College of Computing and Multimedia Studies

# Code: IS 115

**Subject: Quantitative Methods Activity Title:** RESEARCH PROPOSAL

# Objectives:

Upon completion of the design brief, students will be able to do the following:

1. Prepare a research proposal based on the given template.
2. Create and develop their proof of concept and working plan.
3. Identify key areas in the development of a research based on modeling and simulation.

# Discussion and Abstraction

The importance of research in the different fields encompasses an important foundation towards growth and progress. Modeling and simulation are techniques which is becoming more popular as an important research method for investigating operational and organizational systems. There are literatures that provided the importance of this concept for both the model design and development and model verification and validation for use in industrial product development systems. According to the study of Yin and McKay (2018), the purpose of modeling and simulation includes performance assessment, proof, prediction, discovery, training, entertainment, and education. This is also used in areas such as design system decision-making mechanisms. In some other way, the application of modeling and simulation methods is also used to understand the performance of complex socio- technical systems which is becoming more promising nowadays.

# Instructions to Students

In this particular activity, it is encouraged that your output should follow research protocols and policies. You may also utilize bibliographic management software to manage your references such as Zotero or Mendeley for such matter. Moreover, it is important to make sure your research follows the sustainable development goals and national harmonization for research towards national development. Ensuring that your research outputs could be utilized towards providing a solution on a society, community, industrial, and/or business problems. As much as possible make your research

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follow the S.M.A.R.T acronym which stands for Specific, Measurable, Achievable, Realistic, and Time bound.

# Research Proposal Format

**CAPSULE RESEARCH PROPOSAL FOR SIMULATION AND MODELING**

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| --- | --- | --- | --- | --- | --- |
| **Proposed Title of Research:** Understanding Coastal Resilience: Storm Surge Modeling for Bagasbas Beach | | | | | |
| **Project Leader** | | Mark Allen D. Raynes | | **College/Office** | CCMS(College of computing and multimedia studies) |
| **Members** | | Anglo, Chris Arcel H. Bana, Glezel C Baile Jhon Kent A. Dacillo, Roniel Mclain B. De Viana, Hynzel Mitch B. | | **Contact Number/s** |  |
| **Co-author** | |  | | **Email Address** |  |
| **CNSC RESEARCH AGENDA** | | | | | |
|  | Arts, Culture, History and Philosophy | |  | Gender and Development & Reproductive Health | |
|  | Environment and Mines & Geo-Sciences | |  | Agriculture, Fishery, Forestry, Marine and Freshwater Resources | |
|  | Agriculture Sustainable Development | |  | Biodiversity Conservation and Protection | |
|  | Energy Exploration and Utilization | |  | Inventive, Innovative Technologies Development | |
|  | Health, Sanitation and Safe Water Supply | |  | IR 4.0 / IR 5.0 | |
|  | Business Development and Management and Market Access of Local Products and Technologies | |  | Applied Sciences, Mathematical Theories and Modelling | |
|  | Justice and Peace | |  | Language, Communication and Media | |
|  | Education and Capability Building | |  | Food Security and Poverty Alleviation | |
|  | Inclusive Education and Sports | |  | Tourism, Economics, Business Marketing and Management | |
|  | Political System, Governance and Policy-making on Professional Ethics, Standards | |  | Institutional Collaboration / Partnership | |
|  | Crops Development and Farming Adaptation | |  | Community-based and Participatory Resource Management, Monitoring and Development | |
|  | Agricultural Meteorology and Agro-Forestry | | X | Disaster Risk Reduction and Management | |
| **Rationale / Significance** | | | | | |
| *State the research problem and significance of the proposed study to the current needs of the country. The proposal should clearly discuss the specific needs/ problems to be addressed in a realistic environment where modeling and simulation can be used for the study. The proponent/s should have a clear understanding of the needs/ problems in the research area of interest.* | | | | | |
| Coastal communities in the Philippines, particularly Daet in Camarines Norte, are increasingly vulnerable to storm surges due to climate change, urbanization, and environmental degradation. Bagasbas Beach, a vital economic and recreational area, faces risks from rising sea levels and extreme weather events. The primary research problem is to understand and predict the impact of storm surges on this coastal zone, enabling effective preparedness and response strategies. | | | | | |
| **OBJECTIVES**  (Statement of the specific purpose to address the problem.) | | | | | |
| The coastal region of Bagasbas Beach, like many vulnerable areas across the globe, faces an increasing threat from climate change, particularly in the form of storm surges. These surges can cause significant damage to ecosystems, infrastructure, and local economies. To address these challenges, this study aims to develop a comprehensive understanding of storm surge dynamics and enhance coastal resilience in Bagasbas Beach. The following objectives outline the key goals of this research.  First and foremost, the study seeks to develop a robust storm surge model tailored specifically for Bagasbas Beach. By utilizing local topographical, bathymetric, and meteorological data, this model will simulate the dynamics of storm surges under various climatic conditions. This objective is essential for understanding how storm surges will behave in this unique coastal environment, providing a foundational tool for predicting potential impacts.  In combination with model development, the study aims to assess the vulnerability of the local community and its critical infrastructure. This involves identifying high-risk areas and evaluating the susceptibility of various sectors, including tourism, fishing, and residential zones, to storm surge impacts.  In conclusion by achieving the outlined objectives developing a storm surge model, assessing vulnerability, evaluating economic impacts, informing disaster preparedness, promoting community engagement, and supporting policy development the study aspires to contribute significantly to the resilience of this vital coastal area. In an era of climate uncertainty, such efforts are essential for ensuring the sustainability and well-being of coastal communities. | | | | | |
| **METHODOLOGY**  (Brief description of how the study will be implemented). | | | | | |
| *The methodology includes the methods, procedure and techniques used to collect and analyze information. It should include the research design, participants and process of selecting sample respondents, validation and reliability of the instrument/s to be used, methods and data*  *collection, data analysis and procedure and statement how ethical issues will be addressed.* | | | | | |
| Literature Review:  Conduct a comprehensive review of existing studies on storm surge modeling, coastal resilience, and historical storm events in the region. This will provide context and identify gaps in current research.  Research Design  This study will use a mixed-methods approach, combining quantitative modeling with qualitative community engagement to assess storm surge impacts and resilience at Bagasbas Beach. Data Collection Methods  * **Meteorological Data:** Historical weather and tide data will be collected from local MDRRMO * **Surveys:** from residents via online or in person that details past experience or recollections   **Model Development:**   * Setting up the model domain based on collected data. * Implementing boundary conditions reflecting potential storm scenarios. * Calibrating the model using historical storm surge data.   Scenario Simulation:  Run simulations for various storm scenarios, including different intensities and tracks, to assess potential surge impacts under various conditions.  Mitigation Strategy Development:  Analyze potential mitigation strategies through modeling outcomes and stakeholder feedback, focusing on both structural (e.g., seawalls) and non-structural (e.g., natural barriers) solutions. | | | | | |

