions. Professionals are expected to complete their tasks on time and meet the expectations set for their roles.
    - **Transparency:** Being open about your processes, decisions, and mistakes. Admitting errors and learning from them is a crucial part of being a professional.
    - **Commitment:** Showing dedication to your work and continuously striving to improve. This might involve staying updated with industry developments or seeking feedback to enhance your skills.

- **Competence**
    - **Skill Mastery:** Professionals should possess the knowledge and skills required to perform their jobs effectively. This often involves continuous learning and professional development.
    - **Quality Work:** Ensuring that the work you produce meets or exceeds industry standards. Professionals take pride in delivering high-quality results.
    - **Problem-Solving:** The ability to identify, analyze, and solve problems efficiently and effectively. Competent professionals are resourceful and can handle challenges with minimal guidance.

- **Respect and Courtesy**
  - **Respect for Others:** Treating colleagues, clients, and others with respect and dignity, regardless of their position or background. This includes listening to others, valuing their contributions, and being considerate in your interactions.
  - **Politeness and Manners:** Using appropriate language, tone, and behavior in all professional interactions. Simple gestures like saying "please" and "thank you" can go a long way in fostering a positive work environment.
  - **Professional Appearance:** Dressing appropriately for your role and maintaining a neat and clean appearance. This reflects your seriousness about your job and respect for the workplace.

- **Reliability and Punctuality**
  - **Timeliness:** Being on time for meetings, deadlines, and appointments. Punctuality shows respect for other people's time and commitment to your responsibilities.
  - **Dependability:** Being someone that others can count on to fulfil their commitments. Professionals are trusted to do what they say they will do.

- **Effective Communication**
  - **Clarity:** Communicating clearly and effectively, whether in writing or speaking. This involves being concise, organized, and free of unnecessary jargon.
  - **Active Listening:** Paying attention to what others are saying and responding appropriately. Professionals listen carefully to understand the needs and concerns of others.
  - **Professional Tone:** Maintaining a respectful and polite tone, even in difficult conversations. Avoiding slang, overly casual language or aggressive communication is important.

- **Emotional Intelligence**
  - **Self-Control:** Managing your emotions, especially in stressful situations. Professionals are expected to stay calm, even under pressure.
  - **Empathy:** Understanding and considering the emotions and perspectives of others. This helps in building strong professional relationships and resolving conflicts amicably.
  - **Adaptability:** Being flexible and open to change. Professionals can adjust their approach based on new information or changing circumstances.

Why Professionalism Matters

- **Builds Trust and Credibility**
    - Professionalism helps in building trust with clients, colleagues, and employers. When you consistently act in a professional manner, others are more likely to respect you and have confidence in your abilities.

- **Enhances Career Growth**
    - Professionals are often recognized and rewarded for their conduct, leading to career advancements, promotions, and greater opportunities. Employers value individuals who demonstrate professionalism because they reflect positively on the organization.

- **Fosters a Positive Work Environment**
    - Professional behavior contributes to a respectful and efficient work environment. When everyone upholds professional standards, it reduces conflicts and misunderstandings, leading to better teamwork and collaboration.

- **Protects Your Reputation**
    - How you conduct yourself professionally has a lasting impact on your personal and professional reputation. Maintaining high standards of professionalism helps safeguard your reputation in your industry and beyond.

- **Ensures Ethical Decision-Making**
    - Professionalism often involves making decisions that are not only beneficial to oneself but also fair and ethical. This ensures that actions taken are in line with both legal standards and moral principles.

Example of Professionalism in Action

Imagine you're working in a customer service role. A customer comes in, visibly upset, and begins to complain about a product they purchased. The customer is loud and angry and even makes personal attacks towards you. Here's how professionalism would guide your response:

- **Stay Calm:** Instead of reacting emotionally or defensively, you remain calm and composed. You listen to the customer's concerns without interrupting.
- **Empathize:** You acknowledge the customer's feelings by saying, "I understand why you're frustrated, and I want to help resolve this issue."
- **Address the Issue:** You focus on solving the problem, perhaps by offering a refund or replacement, following company policy. You do this politely and efficiently, without taking the customer's anger personally.
- **Maintain Professionalism:** Throughout the interaction, you maintain a respectful tone, avoid matching the customer's hostility, and focus on finding a positive outcome.

By handling the situation with professionalism, you not only resolve the customer's issue but also reinforce your reputation as a competent and respectful employee, which benefits both you and your company.

