البرنامج التدريبى لقسم هندسة الالكترونيات و الاتصالات

لخدمة الكلية و المجتمع المدنى

رئيس القسم
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WELCOME

TO AI ERA

PREPARED BY : AHMED SIMEDA
TEACHING ASSISTANT AT ECE DEPARTMENT

UNDER THE PATRONAGE OF : PROF. NEHAL FAYEZ
HEAD OF ELECTRONICS & COMMUNICATION
ENGINEERING DEPARTMENT

WELCOME
MESSAGE

Welcome AI Explorers! I'm thrilled you decided to join me to discover the fascinating capabilities of artificial intelligence. Whether you're completely new to AI or looking to expand your skills, this course will equip you with valuable insights.

We'll start by covering the AI definition, history and its applications. and what is the challenges and motivations stands in AI way to reach its golden era.

Head of Electronics & Communication Engineering Department

Moving forward, We'll start by covering the building blocks - machine learning, neural networks and more. I'll break down complicated concepts using relatable examples and visuals. You'll gain an intuitive understanding grounded in real applications.
By the end, you'll not only grasp AI technologically, but also its business and ethical impact. You'll discuss AI critically and creatively - essential as these technologies shape our collective future.

I'm thrilled we get to explore this together! If you have any questions before liftoff, don't hesitate to ask. Let's dive in!

A I

PREREQUISITES

- **Needed ones:**
  - **Have the passion to learn.**
  - **Love math :)**
  - **Have programming basics (by any language)**
- **Recommended ones:**
  - **Able to code in python.**
  - **Know what's OOP and how to apply it.**

ACQUIRED
SKILLS

- **Knowing what's AI and how to enter this community and what are the available courses online.**
- **Tell the difference between AI, ML, Big data …. And all these jargons.**
- **Gaining the math intuition behind ML models.**
- **Training some ML models on real-life datasets**

TRAINING CONTENT

- ## DAY 1

  - Definition
  - History
  - Applications
  - Challenges & Motivation
  - Appropriate setups
  - Available Courses

- ## DAY 2

  - Math Basics (Statistics and Probability)
  - ML Project Life cycle
  - ML Types & diff. Algorithms
  - Evaluation Metrics
  - Case Study

TRAINING CONTENT

- ## DAY 3

  - Building Linear Regression model from scratch
  - Building a Neural Network From scratch
  - Available frameworks and APIs
  - Deeper Case study

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INFORMATION

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ELECTRONICS

TRAINING

PREPARED BY : BASSEM SALEH
TEACHING ASSISTANT AT ECE DEPARTMENT

UNDER THE PATRONAGE OF : PROF. NEHAL FAYEZ
HEAD OF ELECTRONICS & COMMUNICATION
ENGINEERING DEPARTMENT

WELCOME
MESSAGE

Welcome everyone! I'm excited for you all to learn about building electronic circuits. Electronics allow us to create all kinds of devices, from computers and phones to toys and gadgets.

We'll start by learning about some basic components like resistors, capacitors, transistors, integrated circuits, and diodes. These parts do different jobs like resisting or storing electricity. We'll learn what they do and how to combine them into simple circuits on a breadboard.

Head of Electronics & Communication Engineering Department

We'll use batteries, switches, buzzers, motors, and sensors to start building gadgets. You'll get hands-on experience assembling the circuits, testing them out, and troubleshooting any issues. Safety first though - we'll go over how to be careful and responsible while working with electricity. I'm looking forward to seeing your creativity shine through as we progress through the exciting world of electronics!

Let me know if you have any other questions before we get started on our first circuit!

ACQUIRED
SKILLS

- **Identify basic components like resistors, capacitors, LEDs, transistors, batteries**
- **Build simple circuits**
- **Testing circuits**
- **Measure voltage and current with kid friendly multimeters**
- **Safely connect components to build circuits using spring loaded breadboards**
- **Inspect circuits closely to detect assembly or wiring problems**
- **Troubleshooting and testing circuits**
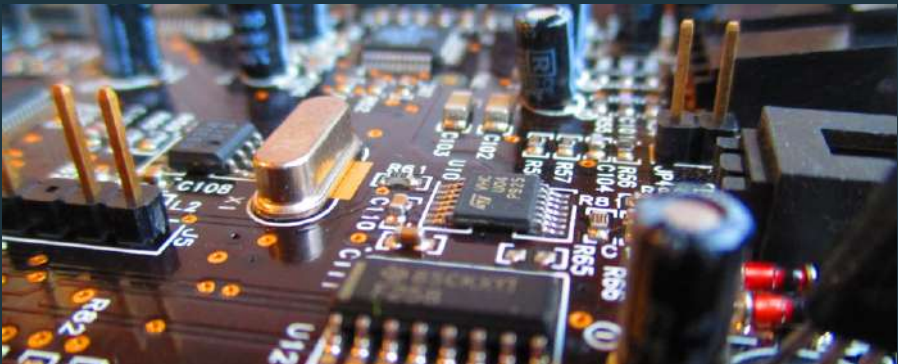
TRAINING CONTENT

