

American International University-Bangladesh (AIUB)  
**Department of Computer Science  
Faculty of Science & Technology (FST)**

**PROJECT TITLE**

A Software Engineering Project Submitted

By

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| --- | --- | --- | --- | --- |
| **Semester: Summer\_21\_22** | | **Section:** | **Group Number:** | |
| SN | Student Name | Student ID | Contribution (CO3+CO4) | Individual Marks |
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The project will be Evaluated for the following Course Outcomes

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| **CO3:** *Select* appropriate software engineering models, project management roles and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects | Total Marks | |
|  | |
| Appropriate Process Model Selection and Argumentation with Evidence | [5 Marks] |  |
| Evidence of Argumentation regarding process model selection | [5Marks] |  |
| Analysis the impact of societal, health, safety, legal and cultural issues | [5Marks] |  |
| Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report | [5Marks] |  |
| **CO4:** *Develop* project management plan to manage software engineering projects following the principles of engineering management and economic decision process | Total Marks | |
|  | |
| Develop the project plan, its components of the proposed software products | [5Marks] |  |
| Identify all the activities/tasks related to project management and categorize them within the WBS structure. Perform detailed effort estimation correspond with the WBS and schedule the activities with resources | [5Marks] |  |
| Identify all the potential risks in your project and prioritize them to overcome these risk factors. | [5Marks] |  |

Description of Student’s Contribution in the Project work

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| Student Name:  Student ID:  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |
| Student Name:  Student ID:  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |
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| Student Name:  Student ID:  Contribution in Percentage (%):  Contribution in the Project:   * Contribution Description 1 * Contribution Description 2   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Signature of the Student |

# PROJECT PROPOSAL

## Background to the Problem

* Write the background description that helps putting your project into the right context of a problem domain and gives everyone involved a common view of the project.
* What is the root cause of this problem? Why this problem is so important to consider?.

## Solution to the Problem

* Describe what is your project/thesis objective? What solutions are you going to provide to solve the above-mentioned problems?
* What are the solutions you are going to propose to deal with the problem? why is this solution is particularly appropriate to solve the problem? Is the solution feasible to the meet the business objective?
* Describe the basic functionalities of your proposed solution that makes the best use of state‐of‐art technology and produced a significant result that is likely to have a major impact on societal, health, safety, legal and cultural issues. Provide a deep insight that demonstrate and preset a creative solution to the real‐life problem.
* Describe the target group of users of your solution? And how they will be benefited by your proposed solution to the problem?
* Describe the contribution of your project to the development of scientific results that is identified and well documented.
* Provide a literature review on what are the other studies that have discussed the same topic of yours in the literature and explain how your study has utilized and extended the problems of existing studies.
* Provide a description of all the existing studies presented in the problem area. What are the existing software solutions (for project) are available to solve the aforementioned problems?
* What are the existing software solutions are available to solve the aforementioned problem? And how your proposed solution is going to extend them in providing more benefits to the users?

# SOFTWARE DEVELOPMENT LIFE CYCLE

## Process Model

* Provide an analysis regarding the nature and environment of the software that you are going to develop and select the best suitable method(s) to develop the software.
* Present your arguments based on your analysis about why your selected method(s) is the best choice among all other methods to develop your proposed software.
* Presents sufficient amount of evidence to support argument for your model selection in developing your proposed solution.

## Project Role Identification and Responsibilities

* Identify all the roles/stakeholder in the software/project management activities in software development.
* Describes the responsibilities of the role in the software development.

**Text Format:**

* Style: Times New Roman
* Size: 12
* Space: 1.0
* Alignment: Justify
* Length: Maximum 6 pages (including cover page)

1.1 Background to the Problem

As urban populations continue to swell, cities face mounting challenges such as traffic congestion, environmental degradation, and rising transportation costs. Traffic jams not only waste valuable time but also contribute significantly to air pollution, adversely affecting public health and the environment. Additionally, the high costs associated with vehicle ownership and maintenance further limit mobility options for many residents.

In response to these pressing issues, cycling has emerged as a sustainable and healthy alternative. However, existing bike-sharing systems often suffer from inefficiencies, such as poorly distributed rental stations, lack of real-time information, and inadequate maintenance. This limits the effectiveness of cycling as a reliable mode of transport.