Conclusion

Professionalism is an essential aspect of any career. It involves a combination of behavior, attitude, and work ethic that ensures you conduct yourself in a manner that is respectful, competent, and ethical. Professionalism is about doing your job to the best of your ability, treating others with respect, and adhering to the standards and expectations of your profession. It's a skill that, when mastered, can significantly contribute to your success and reputation in your chosen field.

6D. Explanation of Our Module

1. Understanding the Module's Focus

The module only covers a few of the broader Program Learning Outcomes, specifically PLOs 1, 2, and 4. This means that the module is designed to help students achieve specific competencies in these areas.

- **PLO 1 and 2: Knowledge and Cognitive Skills**
    - **Knowledge and Understanding (PLO 1):** This refers to the foundational knowledge that students need to grasp, such as understanding what a computer is, the difference between hardware and software, and so forth.
    - **Cognitive Skills (PLO 2):** This is about how well students can remember and apply that knowledge. For instance, if someone wakes you up in the middle of the night and asks, "What is RAM?" you should be able to explain it because it's critical knowledge for an IT professional.

Example Analogy:

Imagine you're learning to drive a car. **Knowledge and Understanding** are knowing what each part of the car does, like understanding that the steering wheel controls the direction of the car, and the brake pedal stops the car. **Cognitive Skills** would be your ability to remember and apply this knowledge. For example, you need to remember how to operate the car even when you're under pressure, such as during a driving test or in an emergency situation.

2. Interpersonal Skills (CLO 3)

This module also focuses on developing **Interpersonal Skills**, particularly through group assignments. This is where students are required to work together, even if they don't like their teammates. The idea here is to simulate real-world scenarios where you have to collaborate with others to get the job done, regardless of personal feelings.

Example Analogy:

Think of it like a team sport, such as soccer. Even if you don't get along with all your teammates, you still need to work together to win the game. The focus isn't just on whether you score goals (the final product), but also on how well you pass the ball and communicate with your teammates (interpersonal skills). In this context, your lecturer is like a coach who is less concerned with whether your team wins and more interested in how well you cooperate and support each other.

3. Assessment Methods

The module has specific methods for teaching and testing these skills:

- **Teaching Methods:** Most of the teaching is done through lectures and case studies, where you learn the necessary knowledge.
- **Assessment Methods:** The assessments are designed to test what you've learned. For example, tests 1 and 2 might assess your knowledge and cognitive skills by asking you to recall and apply what you've learned. The group assignment, however, assesses your interpersonal skills, i.e., how well you work with others.

4. Ministry of Education (MoE) Requirements

The Ministry of Education has set certain skill sets that all IT degree holders should possess. The university has designed its modules (like the one you're taking) to ensure that these skills are covered. The module learning outcomes are aligned with these MoE requirements, ensuring that when you graduate, you have the skills deemed essential by the MoE.

Example Analogy:

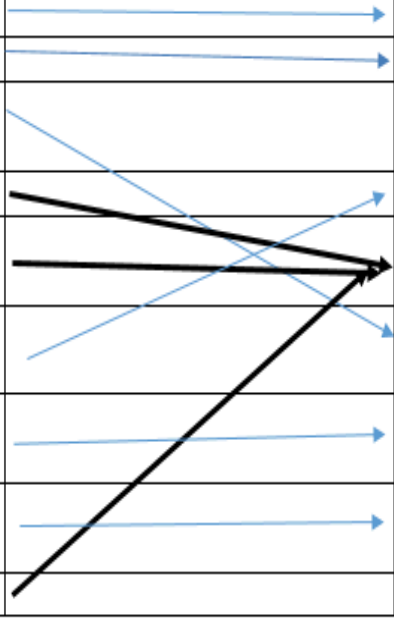
Think of the MoE requirements as a checklist that all drivers need to pass to get a driving license. The university's role is to make sure that by the end of your course, you can tick off all the boxes on this checklist, ensuring you're ready to hit the road as a competent IT professional.

Summary:

- The module focuses on knowledge, cognitive, and interpersonal skills.
- The knowledge and cognitive skills are about what you know and how well you can remember and apply it.
- Interpersonal skills are developed through group work, teaching you how to collaborate effectively.
- The module is designed to meet specific learning outcomes aligned with broader educational standards set by the Ministry of Education.

This approach ensures that you're not just learning technical skills but also developing the soft skills needed to succeed in the IT field.

Everything you see here has been mapped onto something here, which relates to the table that we're showing.