- ## DAY 1

  - Introduction to Components
    - Identify basic components - resistors, LEDs, capacitors, transistors
    - Use magnifying glasses to inspect components
    - Sort components by their shapes and colors
  - Battery Power
    - Understanding battery polarity and stay safe
    - Make a circuit with a battery, LED and resistor
    - Switch the LED on and off with a push button

TRAINING CONTENT

- ## DAY 2

  - Blinking LEDs
    - Use a 555 timer chip to make a blinking LED circuit
    - Adjust blink speed by changing resistor/capacitor values
  - Transistor Switches
    - Use transistors to switch LEDs on and off
    - Make a touch sensor that turns on an LED

- ## DAY 3

  - Motors and Speakers
    - Build circuits with small hobby motors
    - Make motor speed controllers with transistors/caps
    - Generate sounds and music with speakers
  - Circuit Simulation

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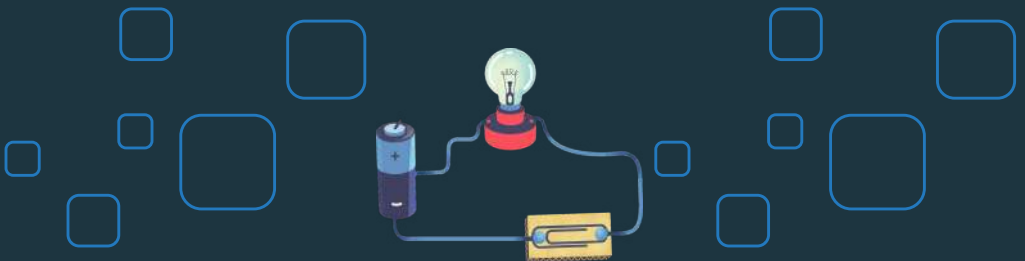
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FLUTTER 101

TRAINING

PREPARED BY : BASSEM SALEH
TEACHING ASSISTANT AT ECE DEPARTMENT

WELCOME
MESSAGE

Welcome everyone! I'm excited you could all join us today for this hands-on workshop to learn Flutter app development.

Flutter is an open-source UI toolkit created by Google for building beautiful, natively compiled, multi-platform applications from a single codebase. In the next few days, we are going to cover the fundamentals to get you started building Flutter apps.

Prof. Nehal Fayez

Head of Electronics & Communication Engineering Department

I'm committed to making sure you have an enjoyable, engaging learning experience. We'll go at a comfortable pace with plenty of room for questions and discussions.

So get ready to immerse yourself in Flutter code - it's going to be challenging but extremely rewarding! With some dedication, and lots of fluttering fingers on the keyboard, you'll gain fresh skills to bring any creative app idea to life.

FLUTTER
PREREQUISITE

Basic programming knowledge: Some background in object-oriented programming and general programming concepts is helpful before learning Flutter. Familiarity with languages like JavaScript, Java, Python, etc can give you the foundation.

Recommended system requirements:
- **Operating System:** Windows 7 SP1 or later (64-bit), macOS 10.12 or later (64-bit) or Linux (64-bit)
- **CPU:** 4 physical cores with hyper-threading support
- **RAM:** 8GB RAM or more
- **Storage:** 1GB free storage space minimum (SSD recommended)

ACQUIRED
SKILLS

- **Acquire a new programming Language (Dart)**
- **Understand all the fundamental concepts of Flutter development.**
- **Build beautiful, fast and native-quality apps with Flutter.**
- **Build iOS and Android apps with just one codebase.**

TRAINING CONTENT

- ## DAY 1

  - Dart Basics
    - Installing Flutter SDK
    - Data Types, Comments, and Operators.
    - Decision Making (if.. else.., Switch)
    - Loops(For, While)
    - Dart Functions
  - Object Oriented Programming (OOP) in Dart
    - Object and Class
    - Encapsulation
    - Inheritance
    - Polymorphism
    - Abtstraction

