RESEARCH MANUAL

Prepared and Compiled by:

ENGR. CHARITY HOPE A. GAYATIN
School of CEGE
PHILOSOPHY AND OBJECTIVES

MAPUA INSTITUTE OF TECHNOLOGY (MIT)

VISION
Mapúa shall be among the best universities in the world.

MISSION
a) the Institute shall provide a learning environment in order for its students to acquire the attributes that will make them globally competitive.
b) the Institute shall engage in economically viable research, development and innovation.
c) the Institute shall provide state-of-the-art solutions to problems of industries and communities.

CORE VALUES
Mapúa Institute of Technology aims at the empowerment of the youth by providing education grounded on academic excellence and strength of character. Students are expected to develop the passion for mental knowledge and meritorious performance as well as the recognition of moral values as essential to growth of character. the integration of humanities and the social sciences into the technical curriculum has paved the way to the achievement of this goal.

Mapúa upholds the reinforcement of time honored values learned in school and at home directed towards the development in the student of a strong moral fiber that will contribute to his/her personal well-being as well as that of other members of society.

MAPÚA emphasizes the importance of the following core values:

• DISCIPLINE
• EXCELLENCE
• COMMITMENT
• INTEGRITY
• RELEVANCE

By ensuring that these core values are learned in the classroom and outside, MAPÚA shall have done its share in producing men and women who live fulfilled and meaningful lives.
DIRECTED RESEARCH FOR INNOVATION AND VALUE ENHANCEMENT (DRIVE)

The Office of Directed Research for Innovation and Value Enhancement, DRIVE was created to develop the research capability of the Mapua System. Research undertakings include those in the fields of chemical and environmental engineering, materials science, chemistry, electronics, robotics and information technology.

The research projects attempt to respond to the needs of the Philippine economy. Mapua steers its resources to engage in demand-driven projects. These research activities have immeasurably increased Mapua’s intellectual capital and in the future, DRIVE as the research arm hope to translate these formally into intellectual property rights. Still and all, the emergent capability to generate new knowledge brings Mapua closer to the leading-edge and to the attainment of its vision to be an international center of excellence.

VISION

A Culture of research shall be established to breed the human and physical resources needed to develop cutting edge products, process technology improvements, innovations in productivity, and novel socio-economic ideas.

MISSION

We shall foster the establishment of research that shall serve as basis for graduate curricula that are oriented towards generating new know-how, innovation and added value.

We shall establish research programs that are driven by local and global demand oriented along national development plans.

We shall encourage initiatives in research which has potential for spinning off intellectual property, enterprises and more developmental efforts.

We shall foster research initiatives and projects that are focused on contributing solutions to specific technological or socio-economic problems.

RESEARCH AREAS

SCHOOL OF CIVIL ENVIRONMENTAL AND GEOLOGICAL ENGINEERING

• Intelligent Transport System
• Advanced Construction Project Management and Construction Materials
• Sustainable Environmental Engineering
• Natural Disaster Resilient Infrastructures
• Natural Resilient Substructures
• Climate change mitigation and adaptation
• Natural Disaster Resilient Earth
SCHOOL OF CIVIL, ENVIRONMENTAL AND GEOLOGICAL ENGINEERING (SCEGE)

PROGRAM EDUCATIONAL OBJECTIVES
Within the five years after graduation, the graduates of the programs under the School of Civil, Environmental and Geological Engineering shall have:

i. Undertaken, singly or in teams, projects that show ability to solve complex engineering problems

ii. Had substantial involvement in projects that take into consideration safety, health, environmental concerns and the public welfare, partly through adherence to required codes and laws.

iii. Demonstrated professional success via promotions and/or positions of increasing responsibility

iv. Demonstrated life-long learning via progress toward completion of an advanced degree, professional development/continuing education courses, or industrial training courses

v. Exhibited professional behavior and attitude in engineering practice

vi. Initiated and implemented actions toward the improvement of engineering practice

PROGRAM OUTCOMES

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<tbody>
<tr>
<td>a.</td>
<td>Ability to apply knowledge of mathematics, science and engineering</td>
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<td>b.</td>
<td>Ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<td>c.</td>
<td>Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
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<td>d.</td>
<td>Ability to function on multi-disciplinary teams</td>
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<td>e.</td>
<td>Ability to identify, formulate and solve engineering problems</td>
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<td>f.</td>
<td>Understanding of professional and ethical responsibility</td>
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<td>g.</td>
<td>Ability to communicate effectively</td>
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<td>h.</td>
<td>Broad education necessary to understand the impact of engineering solutions in the global and societal context</td>
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<tr>
<td>i.</td>
<td>Recognition of the need for, and an ability to engage in life-long learning</td>
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<td>j.</td>
<td>Knowledge of contemporary issues</td>
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<td>k.</td>
<td>Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</td>
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<td>l.</td>
<td>Knowledge and understanding of engineering and management principles, as a member and leader in a team, to manage projects in multidisciplinary environments</td>
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RESEARCH AGENDA

NATIONAL HIGHER EDUCATION RESEARCH AGENDA (NHERA)

Priority Themes for Multidisciplinary/Multisectoral Research (NHERA-2, 2009-2018)

1. Food safety and security. Considering the country’s proneness to natural hazards and disasters and with its booming population, it is important for the people to be assured of affordable and safe food on their table.

2. Enhancing indigenous renewable energy source in the domestic energy mix. Increasing the percentage of indigenous renewable energy source into the national energy mix will not only result in dollar saving, and protection of the environment but more importantly, ensuring energy security. The search, development and exploitation of renewable energy sources will involve a multidisciplinary approach.

3. Development of vaccines and diagnostic kits using indigenous materials. Emerging and reemerging diseases have always threatened the global and regional scenes. The country has to be prepared for these by having the appropriate medication, vaccines and diagnostic kits that are readily available and affordable.

4. Disaster risk management. The shift from preparedness to prevention and mitigation mode in our disaster risk management framework would entail a lot of research work not only in policy formulation, community development, and public awareness but also in hard science (e.g. forecasting, structural engineering aspects).

5. Pollution control. Environmental issues that affect the land, air and water should be studied. A developing country like the Philippines must ensure that progress is not compromised by environmental degradation.

6. Climate change specifically on the issue of global warming. The four pillars of the Bali Action Plan dealing with a) mitigation, b) adaptation, c) technology transfer, and d) financial resources are rich sources of multi-disciplinary research work. Considering that climate change issues deal with future scenarios, a wholistic approach is necessary.

7. Future ASEAN. The ASEAN Charter has come into force and by AY 2015, we will be a single community. The ASEAN will also have its own legal personality. In the process, immediate studies on how to handle this pending reality must be done.

8. Peace process and conflict resolution. This is a rich source of research work, the results of which can be applied to governance, policies and direction setting.
DIRECTED RESEARCH FOR INNOVATION AND VALUE ENHANCEMENT (DRIVE)

Mapua supports its faculty members and students in undertaking research projects. Research colloquia are held to increase the awareness and interest of faculty members and students in research and development activities.

Mapua has initiated internet, e-learning, e-commerce, computational research projects and development of applications software in all engineering fields. The Institute is advancing a research agenda that leverages its traditional strengths as an engineering school and riding the current wave of information technologies to prepare itself to surf in the oncoming wave of biotechnologies. The intersection of IT and biotechnology, and the convergence of engineering disciplines and special concerns such as energy, environment, productivity, business management and other relevant fields of study are considered to be areas rich in research possibilities.

These research objectives are the platforms that the Institute will use to pursue the following research agenda:

- To pursue the support research projects that are IP-generating, sustainable, basic and applied in nature, and multidisciplinary in scope;
- To present research outputs in international and local conferences; and
- To publish research outputs in ISI-abstracted journals.

Terms of Reference for the Research Agenda

The research Agenda of the Institute emerged after a review of past research activities, emerging local and global issues and concerns, the developmental needs of the institute and the unique strengths and characteristics of the Institute.

- Institute shall embark on a program of development of human resources through short-term training programs and long-term study programs.
- The Institute shall also enhance existing laboratories, establish new research facilities, acquire or build experimental or analytical equipment and organize these for optimal support of research activities.
- There shall be mechanisms and support for research dissemination such as a research journal, colloquia, seminars and the like.
- The DRIVE shall lead in forging linkages, alliances and other forms of collaboration with academic institutions, government agencies, non-government organizations and industry partners to advance the research agenda of the Institute.
- The DRIVE and School of Graduate Studies shall work hand-in-hand to assimilate and integrate research into the graduate curricula.
## RESEARCH THEMES 2010-2011

<table>
<thead>
<tr>
<th>Cluster Engineering Cluster:</th>
<th>Sustainable transport and the application of transportation impact assessment</th>
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<tbody>
<tr>
<td><strong>Cluster Members:</strong></td>
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<tr>
<td>Francis Aldrine Uy</td>
<td>Lourdes Aballera</td>
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<td>Bienvenido Cervantes</td>
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<td>Sustainable construction materials and advanced construction methodology</td>
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<td>Raul Asis</td>
<td>Diego Rosacay</td>
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<td>Eugene Chan</td>
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<td>Edgardo Cruz</td>
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<td>Flordeliza Villasenor</td>
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<td>Fibor Tan</td>
<td>Delia Senoro</td>
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<td>Arsenio Adriano</td>
<td>Ervin Senson</td>
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RESEARCH PROGRAM OF SCHOOL OF CIVIL, ENVIRONMENTAL AND GEOLOGICAL ENGINEERING

RESEARCH THEMES 2011-2012

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<td>Teresito Bacolcol</td>
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<td>Raymundo Villonez Jr.</td>
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### RESEARCH THEMES 2012-2013

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<th>Transportation Engineering Cluster:</th>
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<td>Reduce, reuse, recycle</td>
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<td><strong>Structural Engineering Cluster:</strong></td>
<td>Incorporating green engineering in design</td>
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<td><strong>Geotechnical Engineering Cluster:</strong></td>
<td>Natural Disaster Resilient Substructures</td>
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<td><strong>Geology &amp; Geological Engineering Cluster:</strong></td>
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<td>Teresito Bacolcol</td>
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Institutional Theme: Internet of Things and Sustainable Development

RESEARCH PROGRAM OF SCHOOL OF CIVIL, ENVIRONMENTAL AND GEOLOGICAL ENGINEERING

“FILIPINO INGENUITY BRIDGE BY MAPUAN EXCELLENCE PAVING THE ROAD TO A SUSTAINABLE FUTURE”

RESEARCH PRIORITIES 2013-2014

<table>
<thead>
<tr>
<th>Engineering Cluster</th>
<th>Research Areas</th>
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<tr>
<td><strong>Transportation Engineering</strong></td>
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**Transportation Engineering Cluster:**

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<td>Francis Aldrine Uy</td>
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<td>Dante Potante</td>
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**Construction Engineering Cluster:**

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**Environmental and Sanitary Engineering Cluster:**

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<tr>
<td>Victor Sabandeja</td>
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<td>Delia Senoro</td>
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**Structural Engineering Cluster:**

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<tr>
<td>Edgardo Cruz</td>
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<td>Garry Alviento</td>
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**Geotechnical Engineering Cluster:**

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**Water Resources Engineering Cluster:**

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</table>
Cluster Members:
Fibor Tan
Arsenio Adriano
Romeo Alastre

Geology & Geological Engineering Cluster
Cluster Members:
Marianne Fernandez
Arturo Daag
Maybellyn Zepeda
Teresito Bacolcol
Raymundo Villonez Jr.
Arnold Alvarez
Guillerma Jayne Atienza
Celestino Avis
Jocelyn Villanueva

In a report published by the American Society of Civil Engineer in 2007 on the future of the Civil Engineering profession research and development in 2025 would focus on the following:
1. Nanoscience, nanotechnology, biotechnology applications in infrastructure environment;
2. Information technology and data management;
3. Highly-integrated planning and construction tools, supported by four-dimensional databases;
4. Intelligent infrastructure (such as, embedded sensors and real-time onboard diagnostics);
5. Intelligent sensors to move productivity at an all-time high.

PERFORMANCE INDICATORS:
1. Number of Patents
2. Number of Prototypes and Pilot-test
3. Number of Publications
4. Number of community extension service that applied/adopted research findings and results

Schedule of Faculty Members that can be assigned as Advisers & Panel Members each Term

<table>
<thead>
<tr>
<th>Specialization</th>
<th>1st Quarter</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
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<tbody>
<tr>
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Institutional Theme: Internet of Things and Sustainable Development
“FILIPINO INGENUITY BRIDGE BY MAPUAN EXCELLENCE
PAVING THE ROAD TO A SUSTAINABLE FUTURE”

RESEARCH PRIORITIES 2014-2015

Transportation Engineering: Intelligent Transportation System
Mass Transportation System
Software Applications e.g. Bentley

Construction Engineering & Management: Advanced Construction Project Management
Construction Materials and Methodology
Building Information Management (BIM)
Software Applications e.g. Tekla

Environmental and Sanitary Engineering: Alternative Energy e.g. Wind Power
Sustainable Environmental Engineering
Desalination
Water and Wastewater Treatment
(portable and low-cost)
Software Applications e.g. ArcGIS

Structural Engineering: Natural Disaster Resilient Infrastructures
Assessment of Earthquake/Flood Damaged Structures
Green Structures
Software Application e.g. STAAD, ETABS

Geotechnical Engineering: Natural Disaster Resilient Substructures
Slope Stability/Landslide

Water Resources Engineering: Climate-change Mitigation and Adaptation
Hydropower
Flooding
Water Supply
Watershed Management
Software Application (ArcGIS, HEC-HMS, HEC-RAS)

Geology & Geological Engineering: Natural Disaster Resilient Earth
Soil Properties/Land use study
### Transportation Engineering Cluster:

**Cluster Members:**

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<td>Francis Aldrine Uy</td>
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### Construction Engineering Cluster:

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### Environmental and Sanitary Engineering Cluster:

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INTERNATIONAL LINKAGES FOR RESEARCH AND DEVELOPMENT (ILRAD)

PHILOSOPHY
Keep Ourselves Abreast with International Research Engineers and Scientists.

VISION
The Mapúa Office of International Linkages for Research and Development shall be known globally as an efficient, effective, and sustainable linkage center for research and development.

MISSION
The Mapúa’s Office of International Linkages for Research and Development shall create and establish platforms, venues, and avenues for international research and development (R&D) collaborations and cooperation with competent international partners.

GOALS
1. ILRAD shall create opportunity to produce high impact researches with the ambience of “technopreneurship” of global standards that could provide solutions to societal problems.
2. ILRAD shall seek access for external, technical, and financial support to sustain and deepen the R&D activities;
3. ILRAD shall initiate the institutional R&D capacity and competency building by way of creating R&D networks, organizing international symposia, workshops, seminars, conferences, and other related fora;
4. ILRAD shall provide opportunities, links, and access to enhance Mapúa visibility for International Scientific Indexing journals;
5. ILRAD shall facilitate the processing of travel needs for outbound researchers and the hosting of inbound researchers.
What is research?
- Usually strikes students with anxiety
Can be a rewarding experience, and many continue to do so voluntarily later on in their academic and even their professional careers (e.g. better way of treating industrial waste, alternative source of energy, coming up with a stronger but inexpensive construction material)
- takes a lot of practice; doesn’t come naturally

What it is, and what it’s not
What it is.
- “A research paper is the culmination and final product of an involved process of research, critical thinking, source evaluation, organization, and composition.” (Jack Raymond Baker, Allen Brizee in the Online Writing Lab website of Purdue University)
- “It is, perhaps, helpful to think of the research paper as a living thing, which grows and changes as the [researcher] explores, interprets, and evaluates sources related to a specific topic.” (Ibid.)
- “The research paper serves not only to further the field in which it is written, but also to provide the student with an exceptional opportunity to increase her knowledge in that field.”

What it is not.
- “not simply an informed summary of a topic by means of primary and secondary sources
- “[Not] a book report nor an opinion piece nor an expository essay consisting solely of one's interpretation of a text nor an overview of a particular topic.
- “it is a genre that requires one to spend time investigating and evaluating sources with the intent to offer interpretations of the texts, and not unconscious regurgitations of those sources.
- “The goal of a research paper is not to inform the reader what others have to say about a topic, but to draw on what others have to say about a topic and engage the sources in order to thoughtfully offer a unique perspective on the issue at hand.”

General Kinds of Research
There are five general kinds of research: basic research, applied research, evaluation research, action research, and orientational research.

Basic and Applied Research
Basic research is research aimed at generating fundamental knowledge and theoretical understanding about basic human and other natural processes. Applied research is focused on answering practical questions to provide relatively immediate solutions.

Basic and applied research can be viewed as two endpoints on a research continuum, with the center representing the idea that research can be applied research can contribute to basic research and vice versa. Here is the continuum:

Basic.............................Mixed.............................Applied
Research examining the process of cognitive “priming” is an example of relatively basic research; a comparison of the effectiveness of two approaches to counseling is an example of relatively applied research.

Basic research and applied research are generally conducted by researchers at universities.

**Evaluation Research**

*Evaluation* involves determining the worth, merit, or quality of an evaluation object. Evaluation is traditionally classified according to its purpose:

- *Formative evaluation* is used for the purpose of program improvement.
- *Summative evaluation* is used for the purpose of making summary judgments about a program and decisions to continue or discontinue the program.

A newer and currently popular way to classify evaluation is to divide it into five types:

- *Needs assessment*, which asks this question: Is there a need for this type of program?
- *Theory assessment*, which asks this question: Is this program conceptualized in a way that it should work?
- *Implementation assessment*, which asks: Was this program implemented properly and according to the program plan?
- *Impact assessment*, which asks: Did this program have an impact on its intended targets?
- *Efficiency assessment*, which asks: Is this program cost effective?

