COMP-111
Programming Fundamentals

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Course Administration

Course Administration

- Instructor and Contact Information
  - **Dr Taimur Ahmed**
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  - Consultation hours: Monday - Thursday 01:00 pm – 02:00 pm
    - check notice board for updated consultation hours

Course Administration

❑ Marks Distribution

Theory (100%)	
Assessment Items	**Percentage Weightages**
Quizzes	15%
Assignments	10%
Project	5%
Mid-term Exam	20%
Final Exam	50%

Labs (100%)	
Assessment Items	**Percentage Weightages**
Lab Reports	20%
Lab Performance	40%
Viva	10%
Project	30%

You need to pass both Theory and Labs separately

Course Administration

❑ Written Reports/Assignments

- **Announced/unannounced quizzes**
- **Assignments** must be submitted before the given deadline.
- **Laboratory reports** must be submitted at the **end of each lab**.
- **A penalty** for any late work is **20% OFF** for the **first date** and an additional **30% OFF** for the **second day**.
  No work will be accepted thereafter.

❑ Projects

- Lab and Project groups must be of **maximum 4 students**.

Assignments, Reports and Projects must be submitted as a hardcopy and on MS Teams

Course Administration

- **Class Rules**

  >75% attendance in Theory lectures & Labs is required to appear in the **Final-term Exam**

- **Attendance** will be called in **the first 10 minutes** of class
  - Late commers may not be allowed to sit in the class
- **No retake** of quizzes, assignments and mid-term exam will be allowed


WARNING
Must Pass this Course!
Pre-req for several COMP courses:
Object Oriented Programming
Computer Vision
Introduction to Data Science
Data Visualization
and more...

Course Objectives

- **What is the objective of this Course?**
  - **This course is designed to familiarize the students with knowledge and practice of structured programming. It emphasizes upon the problem analysis, algorithm design, program development and testing/debugging using C++ language.**

Course Objectives

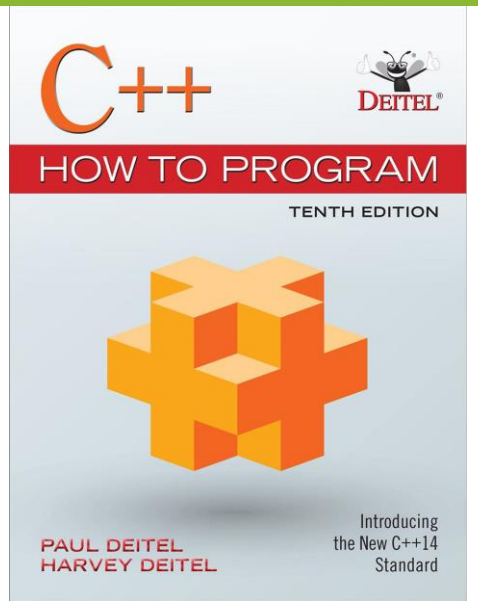
- **At the end of course you must be able to,**
  - Demonstrate **basic problem-solving** steps and **logic constructs**
  - Apply problem-solving steps to **solve simple to moderate real-world problems**
  - **Design algorithms** to solve **real-world problems**

See course card for the weekly content of this course!

Course Content

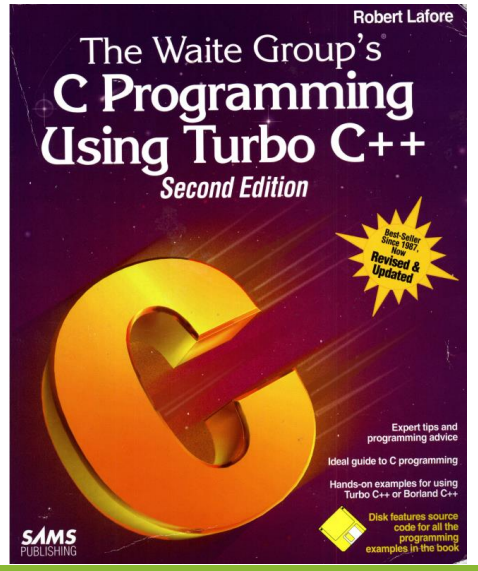
❑ Textbook (Recommended)

- Paul Deitel and Harvey Deitel, "**C++: How to Program**", 10th edition, 2017.



❑ Reference Book

- Robert Lafore, "**C Programming Using Turbo C++**", 2nd edition, 1993.



❑ Lecture Slides

- Material in the lecture slides
- Examples and practice problems

You are fee to explore online resources

Week# 1
Introduction to Computers and Programming

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Types of Computers and Languages

Computers and Programs?

- **What is a Computer?**
  - A device capable of performing **computations** and making **logical decisions**
- **Computer program**
  - A set of **instructions** that control a computer's processing of data
- **Hardware**
  - Devices **building a computer** (analogy - organs of a human body)
    - Examples: keyboard, screen, mouse, disks, memory, CD-ROM, and processing units
- **Software**
  - **Programs** that run a computer

Computer Organization

- **Six basic units** in every computer:
  1. **Input unit**
     - Obtains information from input devices (keyboard, mouse)
  2. **Output unit**
     - Outputs information (to screen, to printer, to control other devices)
  3. **Memory unit**
     - Rapid access, low capacity, stores input information
  4. **Arithmetic and logic unit (ALU)**
     - Performs arithmetic calculations and logic decisions
  5. **Central processing unit (CPU)**
     - Supervises and coordinates the other sections of the computer
  6. **Secondary storage unit**
     - Cheap, long-term, high-capacity storage, stores inactive programs

Types of Computers

- **Personal computers**
  - Economical enough for individual
- **Distributed computing**
  - Organizations computing is distributed over networks
- **Client/server computing**
  - Sharing of information, across computer networks, between file servers and clients (personal computers)

Language of a Computer?

- **Machine language**
  - Only language that **a computer directly understands**
  - Defined by hardware design
    - Machine-dependent
  - Generally, consist of **strings of numbers**
    - Ultimately 0s and 1s (binary code)
  - Instruct computers to **perform elementary operations**
    - One at a time
  - **Cumbersome** for humans to understand
  - Example:

+1300042774	0100 1101 0111 1101 0001 0100 0001 0110
+1400593419	0101 0011 0111 1011 0101 1100 0000 1011
+1200274027	0100 0111 1000 1010 1011 1010 0110 1011

Language of a Computer?

- **Assembly language**
  - **English-like** abbreviations representing elementary computer operations
  - **Clearer** to humans
  - **Incomprehensible** to computers
    - Translator programs (assemblers)
      - ✓ Convert to machine language

  - Example:

```
LOAD      BASEPAY
ADD       OVERPAY
STORE     GROSSPAY
```

Language of a computer?

❑ High-level languages

Examples: C, C++, BASIC, FORTRAN, Java, Pascal, Ada, Perl

- Use common **mathematical notations**
- Single statements accomplish **substantial** tasks
  - Assembly language requires many instructions to accomplish simple tasks
- **Translator programs** (compilers)
  - Convert to machine language
- **Interpreter programs**
  - Directly execute high-level language programs
- Example:

```
grossPay = basePay + overTimePay
```