MOE LO Domains		MQF LO Domains
Knowledge		Knowledge
Practical Skills		Practical Skills
Critical Thinking and Scientific Skills		Social Skills and Responsibilities
Communication Skills		Values, Attitudes and Professionalism
Social Skills, Teamwork and Responsibility		Communication, leadership and Team Skills
Values, Ethics, Moral and Professionalism		Problem Solving and Scientific Skills
Information Management and lifelong Learning Skills		Information Management and Lifelong Learning Skills
Managerial and Entrepreneurial Skills		Managerial and Entrepreneurial Skills
Leadership Skills		

7. Teaching Strategies

7A. Lecturer's Roles & Facilitate Learning

As a lecturer, your role is to be a guide or a facilitator rather than a traditional teacher. The key difference here is that you respect the autonomy and maturity of your students. You assume they are responsible adults who know what they are doing. Your job is not to force students to learn but to create an environment where learning can happen naturally.

Analogy:

Think of yourself as a gardener. A gardener doesn't force plants to grow. Instead, they provide the right environment—water, sunlight, and soil—so that the plants can grow on their own. Similarly, as a lecturer, you provide the resources, guidance, and support, but you allow students to take responsibility for their own learning.

Example:

Imagine you are delivering a lecture, and you notice a student nodding off to sleep. Instead of reprimanding the student, you assume they might have had a rough night or are dealing with something personal. You trust that they will catch up on the material later because they are responsible adults. You don't see it as your job to force them to stay awake; instead, you focus on being available to support them when they need it.

7B. Rules (Sense & Interaction)

For students, common sense and interaction are crucial in the learning process. You emphasize that students need to behave in a way that doesn't disrupt the class and should actively participate by asking questions when they don't understand something.

Analogy:

Consider a group of people on a team-building exercise. For the group to succeed, each person needs to follow certain rules—like listening to one another and not interrupting—so that the team can work together effectively. Similarly, in a classroom, students need to follow basic rules of conduct to ensure that everyone can learn in a supportive environment.

Example:

In a physical classroom, if a student's phone rings, common sense dictates that they should put the phone on silent to avoid disturbing others. If they need to take the call, they should quietly excuse themselves from the room. This behavior ensures that the learning environment is respectful and conducive to everyone's success.

In summary, as a lecturer, your role is to facilitate learning by being supportive and understanding, while students need to use common sense and interact respectfully in the classroom. This mutual respect and responsibility create a productive learning environment.

7C. The Approach (Class Structure - Lecture & Tutorial)

In this approach, the teaching is divided into two main components: **lectures** and **tutorials**. This division allows for a structured learning environment where each component serves a different purpose in the overall educational process.

Lectures:

- **Main Focus:** The lecture is the central part of this teaching strategy where the lecturer (in this case, the person explaining the strategy) delivers the majority of the content.
- **Delivery Style:** The lecturer takes a more traditional approach where they do most of the talking. They introduce the core concepts, theories, and important ideas that students need to understand.
- **Engagement:** Although the lecture is primarily a one-way communication channel, there is still room for interaction. Students are encouraged to ask questions during the lecture, allowing for clarification and deeper understanding.
- **Examples:** The lecturer uses a lot of examples to explain concepts. This is done intentionally because the audience is diverse, with students coming from various backgrounds. By providing multiple examples, the lecturer ensures that the majority of students can grasp the concepts. This approach acknowledges that one example may resonate with one group of students, while another example may be more effective for a different group.
- **Personal Touch:** The lecturer also injects humor and relatable references, such as movies, to make the material more engaging and accessible.

Tutorials:

- **Main Focus:** The tutorial, on the other hand, is more interactive. It is led by another instructor, Miss Vijaya, who engages students in a more hands-on and discussion-based environment.
- **Engagement:** In tutorials, students are expected to actively participate by answering questions, discussing concepts, and applying what they have learned in lectures.
- **Purpose:** The tutorial complements the lecture by giving students a space to practice what they've learned. This reinforces their understanding and allows them to apply the theoretical knowledge from the lecture in practical scenarios.

Why This Approach Works:

- **Balanced Learning:** The combination of lectures and tutorials ensures that students are not just passively receiving information but also actively engaging with it.
- **Diverse Learning Needs:** The use of multiple examples during lectures caters to a diverse student body, ensuring that the material is accessible to everyone.
- **Interactive Learning:** The tutorials provide a platform for students to clarify their doubts, engage in discussions, and deepen their understanding.

