



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 Advanced Manufacturing (MSAM)**

Academic Year 2021-2022

Reference CMOs: 15 Series of 2019: Policies, Standards and Guidelines for Graduate Programs

### **Curriculum Description**

The Advanced Manufacturing MSc degree is focused on providing students with a unique learning opportunity to develop in-depth knowledge, skills and competencies in advanced manufacturing, particularly those whose interest is to grow in the dynamic field of manufacturing that ranges from semiconductor/food/beverage/automotive process engineering, new product introduction, and factory management to supply chain design and implementation. (MIT) It is a graduate academic degree program consisting of progressive studies in advanced manufacturing with the primary purpose of contributing to the generation, production and advancement of knowledge. Built on global research and expertise, this degree addresses the required courses concerning advanced manufacturing industries including advanced design, manufacturing technologies including manufacturing simulation and robotics, sensors and measurements, quality engineering management and supply chain management. The Program aims to produce leaders with technological knowledge in modern manufacturing systems. This will enhance the ability of graduates to increase the performance and profitability of manufacturing companies through the use of modern automated systems and management. This will provide the basis for an effective career as managers who can meet the challenges of rapidly changing manufacturing industries. Graduates of this program are in various manufacturing industries of electronics/semiconductor, automotive, food and beverage, oil and gas, and power as well as in research institutions and government sectors. The program includes 9 credits of core courses, 9 credits of specialization courses, 6 credits of elective courses, and 6 credits of theses. The program will adopt outcome-based education (OBE) framework with flipped classroom and other blended learning pedagogies.

### **Program Educational Objectives of Advanced Manufacturing (PEO)**

The MS Advanced Manufacturing alumni three to five years after graduation shall:

1. **Specialist.** Practiced as a high-level in solving complex advanced manufacturing 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 advanced manufacturing principles and apply advanced knowledge in the specific engineering discipline;
2. **Critical and System Thinking.** Analyze, synthesize, create and evaluate the challenges in advanced manufacturing 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 advanced manufacturing 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

<b>A. CORE COURSES (9 units)</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Unit</b>
ENGG 501	Computational Mathematics 1	3
ENGG 502	Computational Mathematics 2	3
ENGG 503	Design of Experiments and Data Analytics	3
<b>B. SPECIALIZATION COURSES (9 units)</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Unit</b>
MSAM 501	Manufacturing Systems	3
MSAM 502	Design for Environment, Manufacture and Assembly	3
MSAM 503	Seminars in Advanced Manufacturing	3
<b>C. THESIS COURSES (6 units)</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Unit</b>
MSAM 513	Thesis I	3
MSAM 514	Thesis II	3
<b>D. ELECTIVE COURSES (6 units)</b>		
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Unit</b>
MSAME 501	Logistics and Supply Chain Management	3
MSAME 502	Product Design and Modeling	3
MSAME 503	Digital Fabrication and Additive Manufacturing	3
MSAME 504	Manufacturing Materials	3
MSAME 505	Industrial Robotics	3
MSAME 506	Finite Element Analysis	3
MSAME 507	Computer Aided Manufacturing and CNC	3
MSAME 508	Special Topics 1	3
MSAME 509	Special Topics 2	3