Evaluation is generally done by program evaluators and is focused on specific programs or products.

**Action Research**

*Action research* focuses on solving practitioner’s local problems. It is generally conducted by the practitioners after they have learned about the methods of research and research concepts that are discussed in your textbook. It is important to understand that action research is also a state of mind; for example, teachers who are action researchers are constantly observing their students for patterns and thinking about ways to improve instruction, classroom management, and so forth. We hope you get this “state of mind” as you read our manual.

**Oriental Research**

*Oriental research* is done for the purpose of advancing an ideological position. It is traditionally called critical theory. We use the broader term orientational research because critical theory was originally concerned only with class inequalities and was based on the Karl Marx’s theory of economics, society, and revolution.

Oriental research is focused on some form of inequality, discrimination, or stratification in society. Some areas in which inequality manifests itself are large differences in income, wealth, access to high quality education, power, and occupation. Here are some major areas of interest to orientational researchers:
• Class stratification (i.e., inequality resulting from one's economic class in society).
• Gender stratification (i.e., inequality resulting from one’s gender).
• Ethnic and racial stratification (i.e., inequality resulting from one’s ethnic or racial grouping).
• Sexual orientation stratification (i.e., inequality and discrimination based on one’s sexual preferences).

Sources of Knowledge
In this section we discuss how people learn about the world around them and gain knowledge. The major ways we learn can be classified into experience, expert opinion, and reasoning.

Experience
The idea here is that knowledge comes from experience. Historically, this view was called empiricism (i.e., original knowledge comes from experience).

The term *empirical* means “based on observation, experiment, or experience.”

Expert Opinion
Because we don’t want to and don’t have time to conduct research on everything, people frequently rely on expert opinion as they learn about the world. Note, however, that if you rely on an expert’s opinion it is important to make sure that the expert is an expert in the specific area under discussion and you should check to see if the expert has a vested interest in the issue.

Reasoning
Historically, this idea was called rationalism (i.e., original knowledge comes from thought and reasoning).

There are two main forms of reasoning:
• *Deductive reasoning* (i.e., the process of drawing a specific conclusion from a set of premises). Deductive reasoning is the classical approach used by the great rationalists in the history of western civilization. Note that, in formal logic and mathematics, a conclusion from deductive reasoning will necessarily be true if the argument form is valid and if the premises are true.
• *Inductive reasoning* (i.e., reasoning from the particular to the general). The conclusion from inductive reasoning is probabilistic (i.e., you make a statement about what will probably happen). The so called “problem of induction” is that the future might not resemble the present.

The Scientific Approach to Knowledge Generation
Science is also an approach for the generation of knowledge. It relies on a mixture of empiricism (i.e., the collection of data) and rationalism (i.e., the use of reasoning and theory construction and testing).
Dynamics of Science.
Science has many distinguishing characteristics:
• Science is progressive. In other words, "We stand on the shoulders of giants" (Newton).
• Science is rational.
• Science is creative.
• Science is dynamic.
• Science is open.
• Science is "Critical."
• Science is never-ending.

Basic Assumptions of Science
In order to do science, we usually make several assumptions. There is a world out there that can be studied. This can include studying the inner worlds of individuals.
1. Some of the world is unique; some of it is regular or predictable; and much of it is dynamic and complex. (Note: These categories can sometimes overlap)
2. The unique, the regular, and the complex in the world all can be examined and studied by researchers.
3. Researchers should try to follow certain agreed-on norms and practices.
4. It is possible to distinguish between more and less plausible claims and between good and poor research.
5. Science cannot provide answers to all questions.

Choosing a Topic
- Try brainstorming
- Remember to be fluid; what you start out with may not be what you end up with
- Try: Choosing a Specific Topic in Three Steps
  1. Choose any topic or topics in the universe. - "e.g., something about organic matter"
  2. Be a little more specific about your topic. - "e.g., compost and soil"
  3. Be a lot more specific about your topic. - "e.g., soil nutrients released by organic matter decomposition"
  4. Repeat these three steps three or more times to give yourself a few examples of topics to choose from. When you have a few examples, choose the topic that you feel meets your course requirements, the needs of your intended (or imagined) audience, and/or has the most relevant source material to support it.

Once you feel solid about the topic you have chosen, you are ready to Narrow Down Your Topic. Always remember that you can go back to research at any time of your writing process. (http://www.sophia.org/tutorials/choosing-and-narrowing-a-topic-to-write-about-for)

Steps 3, 4, and 5: Narrowing Down Your Topic
1) Make one or two more words more specific.
   In this case, we replaced the words "soil nutrients" with nitrogen and replaced "organic matter" with food waste to make the topic we wish to write about as precise and as specific as possible.
2) OK, we’ve added a few words to make the topic more specific. Now turn the topic into a complete sentence that actually makes a statement.

Example: The forms of nitrogen released by the decomposition of food waste is poorly understood.

3) Make the sentence as precise and arguable as possible.

If you compare the following example with the previous step, you might notice how the context of decomposition moves from just a generalized process of decomposition to a particular process that involves household waste. In addition, this example makes a firm statement that can be argued and supported.

Example: The amount and value of plant-available nitrogen released by decomposition of household food waste is not well understood because most home composters do not have the tools to measure soil nutrients.

- Do some preliminary, background reading
- Think about the topic in terms of time, place, person/group, aspect/event
- Are there sources for it?
- Are there too many sources (too broad)?
- Are there too few sources (too limited)?
- Come up with a research question on the topic, answering which gives you the thesis statement of the essay

Example:

**Broad topic:** Demographic change and social policy

- Time: present
- Place: East Asia, more specifically, Japan
- Aspect: ageing of the population

Restricted topic: Ageing and economic policy

Narrowed topic: Ageing and economic policy in Japan

Research question: What are the implications of ageing of the population in Japan on sustaining domestic economic growth?

For a shorter essay this can be narrowed down even more: What are the implications of ageing of the population in Japan on investment decisions by small- and medium-scale businesses?

Relevance of the topic: In the past decades industrialized societies have been experiencing a rapid change in the demographic composition: increasing life expectancy and decreasing fertility created the phenomenon of ‘ageing of the population’. In the long run this change leads to a shrinking of the domestic market, which is the primary market of small- and medium-scale industries, unlike large corporations that either manufacture for export or have subsidiaries overseas. Thus, the survival of small- and medium-scale industries is becoming more and more discussed both at the academic and policy-making levels.
Scientific Methods
There are many scientific methods. The two major methods are the inductive method and the deductive method.

- The **deductive method** involves the following three steps:
  1. State the hypothesis (based on theory or research literature).
  2. Collect data to test the hypothesis.
  3. Make decision to accept or reject the hypothesis.

- The **inductive method**. This approach also involves three steps:
  1. Observe the world.
  2. Search for a pattern in what is observed.
  3. Make a generalization about what is occurring.

Theory
The word "theory" most simply means "explanation." Theories explain "How" and "Why" something operates as it does. Some theories are highly developed and encompass a large terrain (i.e., "big" theories or "grand" theories); others theories are "smaller" theories or briefer explanations.

A summary of the key criteria to use in evaluating a theory is given below
1. Is it logical and coherent?
2. Is it clear and parsimonious?
3. Does it fit the available data?
4. Does it provide testable claims?
5. Have theory-based predictions been tested and supported?
6. Has it survived numerous attempts by researchers to identify problems with it or to falsify it?
7. Does it work better than competing or rival theories or explanations?
8. Is it general enough to apply to more than one place, situation, or person?
9. Can practitioners use it to control or influence things in the world?

The Principle of Evidence
According to the principle of evidence, what is gained in empirical research is *evidence*, NOT proof. This means that knowledge based on educational research is ultimately tentative. Therefore, please eliminate the word "proof" from your vocabulary when you talk about research results. Empirical research provides evidence; it does not provide proof. Also note that, evidence increases when a finding has been *replicated*. Hence, you should take NOT draw firm conclusions from a single research study.
Objectives of Educational Research
There are five major objectives of educational research.

1. **Exploration.** This is done when you are trying to generate ideas about something.
2. **Description.** This is done when you want to describe the characteristics of something or home phenomenon.
3. **Explanation.** This is done when you want to show how and why a phenomenon operates as it does. If you are interested in causality, you are usually interested in explanation.
4. **Prediction.** This is your objective when your primary interest is in making accurate predictions. Note that the advanced sciences make much more accurate predictions than the newer social and behavioral sciences.
5. **Influence.** This objective is a little different. It involves the application of research results to impact the world. A demonstration program is an example of this.

Research Methodology Paradigms
A paradigm is a perspective based on a set of assumptions, concepts, and values that are held by a community or researchers. For the most of the 20th century the quantitative paradigm was dominant. During the 1980s, the qualitative paradigm came of age as an alternative to the quantitative paradigm, and it was often conceptualized as the polar opposite of quantitative research. Finally, although the modern roots of mixed research go back to the late 1950s, I think that it truly became the legitimate third paradigm with the publication of the *Handbook of Mixed Methods in Social and Behavioral Research* (2003, by Tashakkori and Teddlie). At the same time, mixed research has been conducted by practicing researchers throughout the history of research.

Characteristics of the Three Research Paradigms
There are currently three major research paradigms in education (and in the social and behavioral sciences). They are quantitative research, qualitative research, and mixed research. Here are the definitions of each:

- **Quantitative research** – research that relies primarily on the collection of quantitative data.
- **Qualitative research** – research that relies on the collection of qualitative data.
- **Mixed research** – research that involves the mixing of quantitative and qualitative methods or paradigm characteristics.

One convenient and useful way to classify research is into exploratory research, descriptive research, explanatory research, predictive research, and demonstration research.

Sources of Research Ideas
Research ideas and research problems originate from many sources. We discuss four of these sources in the text: everyday life, practical issues, past research, and theory. Regardless of the source of your idea, a key point is that you must develop a questioning and inquisitive approach to life when you are trying to come up with research ideas.

**Everyday life** is one common source of research ideas. Based on a questioning and inquisitive approach, you can draw from your experiences and come up with many research topics. For
example, think about what educational techniques or practices you believe work well, or do not work well. Would you be interested in doing a research study on one or more of those techniques or practices?

• **Practical issues** can be a source of research ideas. What are some current problems facing education (e.g., facing administrators, teachers, students, parents). What research topics do you think can address some of these current problems?

• **Past research** can be an excellent source of research ideas. In my opinion, past research is probably the most important source of research ideas. That’s because a great deal of educational research has already been conducted on a multitude of topics, and, importantly, research usually generates more questions than it answers. This is also the best way to come up with a specific idea that will fit into and extend the research literature. For students planning on writing a thesis or dissertation, the use of past research is extremely helpful, and remember to not just look at the variables and the results, but also carefully examine how they conducted the study (i.e., examine the methods).

• **Theory** (i.e., explanations of phenomena) can be a source of research ideas.
  – Can you summarize and integrate a set of past studies into a theory?
  – Are there any theoretical predictions needing empirical testing?
  – Do you have any "theories" that you believe have merit? Test them!
  – If there is little or no theory in the area of interest to you, then think about collecting data to help you generate a theory using the grounded theory technique.
**Selecting a Topic and Writing a Proposal**

**Step One: Reflection**
Thesis should be based on something that has interested you during your pursuit of an undergraduate degree and should be aligned with the research agenda of the School of Civil, Environmental and Geological Engineering. Often, a thesis topic grows from a persistent question you have studied or even written about in a course you valued. How does this question connect with other things that interest you? Often it is best to talk with a friend, professor, or adviser in your department. You must get used to talking about your ideas as soon as possible.

**Step Two: Focus**
After you have traced several branches of your main idea, choose one of these and pare away all excess material. This aspect may be your thesis topic. The best test to see if this idea can be made into a thesis is to prepare an abstract.

**Step Three: Writing a Proposal**
A proposal is a refined synopsis of your proposed thesis topic. A well-composed proposal guides your research and writing. It also helps you engage a faculty supervisor, and it is required for research funding. The proposal is broken down into the following questions/topics.

**Thesis statement** - This is one sentence, 25 words or less, that makes the main idea of your argument clear to any intelligent reader.

**Method** - Is there a theoretical model you will follow? What is your evidence? Are you doing field research?

**Goals** - What do you hope to accomplish by writing this? Are you hoping to fill a particular gap in the research of this topic, or to bring a special perspective?

**Audience** - In general, the audience for a research thesis will be professionals in your discipline.

**Implications** - So what? What do you hope to show that is different from what has been said before in the conversation on your topic? How do you see your project fitting into the big picture of studies in your chosen discipline? If you are writing a creative thesis, what is creative about it?

A good proposal usually goes through several drafts, and it will go on changing even while your write the thesis itself. It is essential that you get feedback from readers you respect at every stage of proposal development.
Faculty Thesis Supervisors: Your First and Second Readers

Who can supervise a thesis? The student is responsible for securing two readers. Your thesis adviser (first reader) must be a faculty member of the School of Civil, Environmental and Geological Engineering. Usually, your adviser should be a professor with whom you have previously worked. The second reader is usually a faculty member, but may in some cases be an expert in your field outside of the institution. Approval for non-faculty readers should always be obtained from your professor before making any firm commitments. A successful student-supervisor match is one of the most important elements for a successful thesis.

How does a student get a thesis supervisor? You should approach prospective supervising professors. Provide an abstract of your project, as this will greatly increase your chances of getting a positive answer from the professor in question. Check with your professor about deadlines for designating your thesis supervisor.

What are the first steps to take with a thesis supervisor? Come to a clear, explicit agreement about the following things:
• the topic and the limits of your research, as worked out in your abstract
• a schedule for regular meetings or communications with your supervisor
• a timeline for completing outlines, bibliographies, drafts, revisions

What about the Second Reader? Consult your first reader about possible second readers, and then work out a feedback schedule with the second reader. Although you may only meet a couple of times with your second reader, it is nonetheless important that you arrive at an explicit agreement of mutual expectations. Leave plenty of time to follow your second reader’s suggestions on your final draft. The second reader is not obligated to approve your thesis just because your first reader has approved it.

How often should I meet with my supervisors? Some supervisors will want to have weekly, bi-weekly, or monthly conferences. It is to your benefit to start with a regular schedule of appointments, and to keep them.

What if problems develop between student and supervisor? If you suspect you may be mismatched with your supervisor, act sooner rather than later. Go to your professor for advice on how to proceed.

For the Thesis Adviser (First Reader)
The thesis adviser (first reader) is the student’s primary source of feedback for the thesis project. The most common complaint from thesis students is that they don’t get enough feedback and are not sure where they stand in the project. The SCEGE has recommended that the thesis student enter into an explicit agreement with you on the following points:
• the topic and the limits of the research, as worked out in an abstract
• the times for regular meetings or communications
• a timeline for completing outlines, bibliographies, drafts, revisions
• advice on choosing a second reader for the thesis

For the Second Reader
Second readers often offer general advice on content rather than detailed editorial comments on style. Consequently, you may want to see an early draft rather than waiting to judge the final draft. The second reader should not feel obligated to approve a thesis that clearly seems inadequate, even in the eleventh hour. Last minute dilemmas can be avoided only by early intervention.

You may want to meet with the student and thesis supervisor to discuss your role as soon as you agree to be the second reader. Students are encouraged to meet regularly with their primary adviser, but at less frequent intervals with their second readers. Make a schedule with the student to help facilitate the feedback process. If you have any questions, you should contact the department for which the student is writing the senior thesis.

Note: Once the thesis is completed, the student should provide a copy to each reader.

The Research and Writing Process: A Checklist
___ Discuss your proposal with the faculty member who will be your adviser / first reader. Make necessary revisions to the scope and focus.
___ Work out a written schedule with your supervisor for each of the following checkpoints.

For each step you should determine two dates: a date by which you will turn in your work, and a date by which your adviser will return your work with feedback.
• submission of revised proposal to your professor (Suggested deadline: first week of class. You must consult your professor for deadlines.)
• date for submission of research prospectus and bibliography
• date for completion of the bulk of the research and reading phase
• date for submission of detailed outline and draft of introduction
• dates for submission of each chapter or section draft
• date for submission of first completed draft
• date for submission of final draft for last reading and faculty signatures

___ Follow the schedule as closely as possible, and make explicit, mutually agreeable revisions to deadlines only as needed. Avoid drift.
___ Submit final, signed copies of your thesis in regulation format as required by your department. See Appendices for formats and guidelines.
RESEARCH COORDINATOR

To ensure that proper coordination and dissemination of research activities a Research Coordinator is appointed by the Dean of the School of Civil, Environmental and Geological Engineering. Appointment is on a yearly basis to assist the Dean in implementing research related matters. The Research Coordinator is periodically met by the Dean and/or the Institutional Research Director to discuss pressing issues or for information dissemination relating to research matters of the School of Civil, Environmental and Geological Engineering.

The Research Coordinator is tasked to:
1. Assist the Dean in coordinating the Research activities of the School of Civil, Environmental and Geological Engineering.
2. Oversee the development and implementation of Research in the School of Civil, Environmental, and Geological Engineering.
3. Initiate methods/techniques for efficient planning, implementation, performance evaluation, and reporting of Research activities in the School of Civil, Environmental and Geological Engineering.
4. Effect increased output of technical papers for the School of Civil, Environmental and Geological Engineering.

RESEARCH STATISTICIAN

To ensure that complex statistical concepts are explained in a way the client can understand, and advises on strategy to be employeed in researches submitted a Research Statistician is appointed by the Dean of the School of Civil, Environmental and Geological Engineering. Appointment is on a yearly basis to assist the Dean and the Research Coordinator.