7D. Materials

Note-Taking:

- **Importance:** Taking notes during lectures is emphasized as a critical part of the learning process. While slides and textbooks provide a foundation, the lecturer often shares additional insights, examples, and diagrams that are not found in the official materials.
- **Real-Life Application:** For example, during a lecture, the lecturer might explain the difference between two computing components using a unique diagram that isn't included in the slides or the textbook. By taking notes, students can capture these valuable explanations and references that could be crucial for their understanding and success in exams.

Supplementary Materials:

- **Slides:** The slides are meant to serve as a summary or outline of the lecture content, but they do not contain all the details.
- **Textbook:** The textbook is the primary source of detailed information, but it may not cover every example or explanation given in the lecture.
- **Recorded Sessions:** All lectures are recorded and made available for students to review later. This is particularly useful for revisiting complex topics or catching up on missed content.

7E. Lecturer's Desire

Student Success:

- **Misconceptions:** Some students may view the lecturer as a challenging figure who is there to make their academic journey difficult. However, the reality is quite the opposite. The lecturer's primary goal is to ensure that students succeed, not just academically but also in preparing for the challenges of the real world.
- **Tough Love:** To achieve this, the lecturer might adopt a strict or demanding approach at times. This isn't out of malice but rather a deliberate strategy to push students out of their comfort zones, helping them develop resilience and critical thinking skills.
- **Real-World Preparation:** The university environment is seen as a microcosm of the real world. By facing challenges, strict deadlines, and high expectations in university, students are better prepared to handle similar situations in their professional lives. The idea is to equip students with the skills and mindset needed to navigate the complexities and hardships of the real world.

Summary: This teaching strategy balances structured content delivery in lectures with interactive, hands-on learning in tutorials. The lecturer's approach is to provide numerous examples to cater to a diverse student body, while also emphasizing the importance of note-taking and active participation. The

underlying goal is to ensure students are well-prepared for both their exams and the real-world challenges that lie ahead.

7F. Student Desire

In teaching, it's common to encounter students who are deeply passionate about learning for the sake of knowledge itself. These students might say things like, "I don't care about the grade; I just want to understand how to code." This attitude is admirable because it reflects a genuine love for learning and mastery of a subject. However, it's crucial for both students and educators to recognize the broader context in which education occurs, especially concerning future career opportunities.

Understanding the Role of Grades:

Imagine you're a student who loves coding. You're not concerned about getting an A, B, or C; you just want to be good at programming. While this focus on skills is essential, there's an important reality to consider: when you graduate, your ability to land a job often depends on your grades. Here's why:

1. **The Job Market is Competitive:** Let's say a company has five positions open and receives 5,000 applications. The hiring team needs a way to narrow down the list. One of the easiest ways to do this is by filtering applicants based on their grades. Those with higher grades (e.g., first-class honours) are more likely to make it to the interview stage, while many others are filtered out. In this context, grades serve as an initial measure of a candidate's dedication and ability to follow through on tasks.

2. **Grades as Indicators of Dedication:** A common misconception is that grades are a direct measure of intelligence. However, in reality, they are often more about how well a student can prepare, follow instructions, and perform under pressure. If you score an A in a module, it means you were dedicated enough to study the material, understand the key concepts, and demonstrate that knowledge in an exam setting. Employers often view this dedication as a proxy for how you might perform on the job.

3. **Practical Experience Matters Too:** While grades are important, so is practical experience. As a new graduate, it's unlikely that you'll immediately start your own successful business. Instead, you'll probably spend a few years working in a company where you can learn industry-specific skills, understand organizational dynamics, and gain experience that will be invaluable if you later decide to start your own venture.

Analogy: Preparing for a Marathon

Consider the journey of education as preparing for a marathon. If you're passionate about running (like the student passionate about coding), you might focus solely on getting faster and stronger. However, to actually participate in a marathon, you need to qualify by meeting certain standards, like completing shorter races within specific times (similar to getting good grades). If you ignore these qualifications, no matter how fast or strong you are, you might not even get the chance to run the marathon. Similarly, grades are the qualifications that can open doors for you in the job market, allowing you to "run the race" and prove your skills in the real world.

Balancing Desire and Practicality

So, how can students balance their desire for knowledge with the practical need for good grades?

