Name of the Program: B.Sc. in Computer Science and Engineering **22 June 2021**
Semester: Winter 2020-2021 **Time: 2:30 pm – 4:00 pm**

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

Mid Semester Examination **Winter Semester: 2020-2021**
Course Number: CSE 4513 **Full Marks: 75**
Course Title: Software Engineering and Object-Oriented Design **Time: 1.5 Hours**

There are **3 (three)** questions. Answer all of them. Figures in the right margin indicate marks. The examination is **Online** and **Close Book**. Marks of each question and corresponding **CO** and **PO** are written in the brackets.

Write **Student ID** and **Name** top of the **first page** and write **student ID** and **page no** in every page of the answer script. Submission pdf of the answer script should be named as **Full_Student_ID<space>Course Code.pdf**

---

1. a) Assume, the velocity of your team is 100 Story points. You have 20 user stories (US1-US20) in your project backlog. You have estimated the user stories to have a difficulty/complexity expressed in story points as follows: **5+5** (CO1) (PO2)
   - Each of US1 to US5 equals 2 story points
   - Each of US6 to US10 equals 3 story points
   - Each of US11 to US15 equals 6 story points
   - Each of US16 to US20 equals 14 story points

   i. If you have a team of 4 developers and two weeks sprint (1 week = 5 days = 40 hours), which user stories would you be able to implement in the next sprint and achieve the highest possible value without violating your capacity (effort) constraint?
   ii. How would your result change if the following needs to be implemented with highest priority?
      - US6 must be implemented together with US11
      - US7 must be implemented together with US16
      - US8 must be implemented together with US17

   b) ABC bank wants to develop a Mobile wallet for their clients. They already have more than one million users and their service should be up for 99.98% time. If the service is not available, the users should get a notification immediately. Also, the app should response in less than a second for any users' request. In any situation if the app fails to response the app should provide proper error message to the user. The CPU usage of the app should not more than 15% and memory consumption should be less than 20 MB. They want your company to develop such mobile wallet for them which will have all the existing features of their internet banking and they also want to add many new features. The new features are yet not decided. And ABC bank want to observe the progress of development in every 2 weeks. **6** (CO1) (PO2)
   i. Under these circumstances which Software development model will you choose to complete the development. Briefly mention all the events related to your chosen model.

   c) Identify the functional requirements and non-functional requirements mentioned the previous question. **6** (CO2) (PO1)

   d) Suppose you are developing an information retrieval system. What kind of interaction style you need to use for such systems? Mention one advantage and one disadvantage of your chosen interaction style. **3** (CO2) (PO1)

2. a) You are assigned to draw a class diagram for Euro football tournament where- **15**
   - The tournament has 24 teams. Each team consist of 18 players. (CO3)
   - Each player has a specific height, speed, and accuracy. (PO2)
   - Players know which team they belong to.
   - Some players are migrated players. Migrated players need to record their country of origin.
   - Players may exchange jersey to another team
   - Teams play games against other teams in the tournament.
   - Each team has a Coach and a Manager
   - Each coach has specific experience and winning records
   - Coach can communicate with Manager of another team also.

   [marks will be provided for proper identification of Classes, methods, Inheritance, Cardinality, associations]

   b) In mobile financial service there is an option for sending money to others. You can send money without any charge if you add that receiver number in favorite list. From the GUI you can easily add the receiver number to the favorite list. But you can add only five receivers to the favorite list. If you want to add more you need to remove some from the existing list. Considering all possible conditions draw a sequence diagram for adding receivers to the favorite list. **10** (CO3) (PO2)

3. a) You are almost end of the development of a software. And your client is asking to add few new features. You also predict that such request will come in future too. To add the new features to the existing codebase your company don't want to hamper any of the existing code. Modification of existing code may require to execute a full-scale regression test to confirm that none of the existing features are affected by the new modification. Which SOLID principle you need to follow to satisfy the situation. Explain with example. **15** (CO3) (PO2)

   b) Consider a software with the following components: EI (simple) = 30, EO (average) = 20, EQ (average) = 35, ILF (complex) = 08, ELF (complex) = 05. In addition, the software requires significant end-user efficiency, moderate distributed data processing, average data communications, and other GSCs are incidental.
   Estimate the software size in terms of function points using FPA. **10** (CO1) (PO2)