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| **MAJOR ACTIVITIES**  (Enumerate in chronological order the tasks to be undertaken. Use Gantt Chart) | | | | | | | | | | | | |
| **Activities** | **Duration ( Timeline )** | | | | | | | | | | | |
| **WK1** | | **WK2** | **WK3** | | **WK4** | **WK5** | **WK6** | **WK7** | **WK8** | **WK9** | **WK10** |
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| **DELIVERABLES**  (Indicate the specific deliverables expected to be accomplished in this project based on the objectives). | | | | | | | | | | | | |
| **Literature Review**:   * Comprehensive analysis of existing studies on storm surge modeling and coastal resilience.   **Data Collection and Analysis**:   * Compilation of historical meteorological and oceanographic data specific to Bagasbas Beach. * GIS mapping of the area, including topography and land use.   **Model Development**:   * Creation of a hydrodynamic model to simulate storm surge events. * Calibration and validation of the model using historical storm data.   **Simulation Scenarios**:   * Development of various storm surge scenarios, including different storm intensities and sea-level rise projections. * Simulation of these scenarios to assess potential impacts.   **Impact Assessment**:   * Analysis of the effects of storm surges on infrastructure, ecosystems, and communities at Bagasbas Beach. * Identification of vulnerable areas and populations.   **Coastal Resilience Strategies**:   * Recommendations for improving coastal resilience based on simulation results. * Evaluation of existing coastal defense measures and their effectiveness.   **Stakeholder Engagement**:   * Organization of workshops or meetings with local stakeholders to discuss findings and gather input. * Development of informational materials for the community on storm surge risks and resilience strategies.   **Final Report**:   * A comprehensive report detailing the research methodology, findings, simulations, and recommendations. * Visualizations, such as maps and graphs, to illustrate key results. | | | | | | | | | | | | |
| **Implementing Schedule** | | **Month** | | | | | | **Year** | | **Duration in Months** | | |
| **Planned Start Date** | |  | | | | | |  | |
| **Planned Completion Date** | |  | | | | | |  | |  | | |
| **Budgetary Requirement** | | | | | | | | | | | | |
| **Particulars** | | | | | **TOTAL** | | | | | | | |
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*\*adopted from DOST Forms 1A and 1B Capsule RD Proposal with modification*

# Evaluation

Answer the following:

1. What makes a successful research proposal especially in modeling and simulation?

**A successful research proposal for modeling and simulation should clearly state the problem, explain its importance, and provide a detailed plan for addressing the problem.** It should include a solid understanding of existing theories, a well-structured methodology, a justification for using modeling and simulation, a realistic timeline, and a discussion of the potential benefits of the research.