1. **Embrace the Dual Goal:** Understand that grades and knowledge are not mutually exclusive. Strive to excel in your studies while also deeply understanding the material. For example, when preparing for exams, focus on truly understanding the concepts, not just memorizing them.
2. **Seek Out Real-World Applications:** Beyond classroom learning, take advantage of online courses, internships, and projects that allow you to apply what you're learning. This not only strengthens your skills but also makes your resume stand out.
3. **Use Grades Strategically:** Recognize that good grades can be a tool to achieve your broader goals. They can help you get your foot in the door, after which your skills and passion can shine through in your work.

In conclusion, while the desire to learn purely for knowledge is commendable, it's important to recognize the role that grades play in opening up opportunities. By understanding and balancing these two aspects, students can position themselves for both personal fulfilment and professional success.

8. Assessment Methods

Assessment Type	Weight (%)
In-course Group Assignments	40%
Test 1	30%
Test 2	30%

- Now the tests, there are going to be two. The first one is going to be middle of the SEM. The second one is going to be at the end of the SEM. The in-course assignment also will be submitted at the end of the SEM. There will be a particular week, two weeks, 2-3 weeks from now.

9. Student Learning Time (SLT)

- **Course Credit Value: 3**
- **Total Learning Hours: 128**
    - Lecture: 24 hours per semester
    - Tutorial: 18 hours per semester
    - Independent Learning Time: 61 hours

- You are also expected to invest 61 hours in these 14 weeks to study this module. This is your independent study alone, so you're reading the textbooks, doing your assignments, your preparation for the test and so on should at least 61 hours. What you want to do now is on a weekly basis. You might consider creating a study group. You and your friends, meet up maybe once or twice a week, so everybody has their private study time.

- You study privately and then you have a group study time maybe twice a week so that you can sit down, have fun, engage, and then try to ask each other questions and answers, work on assignments, get ideas, and so on. It will help you and it will go a long way the way. Some people like to play basketball, football, badminton, squash and so on. They have their groups also. Create a study group.

- But it's also important that you have your own personal individual study time so that when you go to the group time, you have something to contribute. We will be focused here on lectures and tutorials, which will be about 24 hours for the 14 weeks and 18 hours for the tutorials for the 14 weeks approximately.

10. Methods of Delivery

- I've already mentioned that we're moving to something called **Outcome Based Education**. This is the Malaysian Ministry of Education requirements where we know we teach students and prepare them for the real world.

- OBE is education based on producing particular educational outcomes that:
    - Focus on what students can actually do after they are taught
    - Expect all learners / students to successfully achieve particular (sometimes minimum) level of knowledge and abilities.

11. Course Content Outline

11A. Lecture:

- **Introduction**
  - Overview of the module System Overview
  - (Hardware, Software & Communication components)
  - Types of Computer Systems
  - Standards & Protocols
  - Modern attitudes & Personalities
  - Evolution of Computers
- **Introduction to Computer Architecture**
  - Concept of System Architecture
  - IT Systems Architectures
- **Data Representation**
  - Number Systems and Inter-conversion
  - Representation of text, images and sound
  - File Type Formats & Page Description Languages
  - Internal Computer Data Format
- **Logic Gates**
  - Properties & Symbols of Logic Gates
  - Truth Tables
  - Characteristics of Logic Gates
  - (AND, OR, NAND, NOR & Exclusive OR Gates)
- **CPU & Memory**
  - Components of the CPU
  - Concept of Registers & Memory
  - Instruction Cycle
  - CPU Architectures
  - CPU & Memory Enhancements
  - Multiprocessing
- **Input/output & Computer Peripherals**
  - Characteristics of I/O Devices
  - I/O Modules
  - Memory Hierarchy
  - SSD memory, Magnetic Disk & Optical Disk Storage
  - Displays & Printers
  - User Input Devices & Communication Devices
  - Modern Computer Systems

- **Operating Systems**
    - OS Concept
    - OS Services & Facilities
    - OS Organization
    - Types of Computer Systems
    - Purpose of Interfaces
    - Types of Interfaces
    - User Functions & Program Services
    - File Management
    - Processes & Threads
    - CPU Scheduling & Dispatching
    - Memory Management
    - Virtual Storage
    - Secondary Storage Scheduling
    - OS Issues
    - Virtual Machines
- **Unix, Linux & Windows OS**
    - Introduction
    - Basic Operations
- **Assignment Presentation**
- **Summary**
    - Summary of module
    - Revision of Major Topic Areas

11B. Tutorial:

- Introduction to computer systems (Tutorial)
- CPU and Memory (Tutorial)
- Input/output and Computer Peripherals (Tutorial)
- Operating Systems (Tutorial)
- Data Representation (Tutorial)

11C. Case Study / Panel Discussion:

- Case Study: Logic Gates-Equations, Truth Tables and Circuit Design
- Computer Architecture (Tutorial): Company Case Study
- Group Activity - Computer Technology Applications

11D. Practical:

- Lab: Operating System Installation (VM)

12. What Is Expected Of You

- You should abide by all the rules & regulations of APU
    - Proper attire
    - No speaking in languages other than English
    - Attendance is compulsory and valid medical certificates must support any absence from class.
    - Three cases of lateness will be equal to one absence
    - All handphones should be turned off during lectures.