TRAINING CONTENT

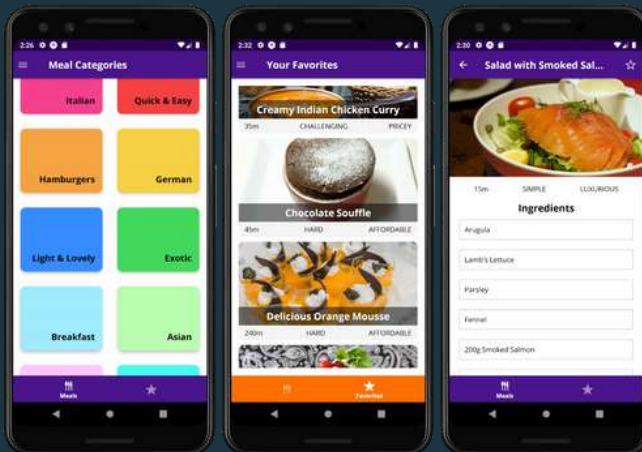- # DAY 2

  - Flutter App Anatomy (Widgets)
    - Create New App
    - App Widget Tree
    - Material App and Scaffold
    - Stateless and Stateful Widgets
  - Quiz App
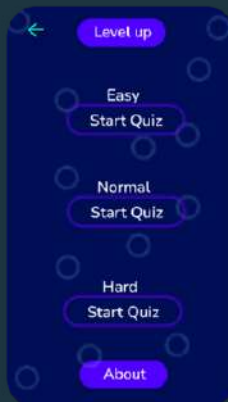
WORKSHOP CONTENT

- ## DAY 3

  - App Different Structures
    - Navigation Drawer
    - Bottom Navigation Bar
    - Tab Controller
    - Multi-Screen App With Navigations
  - Meals App

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MICROWAVE CIRCUITS AND ANTENNAS

TRAINING

PREPARED BY : AHMAD M.K. ALMONAIER
TEACHING ASSISTANT AT ECE DEPARTMENT

WELCOME
MESSAGE

Welcome to our intensive hands-on training in microwave circuits and antennas! I'm very excited to have you in this course learning the theory and getting vital skills in this dynamic field.

This is not just a typical textbook course, however. You will get extensive hands-on lab practice in areas like power dividers, filters and low-noise amplifiers. We want you to feel fully equipped to work in the growing microwave field.

Head of Electronics & Communication Engineering Department

I'm very excited to lead you into this foundational realm between RF engineering and optical engineering. Please feel free to ask me any other prep questions before we dive into electromagnetic waves! Let's have a great course.

MICROWAVE
PREREQUISITES

- **A first course in Electromagnetism.**
- **A first course in Microwave Engineering.**

TRAINING CONTENT

- ## DAY 1

  - Understand microwave communication system.
  - Acquire knowledge on microwave system measuring technique.
  - Understand the theory and concept of power divider.
  - Understand design process of power divider.
  - Characterization of power divider through experiments & measurements.

TRAINING CONTENT

- ## DAY 2

    - Introduction to filters.
    - Understand the high-frequency limitations of lumped-element filters.
    - Understand the theory and operation principle of bandpass filter.
    - Characterization of band pass filter through experiments & measurements.

- ## DAY 3

    - Understand the theory and operating principle of Low-Noise Amplifier.
    - Understand design process of Low-Noise Amplifier.
    - Understand characteristics of Low-Noise Amplifier through experiments & measurements.

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ELECTRONICS AND COMMUNICATION
DEPARMENT

OOP IN JAVA

TRAINING

PREPARED BY : BASSEM SALEH
TEACHING ASSISTANT AT ECE DEPARTMENT

UNDER THE PATRONAGE OF : PROF. NEHAL FAYEZ
HEAD OF ELECTRONICS & COMMUNICATION
ENGINEERING DEPARTMENT

WELCOME
MESSAGE

Welcome to the Object Oriented Programming in Java course! I'm excited to have you learn this fundamental concept that has revolutionized software development.

Over the next few days, we will transform how you think about designing and writing programs. We will journey into the world of objects, classes, inheritance, encapsulation, and polymorphism.

Prof. Nehal Fayez

Head of Electronics & Communication Engineering Department

Whether you're a new programmer or experienced developer aiming to skill up, we're here to support you each step along the way. I encourage you to approach me with questions, insights, even mistakes!

Fasten your seat belts, we have an exciting oriented-programming adventure ahead! Let's get started, shall we?

OOP

PREREQUISITE

Basic Programming Knowledge: You need basic familiarity with writing code, control structures like loops and conditionals, data types, variables, functions, etc. If you have done some programming in a different paradigm, that helps.

Patience for Learning Concepts: OOP has ideas of classes, inheritance, polymorphism that may be unfamiliar early on. But with time and practice, you can grasp them well.