The Research Statistician is tasked to:
1. Adapt statistical methods in order to solve specific problems in the field of civil, environmental and geological engineering.
2. Analyze and interpret statistical data in order to identify significant differences in relationships among sources of information.
3. Evaluate the statistical methods and procedures used to obtain data in order to ensure validity, applicability, efficiency and accuracy.
4. Evaluate the statistical methods and procedures used to obtain data in order to ensure validity, applicability, efficiency and accuracy.
CONDUCT OF DISSERTATION, THESIS AND RESEARCH PRACTICUM
General Provisions

DISSERTATION, THESIS, RESEARCH PRACTICUM TOPIC
1. All students enrolled in dissertation, thesis and research practicum courses must join a research group and choose an advisor/s.
2. The advisor will confer with the student and decide his dissertation, thesis, or research practicum topic.
3. When the research proposal has been drafted, the advisor and the student will choose their panel members.
4. The student will submit the form for advisors and panel members to the course coordinator or Dean. This form officially reports to the department/school the student’s thesis topic, and the names of the advisors and panel members.

ORAL PRESENTATION OF DISSERTATION, THESIS AND RESEARCH PRACTICUM PROPOSAL
1. On a specified date arranged by the student, in coordination with the dissertation, thesis or research practicum coordinator, advisor and panel members, the dissertation, thesis or research practicum proposal will be scheduled for oral presentation. In case of doctoral dissertation, the proposal presentation will be scheduled only after the student has completed 50% of the research work.
2. The schedule of the oral presentation of the proposal must be made public.
3. The student must submit form for proposal oral examination to the course coordinator and Dean attesting the approval of the advisor to the oral presentation of the proposal.
4. The student must also pay the following proposal examination fees:

<table>
<thead>
<tr>
<th></th>
<th>Adviser’s Fee (per adviser)</th>
<th>Panel Member’s Fee (min. of 3 panels)</th>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master’s Thesis- Proposal</td>
<td>1,500</td>
<td>1,000</td>
<td>500</td>
</tr>
<tr>
<td>Master’s Thesis –Final</td>
<td>2,500</td>
<td>2,000</td>
<td>500</td>
</tr>
<tr>
<td>Research Practicum – Proposal</td>
<td>1,500</td>
<td>1,000</td>
<td>500</td>
</tr>
<tr>
<td>Research Practicum-Final</td>
<td>2,000</td>
<td>1,500</td>
<td>500</td>
</tr>
<tr>
<td>Dissertation – Proposal</td>
<td>3,000</td>
<td>2,000</td>
<td>500</td>
</tr>
<tr>
<td>Dissertation-Final</td>
<td>5,000</td>
<td>3,000</td>
<td>500</td>
</tr>
</tbody>
</table>

The proposal oral examination fee will be subdivided for group of undergraduate students doing a common research practicum or thesis. The proposal oral examination fee will be used to pay the honoraria of advisers and panel members.

1. Upon submission of the form and the receipt of the oral examination fee to the course coordinator, the course coordinator will schedule the date of the oral presentation of the proposal, in coordination with the advisor and panel members. Based on this submittal, the department or school, through the course coordinator, will elect the chairman of the committee from the panel members.
2. All students who are going to do the proposal, oral presentation must be enrolled. In case the student is not enrolled in any course, he must enroll prior to the proposal oral examination by paying the residency fee.

DISSERTATION, THESIS AND RESEARCH PRACTICUM PROJECT FORMAT

GENERAL FORMAT

The following format shall be used by all graduate and undergraduate students doing thesis/practicum or research:

- Title
- Approval Page
- Abstract
  The abstract gives the reader an overview of the study, based on information from the succeeding sections of the report. The information given in the abstract is usually the basis of many readers as to whether they will read the entire report or not.

The typical information elements included in an abstract are as follows:

1. Some background or general information on the study
2. The main topic (or purpose) of the study and its scope
3. Some information on how the study was conducted (methodology)
4. The most important findings of the study
5. A statement of conclusion (justified based on the data presented)

- Acknowledgement
- Table of Contents
- List of tables
- List of Figures
- Chapter 1 – Introduction
  The introduction gives an overview of the thesis/practicum or research report, giving the reader background or basis of the problem to be reported. It can be divided into six parts, as follows:

1. The setting or context frame of reference
   This part gives general statement(s) about a field of research to provide the reader with a preview of the problem to be reported.
2. The review of previous research
   This part continues the contextual setting or frame of reference given in Part 1 by including more statements about the general aspects of the problem already investigated by other researchers.
3. The gap or missing information
   This part refers to the statement(s) that indicate the need for the study or the need for more investigation.

4. The statement of purpose
   This part gives very specific statement(s) pertaining to the objective(s) of the study.

5. The statement of value
   This part refers to the statement(s) that give the significance of carrying out the study.

6. The scope and delimitation
   This part indicates what the study covers and what it does not or fails to cover.

Note:
The introduction is written continuously paragraph by paragraph, i.e, without any heading.

- Chapter 2- Review of Literature
  The review of Literature is basically an evaluated, organized, and synthesized collection of citations to other studies (NOT a MERE listing of previous studies), which are related or somewhat related to your own specific research problem. It serves three important functions.

  1. It continues the process started in the introduction of giving the readers background information needed to understand your study.
  2. It assures the readers that you are knowledgeable about the significant research that has been done in your area of investigation.
  3. It establishes your study as one link in a chain of research that is developing and enlarging knowledge in your field of research interest.

The role of literature review is as follows:

  1. It will increase your confidence in your topic as a result of the time, effort and resources you invested in studying your research problem.
  2. It can give you new ideas and approaches that may not have occurred to you.
  3. It can inform you about other researchers doing work in your area of study/ individuals whom you may choose to contact for advice or feedback.
  4. It can show you how others have tackled methodological and design issues in studies similar to your own.
  5. It can lead you to sources of data that you may have not known existed.
  6. It can orient you to measurement tools that other researchers have developed and used effectively.
  7. It can reveal methods dealing with problem situations that may be similar to difficulties you are having.
  8. It can help you get meaning out of your data or make sense of your findings and eventually, help you tie your results to the work of previous researchers.

- Chapter 3- Body of the thesis/practicum or research report
This chapter represents a major aspect of your study written in article format. It should be able to stand alone as an article if published in a referred journal. The format of the chapter is as follows:

i. Abstract

ii. Introduction

iii. Methodology
This section describes the procedural steps used in conducting this major aspect of your study and the materials or any equipment used at each step. It includes all mathematical treatment of data as well as equations or models used. It is useful to readers who want to know how the methodology of your study may have influenced your results. The procedure should be stated in as much as detail as possible so that readers who are interested in replicating or extending your study could follow the steps as they read your work. Schematic diagram (properly labeled and numbered) must accompany the next whenever possible.

iv. Results and Discussion
This section presents the data collected from the study on this major aspect of your research problem, followed by extensive comments on or interpretation of the findings of study.

v. Conclusion
This section addresses the objective[s] pertaining to the major aspect of your research problem.

Note:
For another major aspect of your research problem, a separate chapter of the same format follows this chapter.

• Chapter 4 – Conclusion
This chapter gives the overall conclusion of the study, which addresses the objective[s] of your research problem. Here you step back and take a broad look at your findings and your study as a whole.

• Chapter 5- Recommendation (for further studies)
This chapter indicates statements that suggest the need for further studies on what else can be done relevant to your research problem and what other related problems should be addressed.

• References
All references must be stated in the review of literature; no report will be accepted without the proper acknowledgement to the authors referred to in the literature review.
The format reference for non-verbatim statements is as follows:

a. Author stated in year that biosorption of cationic ...

b. Author stated that biosorption of cationic.... (year)

c. It has been said that biosorption of cationic ... (Author, year)

Acceptable references include:

a. Technical journals and periodicals
b. Books and monographs
c. Unpublished research, and
d. Dissertation and master’s thesis

Note: Internet references should NOT be included.

- Appendices
  Each appendix includes all data that you feel must be included for further details, but these data interfere with smooth discussion of results. Naming of each appendix is with characters of the alphabet, and each should have a title.

**WRITING FORMAT**

- **Margins**
  1” from the top
  1” from the bottom
  1 ¼ “ from the left
  1” from the right

- **Title Page**
  Title – font Times New Roman (TNR) size 20, boldfaced, centered
  By – Times New Roman 14, centered
  Firstname M. Lastname – Times New Roman 16, bold centered
  If Graduate Student.... – Times New Roman 14, centered
  A Thesis....Submitted to ... – Times New Roman 14, centered
  Program ... – Times new Roman 16, centered
  Mapua Institute .... – Times New Roman 14, centered

- **Abstract**
  – Times New Roman 12, bold, centered, ALL CAPS
  One paragraph of about 100-200 words, single-spaced

- **Chapter 1**
  Titles of each chapter – Times New Roman 12, bold, centered, ALL CAPS
  Text (Body) – Times New Roman 12, double spaced, paragraphs must be indented

- **Graphs**
  No fill effects, no outer boarder, inside tick, smooth lines
  No triangles or diamonds, title at the bottom of the graph

- **Tables**
  Title on top, body notes following the title
• Writing style

Introduction and review – past participle tense, except for generally accepted truths, which may be written in the present tense.

Methodology – future tense (if proposal) or past tense (if thesis/practicum or research report) and passive voice

Results and Discussion – third person and passive voice are preferred

• Pagination ½” from the bottom, centered

Title page – no pagination
Approval Sheet.... List of Figures – pagination starting from ii,iii,iv...

Chapter 1 to end – pagination starting from 1, 2, 3,...

• References – Times New Roman 12, bold, centered, ALL CAPS
  Alphabetical listing of citations to review of literature

• Appendices – Times New Roman 12, bold centered, ALL CAPS
  Each appendix is named with a letter of the alphabet and with title
INTERNATIONAL LINKAGE FOR RESEARCH AND DEVELOPMENT (ILRAD)

The Office of the International Linkages for Research and Development (ILRAD) is under the service provision of education process. ILRAD is coordinating with schools and other academic departments, faculty development office (FDO), the office of Directive Research, Innovation and Value Enhancement, and the resource management group.

It creates linkages for research and development, United Nations organizations and cooperates with international R & D institutions as well as international funding agencies. It has four tracks; i.e., (1) international R & D for students; (2) international R & D for faculty researchers; (3) international R & D collaboration/partnership/ cooperation/network; and (4) international resource access.

PROCEDURES FOR APPLICATION OF INTERNAL RESEARCH AND DEVELOPMENT FUNDING
1. Dissemination of Call for Papers through email shall be given to Schools and Departments by the DRIVE Office.
2. Proposals are submitted to their respective Deans/Subject Chairs using form 6 for endorsement
3. Proposal shall then be endorsed by the Deans/Subject Chairs to the DRIVE Office for evaluation.
4. Proposals shall be given by the DRIVE Office to the Research and Evaluations Committee for Evaluation.
5. If proposals are approved, it will then be endorsed to the Budget Committee/Department for Internal Funding.
6. If the proposals are rejected, it will be endorsed for External Funding.
7. The proposals shall be submitted to the accounting Office for the Approval of Internal Funding.
8. Notice will be given to the selected faculties once the budget was approved.

PROCEDURES FOR THE REQUISITION OF MATERIALS FOR RESEARCH
1. Notice through electronic mail is disseminated among schools if the research proposal submitted is approved.
2. Faculty Researchers shall submit a full proposal using form 6 with attached list of request of materials with full specifications needed for their research using form 7.
3. The Deans/ Subject Chairs will endorse the proposal to the DRIVE Office.
4. DRIVE Office will request the materials through the Procurement System called Oracle.
5. Notice will be given by the DRIVE Office to the faculties concerned for claiming the procured materials.

GUIDELINES FOR THE RELEASE OF RESEARCH HONORARIUM FOR FACULTY WITH APPROVED RESEARCH
1. Honoraria will be given to faculties with approved research internal funding.
2. DRIVE Office will issue an “Acceptance for Research Honorarium” which is a binding agreement between the Faculty researcher conducting research duly funded by the Institute.
3. The Acceptance of Research Honorarium will be given to the Office of the Legal Affairs for Evaluation.
4. Once approved, the Acceptance for Research Honorarium will be given to the signatories (President, Executive Vice President for Academic Affairs, Research Director, and Dean) for approval.
5. DRIVE Office will give the Acceptance of Honorarium to the concerned faculty researcher for conforme.
6. Once signed and notarized, DRIVE Office will request the honorarium amounting to P 5,000 monthly as stated in the agreement.
7. The request will be submitted to the Accounting Office for processing.

PROCEDURES AND GUIDELINES IN APPLYING INTERNATIONAL RESEARCH INTERNSHIP/ACTIVITY FOR STUDENTS WHO WILL CONDUCT THESIS AND DISSERTATION WORKS, OUTSIDE THE COUNTRY.

1. Researcher is expected to have local adviser before applying for foreign research internship. The applicant shall fill up all spaces of ILRAD Form 1 and submit it for initial evaluation. Graduate students need to submit CV together with Form 1.
2. ILRAD will search for foreign research host and facilitate the application for foreign internship.
3. Upon acceptance, ILRAD shall secure invitation letter from host.
4. ILRAD shall endorse the applicant using Form 2 to OEVPAA for approval. Researcher to acquire necessary signatures required by Form 2.
5. Upon receipt of approval from OEVPAA, ILRAD starts the process for deployment. Details of deployment is shown as “A”. Please see next page.
6. If endorsement is denied, research student will be notified by ILRAD. Student may accept the rejection or make an appeal to the OEVPAA.

PROCEDURES AND GUIDELINES IN APPLYING INTERNATIONAL RESEARCH ACTIVITY SPECIFIC FOR FACULTY RESEARCHER OF ANY ACADEMIC DEPARTMENT.

1. Researcher shall determine research topic/area.
2. Researcher shall submit Form 3 to ILRAD. This will be used in searching for foreign research host and/or partner. ILRAD will then coordinate with FDO and the concerned department. ILRAD may request for CV of the researcher when necessary.
3. ILRAD shall find foreign research host with expertise that matches the research passion and expertise of the applicant, facilitate the matching, and application process to foreign institution. Research host shall be among the researchers of institutions with existing MOA/MOU with the Institute.
4. Continue to look for foreign host for the researcher should one or more foreign host rejects the application.
5. Upon receipt of favorable response from foreign host, ILRAD will request acceptance and/or invitation letter for the faculty researcher.
6. Upon receipt of acceptance notification and/or invitation from foreign research host, ILRAD will endorse the application of the researcher (with the acceptance letter from the host) to OEVPAA for approval using Form 2. Form 3 shall be attached together with Form 2.
7. Upon receipt of approval from OEVPAA, ILRAD will notify the applicant researcher and turn over to FDO. FDO shall process other needs of the faculty researcher. Faculty researcher shall inform ILRAD upon safe arrival to destination by email and upon return to Mapua using Form 4.

PROCEDURES FOR THE FORMATION OF INTERNATIONAL RESEARCH AND DEVELOPMENT COLLABORATION

1. Researcher, Department, School shall participate in international scientific activities either be online or in-situ. Initial discussion to determine the area or line of potential collaboration shall be carried out.
2. Researcher shall conduct a deeper exploratory meeting to determine specific interests of parties and forms of collaboration. If Researcher find potential research collaborator, he/she shall inform ILRAD by calling local 5109 and filling up the FORM 5, or by just sending email to the Officer/Director(dbsenoro@mapua.edu.ph)
3. ILRAD is responsible in drafting the LOI/MOU based from the Institute's template from Legal Affairs Office and communicate with the potential collaborator. The drafted LOI/MOU shall be sent to the foreign collaborator for comments and inputs whichever applies.
4. Should the drafted LOI/MOU comes back from foreign potential collaborator with additional inputs it shall be submitted to the Legal Officer, Chief Finance Officer, VPO and OEVPAA for review.
5. Should the drafted LOI/MOU has been accepted by both parties, the signing ceremony shall be arranged. ILRAD shall arrange the ceremony in cooperation with OP, CORPCOM, OEVPAA and involved academic/research departments. In the event that signing ceremony is not possible due to conflict of schedule, signing of MOU/MOA will be done in the respective institution and by courier.
6. When inputs from foreign institution are not acceptable to Mapua during the review of the Legal, Admin/Finance Dept., proceed to B.
7. When inputs from foreign institutions are not acceptable to either of the concerned department/office, these concerned departments shall make necessary comments/inputs based from the comments/inputs of foreign institution/s. Legal Affairs Office then make necessary revision.
8. ILRAD sends the revised draft (R1) to foreign institution for another review. Revisions shall be made until all parties meet an agreement. Process of revisions shall always pass through Legal Affairs, OEVPAA and Admin/Finance Department.
9. Should the foreign institution accepts the revision/s, preparation for the signing of the document (LOI/MOU/ MOA) shall proceed. The signing ceremony shall be arranged by ILRAD in cooperation with CORPCOM, OP, Legal, Finance Department, VPO and OEVPAA. The MOU shall contain initial signature of the Legal Officer, Chief Finance Officer, VPO, and EVPAA before it will be signed by the President of Mapua. Signing ceremony shall be participated by head of concerned department/school/program as well as DRIVE authorized personnel.
PROCEDURES IN SOURCING INTERNATIONAL RESEARCH AND DEVELOPMENT RESOURCE/S. RESOURCES REFERRED BY THIS DOCUMENT INCLUDE TECHNICAL, PROFESSIONAL AND FINANCIAL RESOURCE.

1. ILRAD will provide IRDRA on available current opportunities and its guidelines (per instrument). Researcher shall be responsible to read the guidelines carefully and look into the appropriate instruments, requirements, deadlines, priority topics and areas (countries).