The By-Cycle Management System aims to establish dedicated bike rental hubs at key locations throughout the city particularly in high-traffic areas and tourist hotspots. By providing easy access to bicycles and streamlining the rental process, we can encourage more people to choose cycling as their primary mode of transport.

## Background to the Problem

Urban areas face significant challenges related to transportation, including heavy traffic congestion, increasing environmental pollution, and the high costs of motorized vehicles. As urban populations grow, these issues not only worsen but also affect the quality of life, health, and productivity of residents.

In cities with limited space and high population density, traditional modes of transportation are often inefficient and contribute to air and noise pollution. Additionally, the high cost of owning and maintaining motor vehicles places a financial burden on many individuals, limiting their mobility and access to affordable transportation.

A promising solution to these interconnected problems lies in cycling, a mode of transportation that is both eco-friendly and accessible. However, for cycling to become a viable alternative for daily commutes, there must be a well-managed system that allows easy access to bicycles across the city. By creating dedicated hubs or locations where residents and tourists can access bicycles, the city can encourage cycling as a primary mode of transportation, helping to reduce traffic congestion and emissions.

The **Bicycle Management System** addresses this need by establishing a network of hubs strategically located across the city, particularly in high-traffic or tourist areas. This system will allow users to easily rent bicycles, travel to their destinations, and drop off bicycles at any designated hub. The initiative supports environmental sustainability, promotes healthier lifestyles through exercise, and offers an affordable means of transportation.

**Root Causes of the Problem**

1. **Rising Urban Population Density**  
   As cities continue to grow, more people are concentrated within limited urban spaces. This increased density places a higher demand on existing transportation infrastructure, which was often not designed for such volumes. This congestion not only leads to increased travel times but also affects the overall functionality of the urban landscape, making movement within the city more challenging.
2. **Dependence on Private Vehicles**  
   Many urban residents and tourists rely on private cars or motorbikes as their primary mode of transportation. This dependency creates a high volume of traffic on the roads, intensifying congestion and increasing carbon emissions. Additionally, the preference for private vehicles is often driven by the lack of viable, convenient, and affordable public transportation alternatives.
3. **Limited and Inconsistent Public Transport**  
   In many cities, public transportation systems are either overburdened or poorly developed. Buses and trains, where available, may not cover all areas adequately, leading to gaps in accessibility. Consequently, people in underserved areas have fewer options for efficient, low-cost transport, reinforcing their dependence on private vehicles.
4. **Air and Noise Pollution from Motorized Vehicles**Heavy traffic in cities results in significant air pollution, including harmful emissions such as carbon monoxide, nitrogen oxides, and particulate matter. These pollutants contribute to respiratory and cardiovascular issues among residents and exacerbate global climate change. The noise pollution from constant traffic also affects the mental health and well-being of residents, particularly in densely populated areas.
5. **Lack of Affordable and Accessible Transportation Options**The high cost of owning and maintaining a vehicle is prohibitive for many city dwellers, especially those in low-income brackets. Traditional car and bike rental systems may also be costly and not accessible in all parts of a city. This financial barrier limits people’s ability to commute freely, impacting their access to jobs, education, and essential services.
6. **Health and Lifestyle Challenges**  
   With an increasing number of people leading sedentary lifestyles, especially in urban settings, the prevalence of lifestyle-related health issues, such as obesity, diabetes, and cardiovascular disease, is on the rise. Motorized transportation contributes to this by reducing the opportunities for physical activity in daily routines, which could otherwise be incorporated through cycling or walking.
7. **Environmental Impact and Climate Change**  
   Fossil-fuel-powered vehicles are a major contributor to greenhouse gas emissions, which drive climate change. Urban areas, with their high density of vehicles, significantly contribute to this environmental crisis. Reducing emissions is critical to mitigating the effects of climate change, and a shift toward non-motorized, sustainable forms of transport like cycling is essential.
8. **Overcrowded Roads and Limited Parking Space**  
   Urban areas often have limited parking space, and overcrowded roads lead to competition for parking spots. This competition increases traffic, as people spend extra time looking for parking. Bicycles, which require minimal space, offer a practical solution to the problem of road and parking congestion.
9. **Tourism Pressure on Urban Transport**  
   Tourist-heavy cities experience additional pressure on their transportation systems, especially during peak tourist seasons. Tourists often add to congestion, pollution, and demand for transport, straining the available infrastructure. A bicycle management system provides a sustainable, visitor-friendly option that can reduce strain on traditional urban transport.
10. **Global Push for Sustainable Development**  
    Urban planning and policy are increasingly aligned with sustainable development goals, aiming for low-carbon, health-promoting solutions. Many cities have set targets for reducing emissions and increasing the share of sustainable transport options. A bicycle management system fits within these global goals, supporting cities' efforts to reduce their carbon footprint and promote public health.