A C Q U I R E D

SKILLS

- **Learn OOP key Concepts: abstraction, encapsulation, inheritance, and polymorphism.**
- **Use Java for OOP: Learn Java syntax and constructs like classes, objects, access modifiers, fields, methods etc. Needed to apply OOP principles. Practice implementing concepts in Java.**
- **Modular & Reusable Code.**
- **Real-World Modeling: Be able to analyze requirements for software applications and model the entities and functionalities into an object oriented program appropriately.**

TRAINING CONTENT

DAY 1

- Basics of Java
  - Syntax, data types, variables, operators, control flow constructs, arrays, strings, methods, classes.
- Introduction to OOP
  - Concepts of objects, classes, abstraction, inheritance, encapsulation, polymorphism. Benefits of object-orientation.

DAY 2

- Constructors & Initialization
  - Constructor declaration, Initializing objects, passing parameters.
- Encapsulation
  - Data hiding through access modifiers private/protected/default/public
  -

WORKSHOP CONTENT

- ## DAY 3

  - Abstraction
    - Abstract classes and interfaces, identifying abstract attributes and behaviors.
  - Polymorphism
    - Method overloading vs overriding. Dynamic binding. Superclasses and subclasses.
  - Class Relationships
    - Association, aggregation, composition. UML class diagrams.

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SATELLITE SYSTEMS
TRAINING

PREPARED BY : AHMED ABDELHADY
TEACHING ASSISTANT AT ECE DEPARTMENT

UNDER THE PATRONAGE OF : PROF. NEHAL FAYEZ
HEAD OF ELECTRONICS & COMMUNICATION
ENGINEERING DEPARTMENT

WELCOME
MESSAGE

Welcome satellite enthusiasts! I'm so glad you chose to take this course on Satellite Systems: Design, Operation, and Applications. Over the next few days, I will provide you with a comprehensive look into the fascinating world of satellites.

We'll start by understanding the fundamental principles of satellite systems, including subsystems, orbits, launch considerations, and mission planning.

Then we'll dive into Learning about different communication protocols, frequency bands and modulation schemes.

Prof. Nehal Fayez

Head of Electronics & Communication Engineering Department

Next, we'll delve into gaining knowledge about the design process, structural considerations, power systems, thermal management, propulsion, and materials used in satellite construction.

By the end I hope you are as enthusiastic about satellites as I am! Feel free to ask me any preliminary questions before we embark on our satellite journey together!

ACQUIRED
SKILLS

- Understanding the fundamental principles of satellite systems, including subsystems, orbits, launch considerations, and mission planning.
- Learning about different communication protocols, frequency bands, modulation schemes, and link budget analysis for satellite communication systems.
- Gaining knowledge about the design process, structural considerations, power systems, thermal management, propulsion, and materials used in satellite construction.
- Exploring the principles and applications of remote sensing, including satellite imagery interpretation, data acquisition, image processing, and analysis techniques.
- Testing that each subsystem operates as intended, meets performance requirements, and is ready for integration into the final satellite system.

TRAINING CONTENT

- ## DAY 1

  - Introduction about satellite subsystems
  - Electrical Power Subsystem Experiments
  - Communication Subsystem Experiments

- ## DAY 2

  - On-Board Computer Subsystem "OBC" Basic Experiments
  - Attitude Determination and Control Subsystem Sensor and control Board Experiments
  - Remote Sensing Payload Subsystem Experiments

TRAINING CONTENT

- ## DAY 3

  - Communication Payload Subsystem Experiments
  - Space Environmental Payload Subsystem Experiments

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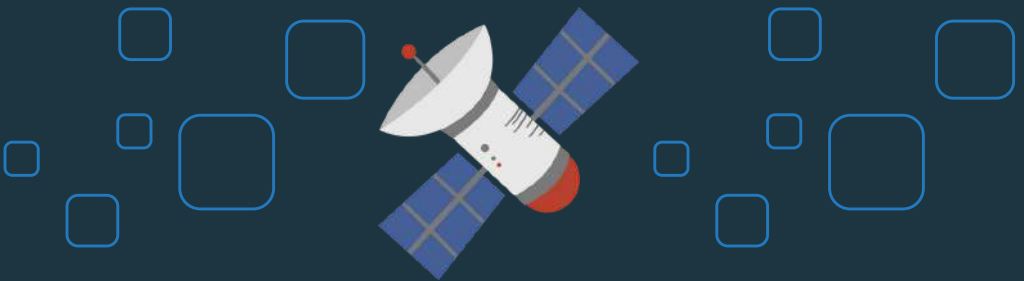
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