2. If potential resource instrument requires foreign partner, the researcher shall check/inquire at ILRAD if the Institute has existing cooperation with the chosen foreign institution. Should the Institute has existing MOU/MOA, and Researcher does not have existing R & D partner, Researcher shall fill up Form 5. ILRAD then will look for his/her potential research partner.

3. If researcher has existing researcher partner at the chosen foreign institution, the Researcher is responsible to make communication directly to his/her research partner and proceed with the drafting of joint research proposal and its submission. After submission, please see B.

4. Should there is no existing MOU/MOA, please refer to PM-IL-03-00. ILRAD (in cooperation with the concerned researcher/department) will initiate and arrange the drafting and signing of the MOU/MOA between the Institute and the concerned foreign institution.

5. If potential resource instrument does not require foreign partner, the researcher shall proceed with the preparation and submission of the proposal. After submission, please see B.

6. Result of R & D proposal application will be received by the applicant within the designated timeframe set by the sponsor/donor.

7. If application has been accepted without revision, signing of agreement will proceed. The Researcher shall inform ILRAD and DRIVE about the result. ILRAD in cooperation with the concerned Department, Researcher, CORPCOM and Legal Affairs Office may arrange the official signing of agreement only if the donor/sponsor permits the signing ceremony.

8. Should the result of application requires revision, the proposal shall be revised based on the recommended issues and concerns of the sponsor/donor.

9. When necessary revision has been made, the proposal shall be resubmitted. Revision and resubmission will be carried out until the proposal is accepted.

10. After agreement has been signed, implementation shall be the responsibility of concerned researcher/s.

11. Supervision and monitoring of accomplishment may be carried out by DRIVE.

PROCEDURES FOR THE ACCEPTANCE OF INBOUND INTERNATIONAL RESEARCHERS POST DOCS, FACULTY RESEARCHER AND STUDENTS FROM FOREIGN INSTITUTIONS WHO WILL CONDUCT RESEARCH WORKS IN THE INSTITUTE.

1. The applicant shall fill-up all spaces of ILRAD Form 6 and submit it for initial evaluation. CV shall be attached with Form 6. Form 6 shall be made available online through the Institute’s website. This could be accessed also by sending email to dbsenoro@mapua.edu.ph. Upon receipt of application, ILRAD will make evaluation.

2. If not qualified, ILRAD will notify the applicant.

3. If qualified, ILRAD will look for host in the Institute, get acceptance letter/mail from the host.

4. ILRAD shall endorse the applicant using Form 2 for OEVPAA approval.
5. Upon receipt of approval from OEVPAA, ILRAD shall send acceptance letter to the applicant (cc the host). Then, proceed to “A”. Host shall communicate directly to the inbound researcher and facilitate necessary arrangement for travel and accommodation in coordination with ILRAD. Inbound researcher shall have physical-medical certificate and medical insurance coverage.

6. If endorsement is denied, host supervisor will be notified by ILRAD. Host may make an appeal to the OEVPAA. If appeal is denied, ILRAD shall notify the applicant.

7. ILRAD shall make necessary transfer from airport upon arrival of the inbound researcher.

8. Inbound researcher shall fill-up and submit Form 7 to ILRAD.

9. ILRAD will inform DRIVE of the arrival of inbound researcher and arrangement with the host. ILRAD will then turn over the inbound researcher to host.

10. Implementation, monitoring and evaluation of research works are responsibilities of the inbound researcher, host and DRIVE.

11. Inbound Researcher will fill-up Form 8 at the end of the contract and before returning to their home institution. Host shall provide input to Form 8.

12. ILRAD will facilitate transfer to airport of inbound researcher at the end of his/her contract.

GUIDELINES FOR SUBMISSION OF QUARTERLY PROGRESS REPORT AND TERMINAL REPORT FOR RESEARCHES WITH APPROVED INTERNAL FUNDING.

1. Faculty members with approved internal research funding shall submit a quarterly progress report to DRIVE Office.

2. All quarterly reports shall use form 8 and shall be submitted every quarter preferably at the end of April, July, October and December respectively. All reports duly signed by the Subject Chairs or Deans shall be accepted by DRIVE Office.

3. Terminal reports shall be submitted to the DRIVE Office every first week of January the following year.

FACULTY DEVELOPMENT OFFICE (FDO)

The Faculty Development Office aims to produce highly competent and dedicated faculty members who will deliver quality education at Mapúa, and perform excellent research and extension work that will propel Mapúa to its place in the academic world as a leading institution of engineering, science, and architecture in the country.

The program aims to accomplish the following:

a. To equip the faculty with the ability to create effective teaching and learning situations in the classroom.

b. To improve the engineering and technical competence of the faculty.

c. To equip the faculty with the necessary tools to conduct relevant scientific and technological research.

d. To produce faculty with improved supervisory and management skills.

e. To improve the values of the faculty especially their attitude toward continuous improvement of the quality of instruction.

f. To make the faculty familiar with educational movements and progress in educational thought and research.
g. To help the faculty reach their professional goals, and heighten their sense of security and self-esteem.

h. To prepare the faculty for a globally-oriented professional direction along their specific fields of specialization.

**FORMAL EDUCATION – LOCAL SCHOLARSHIP**

**Selection Criteria for GRANTEES**

1. The candidate must be a permanent full-time faculty member of Mapúa. He must have an equivalent Faculty Performance Evaluation Rating of at least “very good”.

2. He manifests institutional loyalty and is willing to sign a service contract with Mapúa which will commence after graduation/completion of the degree program.

3. He has potential for teaching, research, extension, or administrative work.

4. He must have qualified for admission on the Accredited Universities and its corresponding accredited doctoral program (Table 1).

5. He must provide the following requirements and must be submitted to his dean/subject chair:
   a. Letter of Intent addressed to his dean/subject chair.
   b. Duly accomplished Scholar’s Data Sheet/Application Form (Form A)
   c. Letter of Acceptance from the Accredited Colleges and Universities.
   d. Degree Program Curriculum Checklist
   e. Proposed Dissertation Topic and Study Plan

**Administration of the Scholarship Program**

1. The scholarship program shall be administered by the respective Deans/Subject Chairs and coordinated with the Faculty Development Office (FDO) for the Executive Vice-President for Academic Affairs (EVPAA).

2. The respective Deans/Subject Chairs shall screen the candidates based on the given selection criteria for scholarship grantees.

3. The Deans/Subject Chairs shall ensure that the appropriate budget has been allocated for the qualified candidates.

4. The Deans/Subject Chairs shall then forward the applicant’s requirements together with his recommendation letter for scholarship to the EVPAA, thru the FDO.

5. The EVPAA shall then endorse the nominees to the President for final approval.

6. The grantee’s performance shall be monitored by the FDO and reported to the EVPAA.

7. Non-Mapúa or “faculty-initiated” scholarships, e.g. FAPE, CHED, must be cours ed through the office of the Deans/Subject Chairs, then to the EVPAA thru the FDO, who then endorses such to the President for final approval.

8. Faculty members are allowed to simultaneously enjoy the financial support provided by the Dean’s Council Scholarship and any private or government scholarship, e.g. ERDT-DOST and CHED.
Selection of Degree Program and Training Institution

1. The post-graduate program being applied for shall be an accredited program offered by the Local and Foreign Accredited Universities [Table 1]. It shall be the same/continuation or is closely related with his Masteral Degree; or one which is related to the position he may occupy upon finishing the degree; or part of the development plan of the school/department.

Duties and Responsibilities of the GRANTEE

1. The grantee shall submit to MAPUA copy of grades, progress/accomplishment reports after each and every term, together with original copies of the transcript of records, certificates/diploma received upon completion of the program, and other documents as may be required by MAPUA.
2. The grantee shall meet the academic standards set by the university he is enrolled in.
3. The grantee shall carry the academic load indicated in his program of study.
4. The grantee shall complete the doctoral program within the approved duration of the scholarship grant.
5. The grantee shall periodically update the EVPAA thru the FDO, and the concerned Dean/Subject Chair, the status/progress of his study. The grantee shall submit the following:
   a. Copy of grades every term/semester
   b. Progress/Accomplishment report – to be submitted within two weeks from the start of the succeeding term/semester
   c. Certificate of Graduation or equivalent – not later than 1 month upon completion of the degree program
   d. Transcript of Records and Diploma upon graduation
   Other pertinent documents as may be required

Scholarship Privileges

1. Reimbursable tuition/matriculation fees and other standard school fees
2. De-loading during Coursework and Dissertation Writing
   a. A grantee may be given de-loading up to 15 units depending on the recommendation of the respective Deans/Subject Chairs and approval of the EVPAA. A salary equivalent to the total units of teaching and study load not to exceed 15 units. The grantee shall submit proof of residency to the EVPAA thru FDO.
   b. A grantee with a de-loading of 15 units will no longer be allowed to take teaching overload.

Book Allowance
   a. Reimbursable book expenses not to exceed Php 4,500.00 per semester or Php 9,000.00 per year
   Reimbursement of Photocopied materials is allowed provided with official receipts.
b. Books must be purchased through the Purchasing department. A grantee shall submit the details of the book/s to FDO at least one month before the target usage. FDO will process the acquiring of the requested book/s and will update the grantee once available.

c. In case wherein requested book/s cannot be produced by Purchasing Department within the target usage, the grantee may seek approval from the EVPAA and Accounting before he may be allowed to purchase personally and then reimburse afterwards. During the reimbursement process, the approved letter must be supported with a Reimbursement Form, summary of book/s and receipts payable to “Malayan Colleges Inc.”

Dissertation Grant (may be given on a case-to-case basis) Reimbursable dissertation expenses not to exceed Php 50,000.00 per doctoral student

Expenses allowed for reimbursement include:
   a. travel to a research site, expenses to attend a conference or professional meeting (travel, hotel, fees),
   b. purchase of books, costs related to photocopying of materials,
   c. software/computer supplies/computer time,
   d. Research supplies (e.g., audio/video tapes, chemicals, inexpensive electronic storage media, etc.),
   e. Photographic supplies and professional journal reprints,
   f. Honoraria of individuals (such as coders, study participants, etc.)
   g. Purchasing of permanent equipment (computer hardware, cameras, etc.) which will be used during experiments and simulation. Upon completion of the program, this equipment shall be properly returned to Mapua and will become its property.

Rules for Reimbursement
   a. A grantee may submit a request for dissertation budget as soon as the dissertation proposal has been accepted in his Institution. Proof of acceptance for dissertation proposal must be provided.
   b. A grantee must initially pay for all dissertation expenses out of his personal pocket. Only the expenses above which incurred during the experiments/researches related to dissertation are allowed for reimbursement. Budget requests related to honoraria of individuals (such as coders, study participants, etc.) must be discussed with the Faculty Development Officer during the submission of the request for dissertation budget.
   i. During the reimbursement process, the approved Dissertation Budget Request must be supported with a Reimbursement Form, summary of book/s and receipts payable to “Malayan Colleges Inc.” Original receipts must be enclosed into separate bond papers (letter size) with descriptions pertaining to the expenses.
A grantee who finishes his Doctoral Program will be provided with a Research Grant of no more than P300,000 by the Office of Research Promotion and Coordination (ORPC) upon submission of a complete research with line item budget and subject to availability of approved budget and accounting procedure for disbursement, liquidation and reporting.

**Duration of Scholarship**
1. Each scholar shall be given an initial scholarship grant for three (3) years. Request for extensions are subject for approval of the Executive Vice President for Academic Affairs.

**Scholarship Extension**
1. Upon completion of the course work and while doing his dissertation paper, the grantee may apply for an extension of his scholarship grant provided that if (i) such extension shall be at no cost to Mapua, he will not be entitled to additional benefits and support, (ii) such extension will only mean request for non-interruption of service to Mapua and without any additional support related to his Scholarship, the equivalent return service is one quarter for every quarter or a fraction thereof, (iii) such extension shall be at cost to Mapua, it will be entitled to additional benefits/support.
2. To apply for an extension, he must prepare a request letter where he shall justify his reason/s for the extension request with attachments of supporting documents such as progress report, copy of grades, study plan, etc. Such letter must be recommended by the Deans/Subject Chairs, Dissertation Adviser/s and Faculty Development Officer which will be approved by the Executive Vice President for Academic Affairs.
3. During the no-cost extension, the grantee may be given teaching load, subject to availability of teaching load at MAPUA, while he is completing his Dissertation paper.
4. Only the approved extension without any cost to Mapua will not be counted for purposes of computing the return service required. In such case, compliance with the return service shall commence from the quarter term following the expiration of the no-cost extension up to the date of completion.
5. Request for extension shall be for a period not exceeding one (1) calendar year at a time. Extensions must not exceed more than two (2) years.

**Deferment of Enrollment/Dissertation**
1. Deferment of enrollment shall not be allowed except for the following reasons:
   a. Sickness/poor health, where grant is already ongoing, duly certified by a physician
   b. Maternity leave
   c. Other justifiable reasons acceptable by Mapúa, depending on the discretion of the Academic Council
2. In no case shall a grantee be allowed to defer his ongoing scholarship to participate in a non-degree training program.
3. The grantee shall be allowed to defer the use of his Dissertation Grant, which may be included in the budget of the following year. Non-consumption of the budget for two (2) consecutive years shall mean non-inclusion of the said budget item in the succeeding years.
4. The EVPAA through the Faculty Development Office shall have the right to re-align unused Formal Education Budget (provided approved by Accounting), resulting from an approved
deferment of enrolment/dissertation work, to other requirements related to Dean’s Council Scholarship.

**Termination of Scholarship**

1. Scholarship grants shall be terminated under the following conditions:
   a. The grantee fails to meet the academic standards set by the school where he is enrolled in.
   b. The grantee willfully fails to comply with the academic load indicated in his program of study.
   c. The grantee fails to finish the degree within the prescribed scholarship time frame.
   d. The grantee commits gross misconduct as stipulated in the rules and regulations of Mapú and of the school where he is enrolled in.
   e. Other justifiable grounds which contribute to the inability of the grantee to finish the degree program or to abide by duties and obligations of the grantee under the terms of the scholarship.
      i. Hence, if the scholarship is terminated because of the above, payback conditions will apply.

**Service Contract**

1. In consideration of the opportunity for growth and learning accorded to him/her by virtue of the training program, the grantee shall render to MAPÚA a return service of full time teaching equivalent to **one (1) year for every year** or a fraction thereof.
2. The number of “years of scholarship” shall be reckoned from the date the grantee was first given Scholarship support. Rendition of “return service” on the other hand, is reckoned from the date the grantee resumed full-time teaching (for Faculty Members) while full-time administrative position (for Admin) following completion and conferment of his PhD degree. Any period rendered by grantee prior to completion or conferment of his PhD degree shall not be considered as service returned. All leave of absences shall be included except for those accepted under section 4.8.

**Payback Conditions**

1. In cases of willful abandonment of the scholarship, non-compliance with the terms and conditions stipulated of the Scholarship/Training Contract and if the scholarship is terminated under the conditions set forth, the grantee shall reimburse to Mapú the total assistance given to him, plus interest at prevailing rates computed from the actual date of disbursement, the whole amount being due within 6 months.
2. Grantee’s who do not serve Mapú for the full matching service component after completion of their degree programs, shall be made to pay back all salary and financial benefits received, including cost of training in connection with the grant, plus interest at prevailing rates computed from the actual date of disbursement, the whole amount being due within 6 months. This will also apply for the non-completion of program.
FORMAL EDUCATION – FOREIGN SCHOLARSHIP WITH EXTERNAL FUNDING

Selection Criteria for GRANTEEES

1. The candidate must be a permanent full-time faculty member of Mapúa. He must have an equivalent Faculty Performance Evaluation Rating of at least “very good”.
2. He manifests institutional loyalty and is willing to sign a service contract with Mapúa which will commence after graduation/completion of the degree program.
3. He has potential for teaching, research, extension, or administrative work.
4. He must have qualified for Admission and Scholarship from the Accredited Colleges and Universities (Table 1).
5. He must provide the following requirements and must be submitted to his dean/subject chair:
   a. Letter of Intent addressed to his dean/subject chair.
   b. Duly accomplished Scholar’s Data Sheet/Application Form (Form A)
   c. Letter of Acceptance from the Accredited Colleges and Universities.
   d. Degree Program Curriculum Checklist
   e. Proposed Dissertation Topic and Study Plan
   f. Dissertation Topic and Study Plan

Administration of the Scholarship Program

1. The scholarship program shall be administered by the respective Deans/Subject Chairs and coordinated with the Faculty Development Office (FDO) for the Executive Vice-President for Academic Affairs (EVPAA).
2. The respective Deans/Subject Chairs shall screen the candidates based on the given selection criteria for foreign scholarship/training.
3. The Deans/Subject Chairs shall ensure that an appropriate budget has been provided for the qualified candidates.
4. Once the candidate accomplished and forwarded the requirements (under 5.1.5), the Deans/Subject Chairs shall then forward their nominations for scholarship (with the supporting documents) to the EVPAA, thru the FDO, not later than six months before the deadline set by the foreign scholarship/training funding agency.
5. The EVPAA shall then endorse the nominees to the President for final approval.
6. Upon the President’s approval, the applicant in coordination with the FDO, shall forward all the necessary papers to the funding agency.
7. Upon receipt of the notice of acceptance from the funding agency, the applicant prepares his travel documents in coordination with the FDO.
8. The grantee’s academic performance shall be monitored by the FDO, and reported to the EVPAA at the end of each term.

Duties and Responsibilities of the GRANTEE

1. The grantee shall meet the academic standards set by the university he is enrolled in and shall carry the academic load indicated in his program of study.
2. The grantee shall complete the doctoral program within the approved duration of the scholarship grant.
3. Take full academic load per semester/term.
4. Upon completion of the program, render the required number of years of return service to Mapua as full-time faculty corresponding to the duration of his training.