11.**Traffic Congestion**: Urban roads are often overcrowded due to the high volume of private vehicles, leading to long delays, increased travel times, and higher fuel consumption.

**12.Environmental Pollution**: Emissions from vehicles contribute significantly to air pollution, which affects the health of city residents and increases greenhouse gases.

13.**High Cost of Motor Vehicles**: For many people, the cost of owning, maintaining, and fueling a car or motorcycle is prohibitively high. This limits affordable transportation options, especially for students, low-income residents, and tourists.

## Rubric for Project Assessment (CO3)

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| Criteria | Marks distribution (Max 3X5= 15) | | | | Acquired  Marks |
| **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** |
| Selection of Software Engineering Models | Does not articulate a position or argument of choosing appropriate model. Does not present any evidence to support the arguments for the choice of the model | Articulates a position or argument for choosing models that is unfocused or ambiguous. Presents incomplete/vague evidence to support argument for model choice | Articulates a position or argument of choosing models that is limited in scope. Does not present enough evidence to support the argument for the choice of the model | Clearly articulates a position or argument for the choosing software engineering models. Presents sufficient amount of evidence to support argument for the model selection |  |
| Role identification and Responsibility Allocation | The project has poor project management plans for identifying roles and assigning the responsibilities | Identify few roles in the project management where some of the roles are left alone with any project responsibilities | Identify most of the roles in the project management and assign their responsibilities | Well planned project with proper role identification and responsibility allocation in the project management activities |  |
| Impact identification |  |  |  |  |  |
| Formatting and Submission | Project report is not complete and Several errors in spelling and grammar. Present a Confusing organization of concepts, supporting  arguments, and  real-life example.  Sentences rambling, and details are repeated. | Some errors in spelling and grammar. Some problems  of organizing the answer in a logical order of defining,  elaborating, and providing real-life examples. | Few errors in spelling and grammar. Presents most of the details in a logical flow of  organization in  definition,  details, and  example. | Project report is complete and No errors in spelling and grammar. Consistently  presents a logical  and effective  organization of definition,  details, and real-life example of  the topic. |  |
| Acquired marks: | | | | |  |
| CO Pass / Fail: | | | | |  |

## Rubric for Project Assessment (CO4)

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| Marking Criteria | Marks Distribution (Maximum 3X5=15) | | | | Acquired Marks |
| **Inadequate (1-2)** | **Satisfactory (3)** | **Good (4)** | **Excellent (5)** |
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| Project Planning | No background information regarding the project is  given; project goals and benefits are  missing. | Insufficient background information is given; project goals and benefits are  poorly stated | Sufficient background information is given; the purpose and goals of the project are explained. | Thorough and relevant background information  is given; project goals are clear and easy to identify. |  |
| Effort Estimation and Scheduling | Student vaguely discuss the impact of societal, health, safety, legal and cultural issues in their project | Student provided with partial relevance to the impact of societal, health, safety, legal and cultural issues in their project | Student fairly provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project | Student comprehensively provided the analysis to the impact of societal, health, safety, legal and cultural issues in their project |  |
| Risk Management | Ambiguous representative example. | Partially identify / indicate towards real-life example. | Real-life example is fairly connected towards the definition. | Comprehensively defend with real life example. |  |
| Acquired Marks: | | | | |  |
| CO Pass / Fail: | | | | |  |