- At the end of the day, please obey the general rules and regulations of the university. When online, conduct yourself properly. When physical, also conduct yourself properly. The rule is never do anything that will disturb other students. These rules are not for the lecturers, they are for your fellow students. To make a healthy, conducive learning environment.

- Do not tease people, do not bully people, Do not denigrate, Do not insult, Do not slander, do not back bite. All of these are bad traits and they make for a terrible learning experience for the community. You want to try your best to be as civil as possible. Do not do to somebody else what you do not want done to you. That's just a general rule of human decency. So try to enact that. Dress properly, brush your teeth, don't fart in public, and I think you will do just fine.

13. What Support Is Available For You

- **Consultation Hours**
- **Resources**
    - Internet resources
    - Microsoft Teams

- **Essential Reading**
    - Irv Englander, 2014. The Architecture of Computer Hardware, Systems Software, and Networking: An Information Technology Approach, John Wiley, (ISBN: 978-0-470-40028-9)
    - Irv Englander, 2010. The Architecture of Computer Hardware and Systems Software, John Wiley, (ISBN: 978-0-470-40028-9)
    - Ian McLoughlin, 2011. Computer Architecture: An Embedded Approach. McGraw Hill, (ISBN: 978-007-131118-2)

- **Further Reading**
    - Charles Petzold, 2000, CODE: The Hidden Language of Computer Hardware & Software, Microsoft Press, (ISBN: 0-7356-1131-9)

14. Achievement Requirements

Marks	Alphabetical Grade	Grading Point	Classification
80 - 100	A+	4.0	Distinction
75 - 79	A	3.7	
70 - 74	B+	3.3	Credit
65 - 69	B	3.0	
60 - 64	C+	2.7	Pass
55 - 59	C	2.3	
50 - 54	C-	2.0	
40 - 49	D	1.7	Fail (Marginal)
30 - 39	F+	1.3	Fail
20 - 29	F	1.0	
0 - 19	F-	0	

15. Basic Info

- What is an Organization?
- What is a System?
- What is a Network?
- What is the purpose of a Network?

We are going to be studying computer architecture and system software. In order to do that effectively, we need to understand the context in which we will be studying. We will be studying particularly with a focus on organisations. When we discuss computing and computing technology, we're not going to be discussing it from a user point of view.

What's a user? You are a user. You can go into the market, buy a phone, buy a computer for your own personal use. As a user, your personal use might include I want something to be able to browse the Internet, maybe play a couple of computer games, store my music and my media, and so on.

For an organization, computers have a different connotation. They are meant for producing work. You need to understand what organizations require. For example, as an organization, if I was running a company, I might have 500 employees, so I might need to go into the market to buy 500 computers. Now, even if there's a difference of 100 ringgit between one computer model and another, if I'm buying 500, that 100 ringgit different becomes 500 * 100, which is like 50 thousand. Organizations, when they're making purchases or when they're making considerations, they consider bulk buying the architecture, how this computer will fit into their own environment.

We also need to understand what a system is. We've already defined that. We said it's a group of interrelated components. It's not just a group of components, it's a group of interrelated components working together for a specific function.

What is a network? A network is a collection of communicating computers, a group of communicating computers. What is a computer? We said it's an electronic device that can accept input, process it by a set of instructions, and produce output. Now, **a computer doesn't mean desktop, doesn't mean laptop**. It means anything that can do input, process, and output. My game console, my PlayStation, is a computer. My smart TV is a computer. My smart projector is a computer. My smart washing machine is a computer. Don't just think desktop and laptops. Anything that can perform processing is a computing device, and a computing device is a computer.

What is the purpose of computer networks is for communication. The computer is the main tool in IT technology, and IT technology also involves the distribution and dissemination of information, which is done through computer networks. The primary purpose of a computer network is for the transmission of information and we're done.