5. The grantee shall periodically update the EVPAA thru the FDO, and the concerned Dean/Subject Chair, the status/progress of his study. The grantee shall submit the following:
   a. Copy of grades every term/semester
   b. Progress/Accomplishment report – to be submitted within two weeks from the start of the succeeding term/semester
   c. Certificate of Graduation or equivalent – not later than 1 month upon completion of the degree program
   d. Transcript of Records and Diploma upon graduation
      Other pertinent documents as may be required

**Scholarship Privileges**

1. Full salary equivalent to 15 units teaching load for the duration of the scholarship/training including bonuses and 13th month pay
2. Clothing Subsidy of Php 1,500/month with winter period. For those studying in Taiwan, a grantee will only be given allowance for the months of January, February, March, and December.
3. Two-way transportation expenses (airfare or transfer costs) if these are not provided by the funding agency
4. Visa processing fee
5. Book Allowance
   Reimbursable book expenses not to exceed Php 4,500.00 per semester or Php 9,000.00 per year
6. Dissertation Grant (may be given on a case-to-case basis)
   Reimbursable dissertation expenses not to exceed Php 50,000.00 per doctoral student

Expenses allowed for reimbursement include:
1. Travel to a research site, expenses to attend a conference or professional meeting (travel, hotel, fees),
2. Purchase of books, costs related to photocopying of materials,
3. Software/computer supplies/computer time,
4. Research supplies (e.g., audio/video tapes, chemicals, inexpensive electronic storage media, etc.),
5. Photographic supplies and professional journal reprints,
6. Honoraria of individuals (such as coders, study participants, etc.)
7. Purchasing of permanent equipment (computer hardware, cameras, etc.) will not be allowed to be reimbursed

Rules for Reimbursement*

a. A grantee may submit a request for dissertation budget as soon as the dissertation proposal has been accepted in his Institution. Proof of acceptance for dissertation proposal must be provided.
b. A grantee must initially pay for all dissertation expenses out of his personal pocket. Only the expenses above which incurred during the experiments/researches related to dissertation are allowed for reimbursement. Budget requests related to honoraria of individuals (such as coders, study participants, etc.) must be discussed with the Faculty Development Officer during the submission of the request for dissertation budget.

c. During the reimbursement process, the approved Dissertation Budget Request must be supported with a Reimbursement Form, summary of book/s and receipts payable to “Malayan Colleges Inc.” Original receipts must be enclosed into separate bond papers (letter size) with descriptions pertaining to the expenses.

7. Health/Medical Accident insurance

8. Alien Residence Certificate (for grantee’s studying in Taiwan)

   The fund needed to finance the above-cited entitlements and benefits shall be drawn from the faculty development budget of each school/department.

   A grantee who finishes his Doctoral Program will be provided with a Research Grant of no more than P300,000 by the Office Of Research Promotion and Coordination (ORPC) upon submission of a complete research proposal with line item budget and subject to availability of approved budget and accounting procedure for disbursement, liquidation and reporting.

**Scholarship Extension**

1. Upon completion of the course work and while doing his dissertation paper, the grantee may apply for an extension of his scholarship grant provided that if (i) such extension shall be at no cost to Mapua, he will not be entitled to additional benefits and support, (ii) such extension will only mean request for non-interruption of service to Mapua and without any additional support related to his Scholarship, the equivalent return service is one quarter for every quarter or a fraction thereof, (iii) such extension shall be at cost to Mapua, it will be entitled to additional benefits/support.

2. To apply for an extension, he must prepare a request letter where he shall justify his reason/s for the extension request with attachments of supporting documents such as progress report, copy of grades, study plan, etc. Such letter must be recommended by the Deans/Subject Chairs, Dissertation Adviser/s and Faculty Development Officer which will be approved by the Executive Vice President for Academic Affairs.

3. During the no-cost extension, the grantee may be given teaching load, subject to availability of teaching load at MAPÚA, while he is completing his Dissertation paper.

4. Only the approved extension without any cost to Mapua will not be counted for purposes of computing the return service required. In such case, compliance with the return service shall commence from the quarter term following the expiration of the no-cost extension up to the date of completion.

5. Request for extension shall be for a period not exceeding one (1) calendar year at a time. Extensions must not exceed more than two (2) years.
Termination of Scholarship
1. The grantee fails to meet the academic standards set by the foreign school/sponsor.
2. The grantee willfully fails to comply with the academic load indicated in his program of study.
3. The grantee fails to finish the degree/training within the approved scholarship/training time frame.
4. The grantee commits gross misconduct as stipulated in the rules and regulations of Mapúa and of the sponsoring institution.
5. Other justifiable grounds which contribute to the inability of the grantee to finish the degree program/training or to abide by the duties and obligations of the grantee under the terms of the scholarship.
6. If the scholarship is terminated because of the above, payback conditions will apply.

Deferment of Enrollment/Dissertation
1. Deferment of enrollment shall not be allowed except for the following reasons:
   a. Sickness/poor health, where grant is already ongoing, duly certified by a physician
   b. Maternity leave
   c. Other justifiable reasons acceptable by Mapúa, depending on the discretion of the Academic Council
2. In no case shall a grantee be allowed to defer his ongoing scholarship to participate in a non-degree training program.
3. The grantee shall be allowed to defer the use of his Dissertation Grant, which may be included in the budget of the following year. Non-consumption of the budget for two (2) consecutive years shall mean non-inclusion of the said budget item in the succeeding years.
4. The EVPAA through the Faculty Development Office shall have the right to re-align unused Formal Education Budget (provided approved by Accounting), resulting from an approved deferment of enrolment/dissertation work, to other requirements related to Dean’s Council Scholarship.

Service Contract
1. Return service to Mapúa shall be rendered by the grantee equivalent to the length of time that he enjoyed the scholarship/training – two years of service for every year of scholarship/training or a fraction thereof.
2. The counting of the number of required return service shall start from the first enrollment of the grantee upon admission into the doctoral program and will end on the date of completion.
3. The counting of the number of rendered return service shall start on the semester/quarter term a grantee was given a teaching load upon completion of his program until the day he will reimburse the expenses.

Payback Conditions
1. In cases of willful abandonment of the scholarship/training, non-compliance with the terms and conditions stipulated in the Scholarship/Training Contract, the scholarship is terminated under the conditions set forth, the grantee shall reimburse to Mapua the total assistance given to him/her, plus interest at prevailing rates computed from the actual date of disbursement, the whole amount being due within 6 months.
2. Grantee’s who do not serve Mapúa for the full matching service component after completion of their degrees/training shall be made to pay back all salary and financial benefits received, including cost of training in connection with the grant, plus interest at prevailing rates computed from the actual date of disbursement, the whole amount being due within 6 months. This will also apply on the non-completion of the program.

**Applying for De-Loading Stipend**

1. The Dean/Subject Chair shall ensure that an appropriate budget is provided to qualified grantee.
2. The grantee shall apply for de-loading not later than one week before the start of each quarter term.
3. The grantee shall submit the duly filled out the Request for de-loading Stipend Form provided by the FDO ([Form C](#)). He shall attach proof of current enrollment such as CM or registration form or certificate of residency when the grantee is currently doing his dissertation. The Dean/Subject Chair shall endorse the same to the FDO.
4. The FDO shall verify and approve the request. The request shall be noted by the EVPAA.
5. The FDO shall prepare the Request for Check Form, duly noted by the EVPAA. The request shall be duplicated:
   1. FDO receiving copy
   2. Accounting copy
6. The FDO shall forward the Request for Check Form to the Accounting Office for processing and budget approval.
7. The Accounting Office thru the Budget Manager shall update the FDO on the status of the request. FDO shall in turn update the grantee on the status of the same.

**Applying for Reimbursement**

1. The Dean/Subject Chair shall ensure that appropriate budget is provided to qualified grantees.
2. The grantee shall fill-out and submit the Request for Reimbursement Form ([Form D](#)) provided by FDO duly endorsed by the Dean/Subject Chair.
3. For tuition and school fees reimbursement, the grantee shall submit to the FDO proof of current enrollment such as CM or registration form showing the amount paid. For Book, Thesis/Dissertation allowances, the grantee shall submit original receipts (sold to Malayan Colleges Inc.). The rules for reimbursement of Dissertation Grant for both Local and Foreign Studies must be followed.
4. FDO shall verify and approve the request and noted by the EVPAA.
5. The FDO shall prepare the Request for Check Form, duly noted by the EVPAA. The request shall be duplicated:
   1. FDO receiving copy
   2. Accounting copy
6. Once approved, the FDO shall inform the respective scholar/school about the approval the scholar/school shall forward the Request for Check Form to the Accounting Office for processing and budget approval.
7. The FDO shall follow-up status of the request from the Accounting Office shall in turn update the respective scholar/school.
**No Cost De-Loading**

1. A probationary faculty member who would like to pursue relevant and related full-time doctoral work and who has served the Institute for at least four quarters of full-time teaching and has shown satisfactory performance may apply for a no-cost de-loading. The doctoral degree can be considered as equivalent to the remaining number of quarters of full-time service required for permanency.

2. All applications for the no-cost de-loading scheme must be submitted by the applicant on his last quarter of teaching, and should be approved by the Dean or Subject Chair, the Faculty Ranking and Promotions Board, the Executive Vice President for Academic Affairs, and the President. As other factors will be considered later, the approval is not a guarantee for permanency.

3. Only related and relevant doctoral programs, to be pursued in accredited institutions, will be approved.

4. Doctoral candidates must apply for permanency one quarter before graduation or their intended return. Based on their graduate performance, applicable legal provisions, or other factors deemed vital and necessary by the Institute, the Institute has the right to reject any application for permanency.

5. All the requisites for permanency as stated in the prevailing CBA must be satisfied.

6. The change in status of the applicant, from probationary to permanent, must be recommended by the Dean or Subject Chair, reviewed and recommended by the Faculty Ranking and Promotions Board, and approved by the President.

7. If the applicant pursues full-time or part-time work in other institution after graduation, the no-cost de-loading approval will be considered void.

8. All faculty members who are made permanent under this scheme must render the corresponding period of return service: one quarter of return service for every quarter of no-cost full-time de-loading.

**List of Local Accredited Universities and Their Accredited Doctoral Programs**

1. Mapúa Institute of Technology
   a. Science and Engineering
      PhD in Chemistry
      PhD in Environmental Engineering

2. De La Salle University, Manila
   a. Engineering
      PhD in Chemical Engineering
      PhD in Electronics and Communications Engineering
      PhD in Industrial Engineering
      PhD in Mechanical Engineering
   b. Science
      PhD in Chemistry
      PhD in Mathematics
      PhD in Physics
   c. Computer Studies
      PhD in Computer Science
   d. Business
      PhD in Business Administration
   e. Education
      PhD in Applied Linguistics
PhD in Counseling Psychology
PhD in Counseling Psychology major in Clinical Psychology
PhD in Counseling Psychology major in Industrial Psychology
PhD in Counseling Psychology major in School Psychology

3. **Ateneo de Manila University**
   a. **Science**
      PhD Mathematics
      PhD Physics
      PhD Chemistry
   b. **Information Technology**
      PhD in Computer Science
   c. **Social Science**
      PhD in Psychology
      PhD Sociology
      PhD Economics

4. **University of Santo Tomas**
   a. **English**
      PhD English
   b. **Social Science**
      PhD Economics
      PhD Psychology
   c. **Natural Science**
      PhD Chemistry
   d. **Business**
      PhD Business Administration
      PhD Business Management

5. **University of the Philippines - Diliman**
   a. **Urban and Regional Planning**
      PhD Urban and Regional Planning
   b. **Arts and Letters**
      PhD English Studies
      PhD Pilipino
   c. **Economics**
      PhD Economics
   d. **Business Administration**
      PhD Business Administration
   e. **Engineering**
      PhD Electrical and Electronics Engineering
      PhD Chemical Engineering
      PhD Materials Science Engineering
   f. **Science**
      PhD Chemistry
      PhD Environmental Science
      PhD Geology
      PhD Materials Science
PhD Mathematics  
PhD Micro Biology and Biotechnology  
PhD Physics

6. **University of the Philippines – Manila**  
a. **Science**  
   PhD Biochemistry  
b. **Nursing**  
   PhD Nursing

7. **University of the Philippines – Los Baños**  
a. **Science**  
   PhD Biochemistry  
   PhD Microbiology  
   PhD Molecular Biology and Biotechnology  
   PhD Soil Science  
b. **Environmental Science**  
   PhD Environmental Science  
c. **Statistics**  
   PhD Statistics  
d. **Computer Science**  
   PhD Computer Science

**LIST OF FOREIGN UNIVERSITIES AND THEIR ACCREDITED DOCTORAL PROGRAMS**

1. **Chung Yuan Christian University - Taiwan**  
a. **Engineering**  
   PhD in Chemistry Engineering and Materials  
   PhD in Microelectronic Engineering and Applications

2. **Hanyang University**  
a. **Science**  
   PhD in Chemistry

For other doctoral programs that are not included in the list but are offered by the accredited schools, the applicant may justify why he would like to take such program and submit the courses’ description to the academic council for evaluation and approval.

**GUIDELINES FOR THE USE OF THE OPEN LABORATORY**

1. The Open Laboratory shall be opened from 7:30 a.m. to 5:00 p.m. from Monday to Saturday.
2. Upon entering the Open Laboratory, the student has to inform the Laboratory Assistant if he/she will use the computer or will avail of the printing services.

**FOR THE USE OF COMPUTER**

1. The student must fill out the Open Laboratory User’s Logbook and he/she will leave his ID to the Computer Laboratory Assistant on duty in exchange for the computer number to be given to the student. The student ID will be attached to the corresponding number given to the student.
2. Students need to wait for the computer laboratory assistant to give the necessary instructions before the computer will be used.
3. The student shall be given one hour to use the computer, but it can be extended as long as other student will not use the said terminal.
4. The accountability of the computer shall be lodged to the student assigned to the computer terminal. It will be his/her responsibility to ensure that the computer is protected from damage, vandalism and misuse.
5. If there are losses and breakages, the student must fill out the Loss/Breakage Acknowledgement form and the guidelines for losses and breakages will be used.
6. After using the computer, the Computer Laboratory Assistant shall inspect the computer assigned to the student before he/she will be cleared.
7. Upon clearing the student, he/she shall again fill out the log form and his/her ID shall be returned upon signing.

FOR THE PRINTING SERVICES
1. For Multimedia services and value added services like downloading and printing of research outputs or spreadsheets data, the Computer Laboratory Assistant shall ask the student about the number of black or colored document to be printed.
2. Upon printing the document, the student shall also be asked to sign the Open Laboratory Printing Log Sheet as basis for charging the student for the printing service.
3. After the student has signed the log sheet, the Computer Laboratory Assistant on duty shall enter in the billing system the student number and the amount to be charged to the student which he/she must pay on or before the end of the quarter.

LOSSES OR DAMAGES
1. The Computer Laboratory Assistant shall assign each student a specific computer unit each time he/she will use the open laboratory. In case any problem arises in a particular terminal, the student will have to inform the computer laboratory assistant immediately. If any defect/problem is encountered, the computer laboratory assistant must immediately report it in writing which will be submitted to the ILMO Makati Administrator.
2. In case there is a report of loss or damage to any part of the computer that may be deemed unusable or unserviceable due to acts of maliciousness and not of damage due to equipment fault, the Computer Laboratory Assistant must see to it that the loss/damage acknowledgement form is accomplished by the student.
3. The student shall be reported to the Office of Student Affairs for proper disciplinary action for any violations of the rules as well as damage or loss of any parts of the computer.
4. All damages and/or losses of items like computer hardware and accessories or any other materials, that may be deemed unusable or unserviceable, will be charged to the individual concerned.
5. As much as possible, replacement of damaged or lost items must at once be carried out.
6. No modifications, repairs or alterations of any equipment in the laboratory are allowed without the written authorization from the Computer Laboratory Head and Admin. Officer.
7. Computer Laboratory Assistants should report at once to the Admin. Officer or the Head of the Department lost/unreturned and damaged computer hardware and accessories.
GUIDELINES FOR STUDENTS FOR THE USE OF THE OPEN LABORATORY
1. Booting up computers is strictly prohibited.
2. Students should never interfere with the original computer configuration or setup: BIOS setup, Operating System setup, Files and Directory created, and the like.
3. Students are not allowed to install Software in the Open Laboratory.
4. Unauthorized copying of software or illegally copied software is strictly prohibited.
5. Respect the privacy of others by refraining from accessing their files or electronic mails.
6. Vandalism such as writing on PCs, taking parts of keyboard, mouse, etc. is strictly prohibited. Violators are directly liable for losses or damages.
7. Do not view, copy, download, or scan pornographic materials in any form.
8. Students are not allowed to add, delete, or modify any PC configuration and settings. If caught, they will be subjected to sanctions.
9. No modification, repairs or alterations of any hardware in the laboratory room are allowed. Only the laboratory technical assistants and DoIT personnel have the right to perform such actions.
10. Handle the equipment with care. Damage or permanent loss of the equipment or peripherals will be lodged on the individual concerned.
11. Report immediately to the Computer Laboratory Assistant any damages to equipment.
12. In case the student will not follow the guidelines in using the Open Laboratory, the Laboratory Assistant is authorized to request the student to leave the Open Laboratory at once and he/she will be reported to the Office of Student Affairs for proper disciplinary action.
13. Creating noise are strictly prohibited.
14. Leave the computer terminal clean and orderly. Chair must be arranged and returned to its proper place.
15. Garbage must be placed on the trashcan located inside the Open Laboratory Room.
16. Eating, drinking and smoking inside the laboratory room are strictly prohibited.

GUIDELINES ON THE EXCLUSIVE USE OF RESEARCH LABORATORY FOR FACULTY MEMBERS

General Policies
1. The faculty member must properly accomplish the Application form for the use of the Laboratory Facilities and Equipment and shall inform the Laboratory Assistant his/her intention to use the Research Laboratory for 30 days or more.
2. Upon the approval of the application form, the faculty member shall be required to sign the contract agreement stating the number of days that he/she will use exclusively the Research Laboratory and that he/she will abide by the ILMO policies, terms and conditions stipulated in the contract agreement.
3. All equipment and facilities under the inventory list of ILMO to be used at the research laboratory shall be covered by the policies on usage of facilities, laboratory equipment and tools.
4. The faculty member and ILMO personnel shall have full access of entry to the Research Laboratory during safety inspection and emergency situations.
5. The Research Laboratory shall only be opened upon the arrival of the faculty member or Research Assistant.

GUIDELINES FOR RESERVATION OF COMPUTER LABORATORY ROOMS, HARDWARE AND ITS PERIPHERALS

Guidelines for the use of Computer Laboratory Rooms & Hardware Room

Regular Computer Laboratory & Hardware Room Use
1. A specific computer laboratory room and schedule shall be assigned to the laboratory class by the Dean or Subject Chair concerned on a per quarter basis.
2. Before the start of classes (per quarter), the Admin. Office shall print the official laboratory class schedules for all the laboratory rooms which shall be posted outside the laboratory rooms.
3. The assigned laboratory room shall only be used on the specified official class schedule and if the professor is already present.
4. On the 1st week of classes, the Professor shall be given the Laboratory Seating Arrangement Form by the Computer Laboratory Assistant to be filled out which will be submitted on or before the 2nd week of classes. This form will be the basis of the seating arrangement of all the students per class for the whole quarter.
5. At the end of the every laboratory class, the Computer Laboratory Assistant shall check if all the computers are in good condition. The Daily Computer Laboratory Report Form will be used by the Computer Laboratory Assistant for monitoring of laboratory activities.
6. The accountability on the laboratory facilities shall be lodged to the professor assigned to the laboratory class. It will be his/her responsibility to ensure that the furniture, fixtures, equipment and materials are protected from damage, vandalism and misuse.
7. If there are losses/damages, the students involved and the Professor of the class must fill out the Loss/Breakage Acknowledgement Form and the guidelines for losses and breakages will be used for this kind of incident.

Seminar / Workshop Use
1. Laboratory Reservation Form (available at ILMO) for make-up classes and other related activities must be filled out by the requesting party to be approved by the Faculty/Deans/Department Head/Laboratory Assistants concerned 2 to 3 days before the activity. After the approval, it will be forwarded to ILMO for the final approval.
2. Upon approval of the room reservation, the form shall be given to the Laboratory Assistant and security guard concerned.
3. It shall be the responsibility of the Laboratory Assistant to prepare the room including other request items needed for the laboratory class.
4. During the make-up class or seminar, the Laboratory Assistant shall give the Professor the Laboratory Seating Arrangement form and logbook to be filled out by the Professor and must be submitted to the Laboratory Assistant before the end of the class.
5. Checking of attendance shall be done by the Laboratory Assistant per activity per day.
6. After the use of facilities, the Laboratory Assistant shall inspect the room. The Laboratory Assistant will make a notation in the room reservation form. The Daily Computer Laboratory
Report Form will be used by the Computer Laboratory Assistant for monitoring of the activity.
7. The accountability on the laboratory facilities shall be lodged on the requesting party of the said activity. It will be his/her responsibility to ensure that the furniture, fixtures, equipment and materials are protected from damage, vandalism and misuse.

Unless the reservation form has been approved by the Dean/Subject Chairperson or Department Head, ILMO will not allow the requesting party to use the said room(s).

RESERVATION OF OTHER EQUIPMENT
1. The Laboratory Reservation Form must be filled out and must be submitted to ILMO one to two days prior to the use of the equipment. Approval of the form will be based on the availability of the equipment.
2. The borrowing of equipment in a single transaction shall only be allowed for a maximum of one week to the requesting party to give chance to other borrowers who will also use the said equipment.
3. Only the student, faculty and non-teaching employee of Mapua whose signature appears on the reservation form can claim the equipment approved for borrowing.
4. A student may represent his/her instructor to borrow the equipment as long as the signature of the faculty Adviser/Instructor/Dean/Lab Assistants appears on the Reservation Form.
5. For the student who will borrow the equipment, the student shall leave his/her ID with the Laboratory Assistant.
6. Upon the release of the equipment, the accountability shall be for the faculty/employee or student whose name appears in the reservation form. It will be his/her responsibility to ensure that the equipment and materials are protected from damage, vandalism and misuse.
7. After using the said equipment, it should be returned by the faculty, student or employee at ILMO immediately and the equipment logbook shall be signed again.
8. The Computer Laboratory Assistant shall then check the equipment borrowed if it is in good condition before the borrower can be cleared.
9. The student shall get his/her ID upon returning the equipment as long as the equipment is in good condition.

In case there is a problem with the equipment, you may call our Laboratory personnel to check or troubleshoot the equipment. You may also ask the roving guard to look for the Laboratory personnel to check the said equipment.

GUIDELINES FOR RETENTION OF ILMO DOCUMENTS

ILMO Documents that need to be scanned
a. Memoranda pertaining to policies and guidelines
b. Laboratory Manual
c. Procedure Manual
d. Reference Guidelines
GUIDELINES AND POLICIES ON THE USE OF LABORATORIES AND RESPONSIBILITIES OF LABORATORY PERSONNEL AND USERS

General Policies
1. All laboratory rooms managed by Institutional Laboratory Management Office (ILMO) shall only be opened upon the arrival of the assigned faculty member, lecturer, or researcher.
2. Students cannot enter the laboratory rooms without the presence of the faculty member, lecturer, or researcher.
3. No food or drink is allowed inside the laboratories.
4. The laboratories shall only be opened for the following:
   a. Regular Classes
   b. Make-up Classes
   c. Seminars/Conference
   d. Thesis Defense
   e. Research and Special Laboratory Use
   f. Showcase to Accreditors and Visitors
g. Examinations (diagnostic exam, TOEIC, NSTP, exit exam, departmental exam)
h. Other activities approved by the ILMO Director or Administrator

Responsibilities

ILMO Director and ILMO Administrator are responsible for the following tasks:

a) Approves the use of laboratory rooms, issuance of equipment/tools/supplies needed in the laboratories;
b) Prepares and periodically reviews/updates the laboratory manual for student and faculty use;
c) Prepares budget, plans, and scheduling of upgrade/repair of equipment in all the laboratories including the installation of software in the computer laboratories;
d) Implement the laboratory manual covering internal administration and operational activities of the laboratory and updating improvement of its course offering facilities; and
e) Coordinates with the deans, subject chairpersons and program coordinators regarding their laboratory requirements.
f) The ILMO Director / Administrator shall inspect the laboratories on a quarterly basis and/or from time to time to know the status of the facilities and laboratory equipment.

Operations Engineer is responsible for the following:

a) Responsible for supporting the laboratory operations by determining and solving operational problems and taking charge of the overall inventory of equipment and apparatus.
b) Prepares a report regarding his/her recommendation for the disposal, decommissioning, transfer, repair and maintenance of laboratory equipment.
c) Inspects the laboratory facilities and equipment from time to time.

Laboratory Assistants and Student Assistants are responsible for the following tasks:

a. Prepares the laboratory room prior to the opening of scheduled classes or approved activity;
b. Ensures that all laboratory facilities and equipment are in good working condition and laboratory supplies are readily available for laboratory activity;
c. Supervises the laboratory with the help of the faculty on matters of laboratory management and discipline, and implementation of course requirements.
d. Checks thoroughly the laboratory facilities and equipment for each laboratory class.
e. Checks thoroughly the laboratory items to be released to requesting laboratory users;
f. Assists in the use of tools and equipment in the laboratories and must be on call when experiments are being performed;
g. Renders overtime work only when necessary;
h. Keeps the laboratory rooms clean at all times;
i. Requests adequate supply of equipment, tools and materials for laboratory activities.
j. Keeps an updated inventory of facilities, equipment and all other properties and prepares an inventory report of all items at the end of each quarter specifying the item, location, status and recommendation. The inventory report shall be submitted to the Operations Engineer and ILMO Administrators.
k. Check thoroughly the laboratory items being returned by users (For breakages or losses, refer to PM-LM-01-00 Managing Breakages and Losses of Laboratory Tools, Equipment and Other Inventory Items.).

I. Immediately check the tools and equipment that need preventive maintenance and/or repair services, and make a comprehensive report to be submitted to the ILMO Operations Engineer, DOIT, or CDM for appropriate action.

m. Fill out the Laboratory Safety Checklist every end of the quarter to be submitted to the Operations Engineer and/or ILMO Director.

n. Laboratory Assistants and/or Student Assistants shall fill out the ILMO Substitution/Special Duty form in case of leave of absence or change of schedule.

Laboratory Users (Faculty Members/Researchers/Students)

a. All laboratory users must properly accomplish the Application Form for the Use of the Laboratory Facilities and Equipment before submitting it to the Laboratory Assistant or Student Assistant or ILMO for approval.

b. Faculty members conducting regular classes in any of the laboratories must closely monitor their respective classes.

c. Faculty members are held accountable of any tool or equipment used during the conduct of their classes in the laboratory.

LABORATORY SAFETY PROCEDURES AND GUIDELINES

Institutional Laboratory Management Office safety practice and guidelines

1. Safety Inspection and Reporting

a. All laboratory rooms shall be inspected by the designated Safety Engineer and/or Laboratory Assistants based on the schedules stated in the safety inspection checklist. The checklist will serve as a guide during the inspections. Appropriate remarks in the checklist for non-compliance shall be done by the Safety Engineer during inspection. If the concern is not included in the checklist, the Safety Engineer must still make a notation.

The Safety Inspection Checklist is composed of the following category:

i. Facility (Walls, ceilings, walkways)

ii. Electrical (Electrical switches, circuit breaker panels, electrical outlets, Proper Grounding)

iii. Signage (Emergency Posters, Emergency procedures, Labels, emergency shutdown procedure)

iv. Compressed Gas Bottles

v. Laboratory Equipment (Emergency shutdown mechanisms, proper mounting)

vi. Personal Protective Equipment (enumerate the protective equipment we have)

b. A safety inspection report shall then be prepared by the Safety Engineer and/or Laboratory Assistants based on the non-compliance items from the checklist and other safety issues/concerns not included in the checklist.

c. The safety inspection report shall then be endorsed to ILMO Director and ILMO’s Operations Engineer if the inspection was done in Intramuros while for the Makati campus, the report
shall be sent to the ILMO Administrator. The safety inspection report may also be given to some concerned parties (i.e. CDMO, Purchasing, etc.) if necessary.

d. For Intramuros campus, the Safety Engineer and the Operations Engineer must prepare a “safety plan or recommendation” while for the Makati Campus, the ILMO Administrator will prepare the safety plan or recommendation for any big safety issue/concern that needs to be planned methodically. This safety plan must be forwarded to the ILMO Director for his approval.

2. Safety Protocol and Procedures

Below is the category/level for each natural disaster or manmade catastrophe:

<table>
<thead>
<tr>
<th>Fire</th>
<th>Level 1 – Isolated fire</th>
<th>Level 2 – Contained fire</th>
<th>Level 3 – Uncontained Fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke</td>
<td>Level 1 - Isolated smoke</td>
<td>Level 2 – Acrid Smoke</td>
<td></td>
</tr>
<tr>
<td>Bomb Threat</td>
<td>Category 1 – Phone Call</td>
<td>Category 2 – Confirmation of Explosive Device</td>
<td>Category 3 – After detonation of explosive device</td>
</tr>
<tr>
<td>Protest</td>
<td>Category 1 - City Wide</td>
<td>Category 2 - Nation Wide</td>
<td></td>
</tr>
<tr>
<td>Earthquake</td>
<td>Level 1 – Magnitude 2.0 – 3.9</td>
<td>Category 2 – Confirmation of Explosive Device</td>
<td>Level 3 – Magnitude 5.0 – 5.9</td>
</tr>
<tr>
<td>Tsunami / Storm Surge</td>
<td>Level 1 – Issuance of alert/warning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typhoon</td>
<td>Level 1 – Signal 1 (Based from PAGASA Announcement)</td>
<td>Level 2 – Signal 2 (Based from PAGASA Announcement)</td>
<td>Level 3 – Signal 3 (Based from PAGASA Announcement)</td>
</tr>
</tbody>
</table>

The table below will describe and explain the appropriate Safety Protocol and Procedures for each natural or manmade disaster:

<table>
<thead>
<tr>
<th>Fire</th>
<th>Description</th>
<th>Immediate Response (First 4 Hours)</th>
<th>Sustained Response</th>
<th>Recovery Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 – Isolated fire</td>
<td>• Single Room or Laboratory</td>
<td>ILMO Quick Response Team (QRT)</td>
<td>Institutional Response</td>
<td>• Conduct damage Assessment by the</td>
</tr>
<tr>
<td>Level 2 – Contained Fire</td>
<td>ILMO Quick Response Team</td>
<td>Institutional Response Team</td>
<td>Operations Engineer or Facilities Officer</td>
<td></td>
</tr>
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<td>-------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• Not more than three laboratories affected.</td>
<td>Prepare to evacuate affected area floor/building. In accordance with evacuation procedures.</td>
<td>Conduct damage Assessment by the Operations Engineer or Facilities Officer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Containment feasible utilizing available firefighting equipment.</td>
<td>Endorsement of Situation Report to Institutional Response Team.</td>
<td>Conduct personnel count by the QRT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 3 – Uncontained Fire</td>
<td>ILMO Quick Response Team</td>
<td>Institutional Response Team</td>
<td>Conduct damage Assessment by the Operations Engineer or Facilities Officer</td>
<td></td>
</tr>
<tr>
<td>• Whole Floor/Building/Fires on Chemical Storage/Fuel Storage</td>
<td>Prepare to evacuate affected area floor/building. In accordance with evacuation procedures.</td>
<td>Conduct personnel count by the QRT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Containment not feasible.</td>
<td>Endorsement of Situation Report to Institutional Response Team.</td>
<td>Conduct access/safety assessment by ILMO Safety Officer or Facilities Officer in coordination with Onsite Incident Commander</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Smoke

<table>
<thead>
<tr>
<th>Description</th>
<th>Immediate Response (First 4 Hours)</th>
<th>Sustained Response</th>
<th>Recovery Plan</th>
</tr>
</thead>
</table>
| Level 1 - Isolated smoke | • Breathing is not difficult | ILMO Quick Response Team  
• Prepare to evacuate affected area. In accordance with evacuation procedures.  
• Endorsement of Situation Report to Institutional Response Team. | Institutional Response Team | • Conduct damage Assessment by the Operations Engineer or Facilities Officer  
• Conduct personnel count by the QRT  
• Conduct access/safety assessment by ILMO Safety Officer or Facilities Officer in coordination with Onsite Incident Commander |
| Level 2 – Acrid Smoke | • Difficulty in breathing/Eye irritation | ILMO Quick Response Team  
• Prepare to evacuate affected area floor/building. In accordance with evacuation procedures.  
• Endorsement of Situation Report to Institutional Response Team. | Institutional Response Team | • Conduct damage Assessment by the Operations Engineer or Facilities Officer  
• Conduct personnel count by the QRT  
• Conduct access/safety assessment by ILMO Safety Officer or Facilities Officer with coordination with Onsite Incident Commander |

## Bomb Threat

<table>
<thead>
<tr>
<th>Description</th>
<th>Immediate Response (First 4 Hours)</th>
<th>Sustained Response</th>
<th>Recovery Plan</th>
</tr>
</thead>
</table>
| Category 1 – | • The existence of | ILMO Quick Response  
Institutional | • Inspection and |
<table>
<thead>
<tr>
<th>Phone Call</th>
<th>an explosive device is yet unconfirmed</th>
<th>Team</th>
<th>Response Team</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Monitoring • Prepare to evacuate affected area. In accordance with evacuation procedures. • Report the situation to the Campus Development Management Office (CDMO).</td>
<td>secures of laboratories to be conducted by ILMO QRT, Operations Engineer and ILMO Safety Officer or Facilities Officer and ILMO Administrator</td>
</tr>
<tr>
<td>Category 2 – Confirmation of Explosive Device</td>
<td></td>
<td>ILMO Quick Response Team • Evacuation of immediate area. In accordance with evacuation procedures. • Endorsement of Situation Report to Institutional Response Team and Onsite Incident Commander.</td>
<td>Institutional Response Team • Incident Report (ILMO Operations Engineer or ILMO Administrator) • Conduct access/safety assessment by ILMO Safety Officer or Facilities Officer in coordination with Onsite Incident Commander</td>
</tr>
<tr>
<td>Category 3 – After detonation of explosive device</td>
<td></td>
<td>ILMO Quick Response Team • Evacuation of immediate area. In accordance with evacuation procedures. • Endorsement of Situation Report to Institutional Response Team and Onsite Incident Commander.</td>
<td>Institutional Response Team • Conduct damage Assessment by the Operations Engineer or Facilities Officer • Incident Report (ILMO Operations Engineer or ILMO Administrator) • Conduct access/safety assessment by ILMO Safety Officer or Facilities Officer in coordination with Onsite Incident Commander</td>
</tr>
<tr>
<td>Protest/Rally</td>
<td>Description</td>
<td>Immediate Response (First 4 Hours)</td>
<td>Sustained Response</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Category 1 - City Wide</td>
<td>• Protest within the city where the institute is located.</td>
<td>ILMO Quick Response Team • Secure laboratories. • Preparation for evacuation of laboratories in an event of escalation. • Monitor events. • Coordinate with the Campus Development Management Office (CDMO).</td>
<td>Institutional Response Team</td>
</tr>
<tr>
<td>Category 2 - Nation Wide</td>
<td>• Protest with two or more cities • Declaration of state of emergency by the national government.</td>
<td>ILMO Quick Response Team • Secure Laboratories • Evacuation. In accordance with evacuation procedures. • Endorsement of Situation Report to Institutional Response Team</td>
<td>Institutional Response Team</td>
</tr>
</tbody>
</table>

**Earthquake**

<table>
<thead>
<tr>
<th>Description</th>
<th>Immediate Response (First 4 Hours)</th>
<th>Sustained Response</th>
<th>Recovery Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 – Magnitude 2.0 – 3.9 • Felt slightly by some people. No damage to buildings. • Often felt by people, but very rarely causes damage. Shaking of indoor objects can be noticeable.</td>
<td>ILMO Quick Response Team • No evacuation needed</td>
<td>Institutional Response Team</td>
<td>• Incident Report (ILMO Operations Engineer or ILMO Administrator) • Damage Assessment • Safety Assessment (ILMO Safety Officer or ILMO)</td>
</tr>
<tr>
<td>Level 2 – Magnitude 4.0 – 4.9</td>
<td>ILMO Quick Response Team</td>
<td>Institutional Response Team</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------</td>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>• Noticeable shaking of indoor objects and rattling noises</td>
<td>• Survey laboratories. Inspect for structural damage.</td>
<td>• Generate Incident Report By the ILMO Operations Engineer or Laboratory Assistant</td>
<td></td>
</tr>
<tr>
<td>• Some objects may fall off shelves or be knocked over.</td>
<td>• Evacuation. In accordance with evacuation procedures.</td>
<td>• Conduct Damage Assessment and safety evaluation by the Safety Officer or Facilities Officer in conjunction with Institutional Response Team</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Endorsement of Situation Report to Institutional Response Team.</td>
<td>• Conduct Personnel count to be performed by QRT</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 3 – Magnitude 5.0 – 5.9</th>
<th>ILMO Quick Response Team</th>
<th>Institutional Response Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>• At most, none to slight damage to all other buildings. Felt by everyone. Casualties range from none to a few.</td>
<td>• Evacuation of Glassware storage rooms (if possible)</td>
<td>• Generate Incident Report By the ILMO Operations Engineer or Facilities Officer</td>
</tr>
<tr>
<td>• Danger from falling objects/debris.</td>
<td>• Evacuation of rooms where compressed gas are stored (if possible)</td>
<td>• Conduct Damage Assessment and safety evaluation by the Safety Officer or Facilities Officer in conjunction with Institutional Response Team</td>
</tr>
<tr>
<td></td>
<td>• Shutdown of Gas Line.</td>
<td>• Conduct Personnel count to be performed by QRT</td>
</tr>
<tr>
<td></td>
<td>• Endorsement of Situation Report to Institutional Response Team</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 4 – Magnitude 6.0 – 5.9</th>
<th>ILMO Quick Response Team</th>
<th>Institutional Response Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Felt in wider areas; up to hundreds of miles/kilometers</td>
<td>• Evacuation of</td>
<td>• Generate Incident Report By the ILMO Operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Administrator)
from the epicenter.
- Danger from falling objects/debris.
- Structural damage maybe incurred.

Glassware storage rooms (if possible)
- Evacuation. In accordance with evacuation procedures.
- Shutdown of Gas Line.
- Endorsement of Situation Report to Institutional Response Team

Engineer or Facilities Officer
- Conduct Damage Assessment and safety evaluation by the Safety Officer or Facilities Officer in conjunction with Institutional Response Team.
- Conduct Personnel count to be performed by QRT

<table>
<thead>
<tr>
<th>Tsunami / Storm Surge</th>
<th>Description</th>
<th>Immediate Response (First 4 Hours)</th>
<th>Sustained Response</th>
<th>Recovery Plan</th>
</tr>
</thead>
</table>
| Level 1 – Issuance of alert/warning | • May come after a major earthquake originating from West Philippine sea | ILMO Quick Response Team
- Evacuation of lower levels (1st floor and 2nd floor).
- Shut down of electrical systems.
- Preparation and execution of evacuation. In accordance with evacuation procedures.
- Endorsement of Situation Report to Institutional Response Team | Institutional Response Team | • Generate Incident Report By the ILMO Operations Engineer or Facilities Officer
• Conduct Damage Assessment and safety evaluation by the Safety Officer or Facilities Officer in conjunction with Institutional Response Team.
• Conduct Personnel count to be performed by QRT |

<table>
<thead>
<tr>
<th>Typhoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 – Signal 1 (Based from PAGASA)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
| Announcement | locality. | • Monitor weather updates.  
|             |          | • Secure laboratories that may be affected by rain or gusts. | Team | Facilities Officer | • Damage Assessment (if needed)  
|             |          |                                                             |     |                      | • Safety Assessment  
| Level 2 – Signal 2 (Based from PAGASA Announcement) | ILMO Quick Response Team | • Monitor weather updates.  
|             |          | • Secure laboratories that may be affected by rain or gusts.  
|             |          | • Preparation and execution of evacuation (if still feasible). In accordance with evacuation procedures.  
|             |          | • Endorsement of Situation Report to Institutional Response Team |     | Institutional Response Team | • Incident Report (ILMO Operations Engineer or Facilities Officer)  
|             |          |                                                             |     |                      | • Damage Assessment  
|             |          |                                                             |     |                      | • Safety Assessment  
|             |          |                                                             |     |                      | (ILMO Safety Officer/Site incident Commander or Facilities Officer)  
| Level 3 – Signal 3 (Based from PAGASA Announcement) | ILMO Quick Response Team | • Monitor weather updates.  
|             |          | • Secure laboratories that may be affected by rain or gusts.  
|             |          | • Preparation and execution of evacuation (if still feasible). In accordance with evacuation procedures.  
|             |          |                                                             |     | Institutional Response Team | • Generate Incident Report By the ILMO Operations Engineer or Facilities Officer  
|             |          |                                                             |     |                      | • Conduct Damage Assessment and safety evaluation by the Safety Officer or Facilities Officer in conjunction with Institutional Response Team.  
|             | Some old galvanized iron roofings may be peeled off. |                                                             |     |                      |                                                             |
3. Personnel Safety Seminar, Training and Orientation/Dissemination

Safety Related Seminars and Trainings shall be conducted on a yearly basis upon the recommendation of the ILMO Director. These seminars and trainings shall be coursed through the Human Resources Department. Also, some safety orientation or information dissemination shall be in a form of videos that may be viewed by the Laboratory personnel.

### PROCEDURES IN BORROWING LABORATORY EQUIPMENT DURING LABORATORY CLASSES AND RESEARCHES

1. The laboratory user shall secure the Borrower’s form from ILMO.
2. The Laboratory user shall fill out the form to be signed by the Instructor.
3. The Lab user shall submit the duly accomplished form together with his/her school ID to ILMO.
4. The Laboratory Assistant shall release the laboratory equipment/materials.
5. The laboratory user shall return the borrowed items to the Laboratory Assistant after the laboratory activity.
6. The laboratory Assistant shall inspect the returned items.
7. The Laboratory assistant shall determine if the item returned is in good condition.
8. The laboratory Assistant shall return the ID if the item is in good condition.
9. The laboratory Assistant shall require the laboratory user to fill out the loss/breakage acknowledgement form.
10. The Laboratory assistant shall implement the Procedures manual for breakage and loss of laboratory items.

PROCEDURES FOR BREAKAGES AND LOSSES OF LABORATORY EQUIPMENT
1. The laboratory assistant shall require the laboratory user to fill out the loss/breakage acknowledgement form.
2. The laboratory user shall fill out the form to be submitted to the laboratory assistant.
3. The laboratory assistant shall inform the Operation’s Engineer if the item is a laboratory equipment or not.
4. The Operation’s Engineer shall prepare a report to be submitted to ILMO Director for proper disposition.
5. Upon assessment, the Operation’s Engineer shall determine if the laboratory user shall be charged or not.
6. The laboratory assistant may change the laboratory user or not depending on the instruction of the Operation’s Engineer.
7. The laboratory assistant shall ask the laboratory user if he/she wants to be charged or replace the item.
8. The laboratory assistant shall check the specs of the damages / lost item.
9. The laboratory assistant shall bill the laboratory user using the billing system.
10. The ILMO Administrative Officer shall prepare the purchase request of the damaged/lost item.
11. The laboratory assistant shall give the specs of the damaged/lost item to the laboratory user.
12. The laboratory assistant shall inform the laboratory user that the laboratory equipment shall be replaced within the quarter.
13. The laboratory user shall deliver the new replacement of the damaged/lost item to ILMO.
14. The laboratory assistant shall inspect the item delivered by the laboratory user.
   Upon inspection and approval, the laboratory assistant shall clear the laboratory user.

PROCEDURES IN APPLYING TO USE A LABORATORY FACILITIES AND / OR EQUIPMENT (FOR RESEARCHES, THESIS AND NON REGULAR CLASSES)
1. The laboratory user shall fill out the application form and the form must be noted by the Adviser/Faculty and Dean/Subject Chairperson.
2. The laboratory assistant shall check whether the request is for the use of lab facility or lab equipment.
3. The laboratory Assistant shall check if the facility is available.
4. The laboratory assistant shall check if the use of facility shall be overnight or not.
5. The laboratory assistant shall check if the facility is available.
6. The laboratory assistant shall inform the requester on the availability.
7. The laboratory user shall submit the overnight request letter to ILMO.
8. The ILMO Director shall approve the request of the laboratory user.
9. The laboratory user shall secure approval from CDM and OSA.
10. The laboratory assistant shall inform the laboratory user about the approval of his/her request.
11. The laboratory assistant shall ask if it will be used outside.
12. The laboratory user shall accomplish the accountability form.
13. The laboratory assistant shall forward the form to ILMO Director for his approval.
14. Upon approval of the ILMO Director, the laboratory user shall request CDMO to approve the gate pass form.
15. The laboratory assistant shall release the equipment to the laboratory user.
16. The laboratory assistant shall request the ILMO Director to approve the user.
17. The laboratory assistant shall release the requested equipment.
Date: __________

DISSERTATION ☐ MASTER'S THESIS ☐ GRADUATE RESEARCH PRACTICUM ☐
UNDERGRADUATE THESIS ☐ UNDERGRADUATE RESEARCH PRACTICUM ☐

TITLE: ___________________________________________________________________________

Schedule of Presentation: Mobile # __________________ Email: _____________________________

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CONFORME

We hereby agree to the scheduled date of the proposal oral examination. We also certify that a draft copy of the paper was given to us a week ahead of the scheduled oral examination.

<table>
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<tr>
<th>Examination Committee</th>
<th>Printed Name</th>
<th>Signature</th>
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</table>

For the Course Coordinator:

Logistics Checklist LCD _____ Laptop/Computer _____ Room _____ Poster _____
Web Announcement _____

APPROVALS

RESEARCH COORDINATOR: ______________________ DATE: __________

COURSE COORDINATOR : ______________________ DATE: __________

DEAN/ SUBJECT CHAIR : ______________________ DATE: __________
# BILLING FORM

**Date:**

**DISSERTATION** [ ] **MASTER’S THESIS** [ ] **GRADUATE RESEARCH PRACTICUM** [ ]
**UNDERGRADUATE THESIS** [ ] **UNDERGRADUATE RESEARCH PRACTICUM** [ ]

**TITLE:** ____________________________________________________________

<table>
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<th>Program of Study</th>
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<th>Amount</th>
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<tr>
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<td>Miscellaneous Fee</td>
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<td><strong>TOTAL</strong></td>
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**NO OF STUDENTS IN THE GROUP**

**AMOUNT TO BE PAID**

Prepared by:

**RESEARCH COORDINATOR:** ________________________  **DATE:** __________
ADVISER ENDORSEMENT FORM

__ Proposal Defense __ Final Defense

Research Directed Study Title: ______________________________________________

Name of Student(s): _______________________ _______________________
_______________________ _______________________
_______________________ _______________________

This is to certify that the above-mentioned research directed study is properly and sufficiently prepared for oral defense. The write-up and the PowerPoint presentation have been reviewed in compliance with proper formatting and have sufficient substance to be qualified for defense. The student/s is/are likewise gauged to be fit to defend his/their research directed study.

____________________________________
Signature over Printed Name of Adviser

Date Signed: ______________________
### Format of CD Cover

```
CONTROL NUMBER

________________________________

TITLE _________________________________________

____________________________________________________________________

NAME

STUDENT NUMBERS

CONTACT NUMBER

____________________________________________________________________

NAME OF ADVISER

Adviser

Mapua Institute of Technology

Month & Year
```
Date: _______________

DISSERTATION ☐ MASTER’S THESIS ☐ GRADUATE RESEARCH PRACTICUM ☐ UNDERGRADUATE THESIS ☐ UNDERGRADUATE RESEARCH PRACTICUM ☐

TITLE: ____________________________________________________________

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PROOF OF EDIT

This is to certify that I have proofread and edited the above-mentioned research practicum/thesis/dissertation.

_________________________________________
Editor’s Signature over Printed Name

-------------------------------------------------------------------------------------------------------------------------

FINAL APPROVAL

<table>
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<th>Examination Committee</th>
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<th>Signature</th>
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<tr>
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This is a capstone course that integrates students’ acquired competencies in research, systems planning, analysis and design, cost estimates, scheduling, and oral and written communication. The main requirement is a practice-oriented group design project incorporating multiple constraints - codes and standards, ethical, environmental, societal, and legal found in the different disciplines of CE. At the final stage of the design project study, each group is required to submit a written report and make an oral defense of their design project.

The CE capstone project must be actual and current needs of an individual or organization or institution etc. The actual challenges and constraints that will be encountered in the preparation of the project will prepare the student to actual scenarios in real life preparation for project proposals.

This includes the following but not limited to:

1. area of the land available
2. cost of the project willing to be spent by the beneficiary
3. structural design of the structure
4. geotechnical design and analysis such as the type of foundation applicable due to the type of soil in the site
5. environmental concern
6. transportation impact assessment
7. safety of the design
8. value engineering
9. project management
10. Social constraint
11. Innovative design
12. Sustainable
13. Energy saving input
14. etc.

Will the infinitely varied conditions of the projects critical thinking, will be developed. These challenges must be overcome and must be solved by the students to prepare them for their future work. The class will be divided into groups with a maximum of three members. Faculty as project consultant must guide and advise the group. At the final presentation of the capstone project, a set of three panel members with at least one of whom is an expert on the track of specialization will evaluate and assess the project. Approval of the said panel members is a need to pass the course.

Follow the 3 BIDS = 3 Fields of Engineering, Beneficiary, Innovation, Design and Sustainability of the Project. (Previously this is 3BIRDS but R=research was separated from the equation and will be dealt with the Thesis courses).

Three (3) in the equation means

1 major field of Specialization and 2 minor fields of Specializations

**Field of Specializations**

1. Structural Engineering
2. Construction Engineering
3. Environmental Engineering
4. Geotechnical Engineering
5. Transportation Engineering
6. Water Engineering

**Workouts:**

**WO#1** Scout for a beneficiary which excludes 2nd degree of consanguinity. The beneficiary may be a government organization (DEP Ed, DENR, DFA, NHA, SSS, GSIS, DPWH, DAR, NFA, PICE, PNRC, NDMRCC DBM, local municipality, provincial, religious, non-government, etc.) that may have projects to implement where you can help. Dead line: ASAP

**Faculty adviser for your CE Project must be notified and a documented approval must be submitted to the course adviser as soon as possible.**

**WO#2** Research the different provisions of a green building as well sustainable development for different types of building/infrastructure. Incorporate in your capstone project all provisions that may help improve the green building/sustainable development rating of your project. This may include but not limited to the use of LED lights, water harvesting system, water treatment, solar panel, wind turbine, bike lanes, roofing system to improve ventilation, innovative building materials, traffic impact assessment etc. Dead line: 2nd week
WO#3 Collect Soil Investigation report of the different structures in any locality and identify what type of foundation is recommended for that particular structure/project. Summarize the soil investigation report and be able to extract important findings in the report such as but not limited to the soil bearing capacity of the location. **Dead line: 2\textsuperscript{nd} week**

WO#4 For students who wish to have **Structural Engineering** as their major track, you have to submit a sample structural plan of a certain building with a minimum of three stories which have been implemented/constructed already. Submit your own structural analysis and calculation for the project using STAADPro or ETABS or any structural program available as free ware. Compare and identify the similarities/difference in your design and the actual plan. This will assess your skills in design and analysis of a structure.

In the case of students with a different track, such as **Transportation Engineering** track, a sample traffic impact assessment of an existing major thorough fare/road will be required.

For students opting to choose **Geotechnical Engineering** track, conduct of soil investigation or slope protection analysis and design will be required.

When students choose the **Environmental Engineering** Track, an analysis of a water treatment facility or any environmental assessment project as advised by their faculty consultant is required for their preparation on their actual project.

For students choosing the **Construction Engineering track**, a sample project preparation analysis and scheduling will be required for their preparation on their capstone project.

For students choosing the **Water Engineering track**, a sample water project preparation analysis such as water supply for a certain village or water treatment facility analysis and design will be required for their preparation on their capstone project.

**Dead line: 3\textsuperscript{rd} week**

**ACTUAL CAPSTONE PROJECT:**

Submit your CE Project proposal design with the endorsement of the beneficiary and approval of your adviser on the 2\textsuperscript{nd} week to be assessed by the faculty course coordinator. Weekly progress report must be submitted to evaluate the work of the group. Final project must be submitted in tracing paper 15”x20” using CAD output and complete structural calculation in short size bond paper.

**GRADES:**

70% of your grade will be dependent on the capstone project while the 30% will be derived from the workouts.
1. Title of the school’s programme
CE200L – CE200-2L: Civil Engineering Project with 3BIRDS Criteria

2. Summary of the programme

Civil Engineering (CE) Project is a capstone course in planning and design of Civil Engineering systems and facilities that integrates the students’ acquired competencies in research, system planning, analysis and design, cost estimates, scheduling and oral and written communications.

CE Project is divided further into three phases – CE200L, CE200-1L and CE200-2L (Fig. 1). In these phases, projects are developed upon fulfillment of the 3BIRDS Criteria (Fig. 2). A more detailed explanation of the 3BIRDS Criteria is provided on Item No. 8 of this section. Each group will be supervised a faculty member of the Institute.

During the first phase of the programme, CE200L, project identification and analysis will be made. Preliminary design and schedule of activities will be created. After completion of the activities, students will be defending their proposed topic in front of a defense panel.

Seminars, workshops and/or plant visits will be organized to further enhance the knowledge and skills of the students in preparing and designing their projects. Some seminars held include sustainable development, Building Information Modeling (BIM) and others.

During the last phase of the programme, students are expected to accomplish detailed engineering designs, which include structural drawings, design specifications, quantity take-off, bill of materials, and cash flow. A final manuscript is also expected to accomplish. After the completion of the requirements, students will defend their project in front of a defense panel. The defense panel, along with the course coordinator and beneficiary, will evaluate the project using the Assessment Rubrics provided in Attachments 2,3,4 and 5.

3. Background information or reasons why the school created this programme

This programme was created to address a graduation requirement for Accreditation Board for Engineering and Technology (ABET). Mapúa Institute of Technology applied for accreditation of its programs which include Civil Engineering last 2010. CE Project with 3BIRDS Criteria is considered to be a capstone senior design experience. With this, students are provided the opportunity to solve open-ended real world problems in Civil Engineering prior to graduation. This also bridges undergraduate students to the engineering profession.

Also, this programme attempts to provide an Outcomes-Based Education for civil engineering students. This programme is a capstone course integrating competencies acquired in research, system planning, analysis and design, cost estimates, scheduling and oral and written communications.

4. School vision, mission and core values

School Vision:
The Mapúa Institute of Technology shall be a global center of excellence in education by providing instructions that are current in content and state-of-the-art in delivery; by engaging in cutting-edge, high-impact research; and by aggressively taking on present-day global concerns.

School Mission:
The Mapúa Institute of Technology disseminates, generates, preserves and applies
knowledge in various fields of study.

The Institute, using the most effective and efficient means, provides its students with highly relevant professional and advanced education in preparation for and furtherance of global practice.

The Institute engages in research with high socio-economic impact and reports on the results of such inquiries.

The Institute brings to bear humanity’s vast store of knowledge on the problems of industry and community in order to make the Philippines and the world a better place.

School Core Values:

Mapúa Institute of Technology aims at the empowerment of the youth by providing education grounded on academic excellence and strength of character. Students are expected to develop the passion for mental knowledge and meritorious performance as well as the recognition of moral values as essential to growth of character. The integration of humanities and the social sciences into the technical curriculum has paved the way to the achievement of this goal.

Mapúa upholds the reinforcement of time honored values learned in school and at home directed towards the development in the student of a strong moral fiber that will contribute to his/her personal well-being as well as that of other members of society.

MAPÚA emphasizes the importance of the following core values:

vii. DISCIPLINE  
viii. EXCELLENCE  
ix. COMMITMENT  
x. INTEGRITY  
xi. RELEVANCE

By ensuring that these core values are learned in the classroom and outside, MAPÚA shall have done its share in producing men and women who live fulfilled and meaningful lives.

5. Objectives/goals of the programme

With the fulfillment of this programme, students are expected to

Be guided in the conduct of planning and design activities in one of the major areas of Civil Engineering taking into consideration two other areas as minor requirement;

Be engaged in real life and open-ended design problems that has impact and benefit to society;

Demonstrate abilities on the use of techniques, skills and modern tools necessary for engineering practice;

Be guided in the conduct of research activities necessary for the improvement of engineering design;
Be guided in the conduct of detailed engineering design; and

Be trained on the sustainable development concept in their design project.

6. Values that the school aims for within the programme and/or definitions

During the whole programme, the students are expected to have the following values:

**Teamwork.** The whole project is to be done by three members, at most. The group should be multi-functional and interdisciplinary to address different aspects of the project. During CE200-1L, the whole class is to conduct a seminar/workshop to further enhance their project.

**Communication.** The project involves data collection, which includes conducting interviews, providing surveys and questionnaires and gathering documents. In these practices, oral and written communication shall be exercised. Communicating to adviser/s, course coordinator, beneficiaries and other professionals is necessary to complete the programme. Lastly, manuscript will be prepared at the completion of the project. Oral presentation will be done for their defense. Questions will be raised by respected panel members.

**Critical thinking.** With an open-ended real world problem, the group can explore with limitless solutions to a specific problem. The group will evaluate each possible solution and determine the most applicable to the situation.

**Professionalism.** As a bridge course to the engineering profession, this programme gives the best training to their profession. Ethical responsibility will be shown while writing the manuscript by employing necessary caution on intellectual property and plagiarism. This will also be imparted while dealing with other professionals and their beneficiaries. Legal details will also be incorporated in the project by considering National Building Code of the Philippines, National Structural Code of the Philippines and other codes used in designing structures.

**Social Responsibility.** The programme involves beneficiaries. The group will identify their beneficiaries, both direct and indirect. With this, students are aware of the needs and challenges of the society that surrounds them. They become more observant and eager to find ways to provide better solutions to existing problems. Also, sustainable development concepts are incorporated to their designs.

7. Period of the time when the programme was or has been implemented

This project is being implemented since November 2010. This project started on the 2nd Term of the Academic Year 2010 – 2011.

8. Activities (Actions and strategies of implementation)

This programme is further divided into three phase, namely CE Project 1, CE Project 2 and CE Project 3. This is shown in the figure below where before completion of each the succeeding components, the previous must be accomplished.
Fig. 1: Divisions of the CE Project

The project is developed with respect to the 3BIRDS Criteria. This could be explained by the figure below.
The 3BIRDS Criteria of the CE Project means:

- **3.** The three areas of civil engineering that must be explored and covered by the study. Students are to choose one among Structural, Transportation, Construction, Geotechnical, Water Resources and Environmental Engineering, as their major area and two other areas as minor areas in civil engineering.

- **B.** Beneficiary. Having identified their areas to be explored, students determine their target beneficiary where structures or systems may be employed. For example, students identified to have a low-cost housing project with rainwater harvesting system as their study. Their beneficiary will be National Housing Association (NHA), which the students will consult regarding their proposal.

- **I.** Innovation. With the chosen project, students are to choose low-cost materials for their structures. With this initiative, students are expected to look for new materials that will perform the same manner conventional materials work but will require less impact on the budget of the project.

- **R.** Research Component. With numerous rainwater harvesting systems available today, students are expected to research on the best system and how this will be incorporated in the design of the structures. Literature review, surveys, interviews and other ways of data gathering are to be done by the students.
D. Design Component. Having consulted the target beneficiary, adviser/s and other professionals, students are to create detailed engineering designs (DED), which include complete structural design, engineering drawings, design specifications, quantity take-off, bill of materials, and cash flow.

S. Sustainable Development. Rainwater harvesting system of the structure provides a sustainability component for its needs. With proper treatment on the system to treat rainwater, this could be used for the daily activities of the occupants of the structure.

During the first phase, CE200L, students are expected to come up with their proposed topics considering the 3BIRDS Criteria. Having known this, the first phase is further divided into three activities:

1. Project Identification. Students are to determine their project and its background. They will identify the problems and challenges on their project and may employ SWOT Analysis on the project.

2. Project Analysis. After identification the strengths, weaknesses, opportunities and threats of the project, design criteria will be establish to scope and limitations of the project. Researches will be made to determine possible solutions to the challenges. Literature review will be used to assess these alternatives. Beneficiaries will be determined.

3. Preliminary Design. With the result of the project analysis, students are going to design the structure or system employing the chosen alternative. Preliminary drawings and schedule of activities will be the results of this activity.

After accomplishing the following activities, the second phase is about to commence. In this phase, seminars, workshops and/or plant visits will be conducted to further enhance the knowledge and skills of the students in preparing and designing their projects.

On the last phase of this programme, students are to complete the design of their project. They are expected to generate complete structural design, engineering drawings, design specifications, quantity take-off, bill of materials, cash flow and final manuscript of their report.

After completion of the manuscript, students are to defend their project in front of a defense panel. The panel, along with the course coordinator and direct beneficiary, will evaluate the project based on the written and oral report. Rubrics in evaluation are attached.

9. Teaching strategies or pedagogies used for teaching values in the school

In teaching the said values in this programme, the following teaching strategies are used

a. Group Discussion. A group is comprised of three members. The group is going to develop a project in line with the 3BIRDS Criteria. Discussions will be made on the details of their project.

b. Brainstorming. With the established constraints and challenges on the project, the group is to determine the alternatives and brainstorm on the best solution to the problem.

c. Seminar. On the second phase of the programme, a seminar is to be conducted. In this seminar, discussion on how to improve their projects is made.

d. Defense. Proposal and final defenses will show the accomplishments of the group on the development of the project.

e. Immersion. The group will go to their beneficiaries and consult with other professionals in relation to their project. In this strategy, students will be engaged in the practice of the profession.
The table below shows what values a specific teaching strategy is attained.

<table>
<thead>
<tr>
<th></th>
<th>Teamwork</th>
<th>Communication</th>
<th>Critical Thinking</th>
<th>Professionalism</th>
<th>Social Responsibility</th>
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<td>☑️  ☑️</td>
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**Table 1. Teaching Strategies vs. Teaching Values**

10. Programme monitoring and evaluation mechanisms and summary of results

Programme monitoring and evaluation mechanisms:

The whole programme is monitored by the course coordinator. The course coordinator observes the group and how the students choose their desired topics and projects. After the approval of the course coordinator to the proposed topics, the group will determine their adviser/s. The project, on the other hand, is administered by the advisers. Consultations regarding their proposed topics are done with the advisers weekly. Instructions are made through Yahoo! Groups or other Learning Management Systems (LMS) such as Moodle and Canvas.

The programme is continuously monitored and evaluated using the rubrics attached in this document (Attachments 2 – 5). The assessment is made by the defense panel, beneficiaries and students aligned to the student outcomes prescribed in the syllabus.

In Graph 1, the results of this assessment are further interpreted per performance indicator as shown in each rubric. Performance indicators 19, 20 and 21 (as shown in Table 2) are used. The first bar shows the percentage of students who have a grade of “4”, while the second bar denotes the percentage of students who have a grade of “3”.

In this evaluation, the direct assessment of the panel members and advisers for all indicators is considered.
**Graph 1. Result of the Analysis of the Evaluation of Performance Indicator**

<table>
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<tr>
<th>Student Outcome</th>
<th>Performance Indicators</th>
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<tbody>
<tr>
<td>H</td>
<td>The broad education necessary to understand the impact of engineering solutions in the global and societal context</td>
</tr>
<tr>
<td>19</td>
<td>Identifies the environmental and social issues involved in an engineering solution</td>
</tr>
<tr>
<td>20</td>
<td>Describes the economics of an engineering solution.</td>
</tr>
<tr>
<td>21</td>
<td>Discuss social values in order to make informed decisions about engineering solutions.</td>
</tr>
</tbody>
</table>

**Table 2. Student Outcome H and Performance Indicators 19, 20 and 21**
11. Resources used for programme implementation

In order to implement the programme, the following are needed

1. Logistics such as projector, white screen, timer and others for the proposal and final defenses and seminars.
2. Facilities such as the location where proposal and final defenses and seminars will be held.

Both logistics and facilities are provided by the school.

12. List of partners, local government bodies, companies or development agencies who have participated in the planning and implementation, including their roles in the activity/programme.

The following are some of the entities contributing to the success of the activity.

<table>
<thead>
<tr>
<th>Name of Partners</th>
<th>Roles or contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Mr. Rhon Zapanta</td>
<td>Grounds and Building Supervisor (St. Anthony School – Beneficiary)</td>
</tr>
<tr>
<td>b) Engr. Leilani D. Panesa</td>
<td>Consultant</td>
</tr>
<tr>
<td>c.) Reginaldo N. Reyes</td>
<td>Chairman, Committee on Infrastructure, Brgy. Kalumpang, Marikina City – Beneficiary</td>
</tr>
<tr>
<td>d.) Mr. Bernardo Santos</td>
<td>Resident, Brgy. Kalumpang – Beneficiary</td>
</tr>
<tr>
<td>e) Engr. Dindo F. Esplana</td>
<td>Consultant (Structural Design Component)</td>
</tr>
<tr>
<td>f) Hon. Sally Llanes</td>
<td>Beneficiary (Brgy. Kagawad)</td>
</tr>
<tr>
<td>g) Hon. Jose Rafael E. Diaz</td>
<td>Beneficiary (Mayor, San Mateo, Rizal)</td>
</tr>
<tr>
<td>h) Mr. Arnel S. Manresa</td>
<td>Chief, Road Transport Planning Division (San Mateo, Rizal)</td>
</tr>
<tr>
<td>i) Ms. Rodora Gamboa</td>
<td>Water Academy (Maynilad Water Services) - Beneficiary</td>
</tr>
<tr>
<td>j) Engr. Evelyn M. Hatulan</td>
<td>Municipal Engineer (Cabuyao, Laguna) – Beneficiary</td>
</tr>
<tr>
<td>k) Arch. John Peter Lo</td>
<td>Consultant (Architecture)</td>
</tr>
<tr>
<td>l) Engr. Nerlisa D. Palomar</td>
<td>HRRO V, City Planning and Development, Marikina City – Beneficiary</td>
</tr>
<tr>
<td>m) Engr. Arjay D. Tabiog</td>
<td>Registered Electrical Engineer - Consultant</td>
</tr>
<tr>
<td>n) Arch. Mabel Ongcarranceja</td>
<td>Consultant</td>
</tr>
<tr>
<td>o.) Mr. Jeffrey Acutim</td>
<td>Brgy. Kagawad (Brgy. Viente Reales, Valenzuela City) - Beneficiary</td>
</tr>
<tr>
<td>p.) Engr. Romeo Reyes</td>
<td>National Housing Authority – Beneficiary</td>
</tr>
<tr>
<td>q.) Engr. Joy F. Bernardo</td>
<td>Rizal Experimental Station and Pilot School of Cottage and Industries (RESPSCI) – Beneficiary</td>
</tr>
<tr>
<td>r.) Reginaldo N. Reyes</td>
<td>Chairman, Committee on Infrastructure, Brgy. Kalumpang, Marikina City – Beneficiary</td>
</tr>
<tr>
<td>s.) Mr. Bernardo Santos</td>
<td>Resident, Brgy. Kalumpang – Beneficiary</td>
</tr>
</tbody>
</table>

13. Benefits/Impacts/ positive outcomes of the activity/programme to teachers, students, parents and the community

The benefits on the students are reflected by achieving the course objectives. Also, when students acquire and reinforce the values they already have, the impact on the students is shown. This is difficult to show but the other competencies may be reflected on the sample CE Project (Attachments 9 and 10),
SCEGE Symposium (Attachment 11) and Certifications (Attachment 12).

Teachers, professors and advisers of the different groups are abreast with latest technologies used in the industry where their beneficiaries are using. This programme also provides an opportunity for them to help students in bridging undergraduate to their engineering profession.

Lastly, the community benefits from the developed projects by providing alternate solutions to their existing problems. New systems and structures are proposed for the development of the community.

14. Proof of achievement from students, teachers and the community

As discussed on the previous section, Attachments 9, 10, 11 and 12 will show the proof of achievement for the students.

Attachment 12, which shows the certification of the beneficiaries, indicates the consultation of the students to their beneficiaries.

15. Plan for sustainability and plan for the future

Plan for sustainability:

This programme will continue to promote teamwork, critical thinking, good communication, professionalism and social responsibility by ensuring the programme is handled by a permanent faculty. There are about four faculty members who can administer the course.

This programme also will continue to aspire for excellence in the next years since this programme is embedded on the curriculum of civil engineering students.

Plan for the future:

The School of Civil, Environmental and Geological Engineering (SCEGE) aims to conduct a study on what percentage of projects are being realized. More studies will be conducted to harness the programme with values needed by the students in the future.

16. List of attachments such as a copy of the school plan, learning/ teaching materials, samples of student worksheet, manual, etc. If the attached materials are in the local language, please provide a brief description in English language.

Attachment 1) CE200L, CE200-1L and CE200-2L Syllabi
Attachment 2) Outcomes-Based Assessment Rubrics for Panel Members and Course Coordinator
Attachment 3) Outcomes-Based Assessment Rubrics for Beneficiary
Attachment 4) Outcomes-Based Assessment Rubrics for Leadership
Attachment 5) Outcomes-Based Assessment Rubrics for Teamwork
Attachment 6) List of Students, Faculty Advisers, Panel Members and title of their CE Project
Attachment 7) CE Project Frequently Asked Questions (FAQs)
17. Photos related to the activity/programme
Four Storey Multi-Purpose Building with a Built-in Rainwater Harvesting System
Location of the Four Storey Multi-Purpose Building with a Built-in Rainwater Harvesting System
Students at Plenary Hall for Sustainable Development Seminar on September 25, 2012