Republic of the Philippines
BATANGAS STATE UNIVERSITY
BatStateU Alangilan
Alangilan, Batangas City
College of Engineering, Architecture and Fine Arts
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CURRICULUM
Master of Science in Energy Engineering (MSEgyE)

Academic Year 2021-2022
Reference CMOs: 15 Series of 2019: Policies, Standards and Guidelines for Graduate Programs

Curriculum Description

Electricity from renewable sources is one of today's main challenges. In many countries, the need for local electricity generation is high, while greenhouse gas emissions globally need to be significantly reduced. Solar, wind, hydropower or bioenergy can be solutions for both electricity and energy supply, which can be selected based on local conditions. The Master of Science in Energy Engineering program prepares the students with the future issues of alternative engineering production. With this comprehensive education in the field of renewable energy, one may acquire knowledge and competence for the design of plants for the use of renewable energy sources from an economic and legal point-of-view, the operation of plants and the future assessment of environmental, technical and economic developments of renewable energy systems. The intent of this program is to train the next generation of renewable and clean energy engineers and to develop research in the area of renewable and clean energies.

Program Educational Objectives of Energy Engineering (PEO)

The MS Energy Engineering alumni three to five years after graduation shall:

1. **Specialist.** Practiced as a high-level in solving complex energy engineering problems leading to improvements and innovations, while taking into consideration the environmental, social, and economical requirements.

2. **Professionalism and Leadership.** Assumed leadership position in industry, academe, government, or private sector with consideration to social and ethical responsibility.

3. **Lifelong Learning.** Engaged in lifelong learning through further studies, research, certifications, promotions, and other personal and professional development activities.

Institutional Graduate Attributes (IGA)

The student should achieve at least 75% for each IGA upon graduation

1. **Knowledge Competence.** Demonstrate a mastery of the fundamental knowledge and skills required for functioning effectively as a professional in the discipline, and an ability to integrate and apply them effectively to practice in the workplace.

2. **Creativity and Innovation.** Experiment with new approaches, challenge existing knowledge boundaries and design novel solutions to solve problems.

3. **Critical and Systems Thinking.** Identify, define, and deal with complex problems pertinent to the future professional practice or daily life through logical, analytical and critical thinking.

4. **Communication.** Communicate effectively (both orally and in writing) with a wide range of audiences, across a range of professional and personal contexts, in English and Pilipino.

5. **Lifelong Learning.** Identify own learning needs for professional or personal development; demonstrate an eagerness to take up opportunities for learning new things as well as the ability to learn effectively on their own.

6. **Leadership, teamwork, and Interpersonal Skills.** Function effectively both as a leader and as a member of a team; motivate and lead a team to work towards goal; work collaboratively with other team members; as well as connect and interact socially and effectively with diverse culture.

7. **Global Outlook.** Demonstrate an awareness and understanding of global issues and willingness to work, interact effectively and show sensitivity to cultural diversity.

8. **Social and National Responsibility.** Demonstrate an awareness of their social and national responsibility; engage in activities that contribute to the betterment of the society; and behave ethically and responsibly in social, professional and work environments.

Students Outcomes

The following skills, knowledge, and behaviors are expected to be attained by the students as they progress through the program:

1. **Knowledge Competence.** Demonstrate a comprehensive and broad understanding of energy engineering principles and apply advanced knowledge in the specific engineering discipline;

2. **Critical and System Thinking.** Analyze, synthesize, create and evaluate the challenges in energy engineering practice;

3. **Design and Analysis.** Design components, devices, and systems to meet specified engineering needs under real–world constraints;

4. **Communication.** Communicate effectively the technical knowledge, both orally and in writing, on complex energy engineering activities;

5. **Leadership and Teamwork.** Function effectively as an individual, a team member, or as a leader in diverse work environments;

6. **Creativity and Innovation.** Contribute to the generation, dissemination and preservation of knowledge, methodologies, techniques, and processes;

7. **Lifelong Learning.** Engage in continuous professional development and lifelong learning endeavors;

8. **Ethics and Professionalism.** Conduct oneself within professional and ethical standards; and

9. **Research.** Perform independent scientific research that results in innovation with application.

CURRICULUM COMPONENTS

A. CORE COURSES (9 units)		
Course Code	**Course Title**	**Credit Unit**
ENGG 501	Computational Mathematics 1	3
ENGG 502	Computational Mathematics 2	3
MSRM 501	Research Methodology	3
B. SPECIALIZATION COURSES (9 units)		
Course Code	**Course Title**	**Credit Unit**
MSEgyE 511	Bioenergy Engineering	3
MSEgyE 512	Solar Energy Engineering	3
MSEgyE 513	Wind, Hydro and Ocean Energy Conversion System	3
C. THESIS COURSES (6 units)		
Course Code	**Course Title**	**Credit Unit**
MSEgyE 531	Master Thesis 1	3
MSEgyE 532	Master Thesis 2	3
D. ELECTIVE COURSES (6 units)		
Course Code	**Course Title**	**Credit Unit**
MSEgyE 501	Energy Management	3
MSEgyE 502	Energy Technology Assessment	3
MSEgyE 503	Design and Simulation of Energy System	3
MSEgyE 504	Waste Heat Recovery and Cogeneration	3
MSEgyE 505	Energy Economics and System Evaluation	3