# Unit-01

# Introduction to Software Engineering

## Software:

Software is the collection of computer programs, procedures and documentation that performs different tasks on a computer system. It is not the physical part like computer hardware. It is a non-touchable part of the computer system. It makes computer hardware to perform tasks.

**Examples:** Microsoft Windows 11, Linux, Unix, MS-Word, VLC player etc are computer software.

**There are two main types of software:**

i. System software

ii. Application software

## Introduction to Software Engineering

Software engineering is a systematic, disciplined, and quantifiable approach to the design, development, operation, and maintenance of software. It applies engineering principles to software creation, aiming to produce high-quality software that is reliable, efficient, and meets user requirements.

## 1.1. Professional Software Development

Professional software development is a comprehensive discipline that encompasses the application of engineering principles to the creation, maintenance, and evolution of software. It involves systematic approaches and methodologies to ensure that software products are high-quality, reliable, and meet the needs of users and stakeholders.

1) **Systematic Approach**
   → Structured process including requirement gathering, design, implementation, testing, deployment, and maintenance.

2) **Use of Standards and Best Practices**
   → Adherence to industry standards, coding guidelines, and design patterns for quality and maintainability.

3) **Collaboration and Communication**
   → Effective teamwork and clear communication among developers and stakeholders.

4) **Ethical Considerations**
   → Adherence to ethical standards, including data privacy, security, and honesty about software capabilities.

5) **Continuous Learning and Improvement**
   → Commitment to staying updated with the latest technologies and methodologies.

6) **Quality Assurance**
   → Rigorous testing and CI/CD practices to maintain high software quality.

7) **Project Management**
   → Effective planning, scheduling, resource allocation, and progress tracking.

8) **User-Centered Design**
   → Prioritizing user needs through feedback and usability testing.

9) **Documentation**
   → Comprehensive documentation of requirements, design, code, and user manuals.

10) **Ethical and Legal Compliance**
   → Ensuring compliance with data protection laws, intellectual property rights, and industry regulations.

## 1.2. Software Engineering Ethics

Software engineering ethics involves adhering to a set of principles that guide professional conduct and decision-making to ensure the integrity, quality, and reliability of software products and services.

**Following are some software engineering ethics:**

**1. Confidentiality:**

→ We should normally respect the confidentiality of our employees or clients irrespective of whether a formal confidentiality agreement has been signed.

**2. Competence:**

→ We should never misrepresent our skills and the level of competency. We should never accept any work which is out of our competency.

**3. Intellectual property rights:**

→ We should be aware of local laws governing the use of intellectual property such as patents and copyright.

**4. Computer misuse:**

→ We should not use our technical skills to misuse other people's computers. Computer misuse ranges from simple like (game playing on an employer's machine) to extremely serious (dissemination of viruses)