1. What are the challenges in doing research and how to overcome them?

**Research can face various challenges such as limited resources, time constraints, data limitations, and ethical considerations.** To overcome these challenges, researchers should prioritize essential resources, manage time effectively by dividing workloads, ensure data quality, and adhere to ethical guidelines and legal constraints like plagiarism.

1. What is plagiarism and how are you going to avoid it?

**To avoid plagiarism, we will always give credit to the original authors of the work we use.** This includes citing our sources, paraphrasing ideas correctly, and using quotation marks for direct quotes. Additionally, we will learn copyright laws and obtain necessary permissions for any copyrighted material. We will also use plagiarism detection tools to check your work for originality.

1. Why is budgeting important in research?

Budgeting is crucial in research because it allows us to properly allocate funds and ensure it is used effectively and efficiently. A detailed budget can be a valuable tool in securing funding from external sources. Budgeting can help researchers evaluate the potential costs and benefits of different research approaches.

1. What motivates you in your chosen topic?

Our motivation for the chosen topic of Understanding Coastal Resilience: Storm Surge Modeling for Bagasbas Beach is to simulate and see how a storm surge will affect the area and how to mitigate the risk and effects of storm surge in bagasbas beach. Also, to provide insight on a disaster and its possible effects and prepare for multiple scenarios of storm surges.

# References:

CNSC Research Manual

Yin, C. and McKay, A. (2018). Introduction to Modeling and Simulation Techniques. Proceedings of ISCIIA 2018 and ITCA 2018. The 8th International Symposium on Computational Intelligence and Industrial Applications and The 12th China-Japan International Workshop on Information Technology and Control Applications.





Republic of the Philippines

**CAMARINES NORTE STATE COLLEGE**

F. Pimentel Avenue, Brgy. 2, Daet, Camarines Norte – 4600, Philippines

College of Computing and Multimedia Studies

Name(s) of Student Researcher(s): Department:

Title of Proposal: Course/Blk:

PROJECT PROPOSAL FOR MODELING AND SIMULATION RESEARCH RUBRIC

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| --- | --- | --- | --- | --- |
| Criterion | Missing or Unacceptable (0) | Developing (1-3) | Accomplished (4-6) | Exemplary (7-10) |
| Title and Rationale | Title or rationale were missing or inappropriate given the problem, research objectives,  and method. | Title or rationale lacks relevance or fails to offer appropriate details about the proposed study or is too  lengthy. | Title and rationale are relevant and of required size, offering details about the proposed  study. | Title and rationale are concise, informative, and clearly indicate the relevant details of the proposed study. |
| Research objectives and deliverables | Research objective(s), scope, and deliverables were omitted or inappropriate given the  context, purpose or methods of the study | Elements are poorly formed, ambiguous or not logically connected to the description of the problem, purpose or research methods. | Research objectives are stated clearly and are connected to the research topic including the  deliverables intended for the purpose. | Articulates clear, reasonable, and succinct research objectives, the aim is fresh, interesting and significant. |
| Methodology | The methodology is erroneous for the desired modeling and simulation processes involved, some of the key aspects are  omitted. | The methodology is confusing or incomplete given the objectives and some important procedures are not well identified. | The methodology has been identified and described in sufficiently, important processes and procedures are well  identified and addressed. | The scope and methodology are complete and well supported with diagrams to make it more coherent, all the necessary elements are clearly stated. |
| Organization and neatness of the proposal | The length of the paragraph are insufficient and ideas are presented in a random manner with no focus. | The content and length of the proposal are inadequate, there is logic but ideas lack focus and structural argumentation. | Proposal format has been followed mostly. The narrative presents the ideas in an almost structural and logical manner. | The narrative has the appropriate length and the ideas are presented in a clear structural and logical manner identifying reasonably well the reasons and means to achieve the goal of the proposal. |
| Budget and timeline | Budget and/or timeline are missing or the timeline is beyond the suggested time. | Budget and/or timeline are present but not adequate to support the project. | Budget and/or timeline are present but not very well defined, not easy to understand. | Budget and timeline are adequate to support the project activities, costs are reasonable in relation to the objectives of  the project, budget is clear to understand. |
| Overall Points |  |  |  |  |

Total Points: