



Republic of the Philippines
BATANGAS STATE UNIVERSITY

ARASOF-Nasugbu
Nasugbu, Batangas

College of Arts and Sciences

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BACHELOR OF SCIENCE IN FISHERIES AND AQUATIC SCIENCES CURRICULUM

University Vision

A premier national university that develops leaders in the global knowledge economy

University Mission

A university committed to producing leaders by providing a 21st century learning environment through innovations in education, multidisciplinary research, and community and industry partnerships in order to nurture the spirit of nationhood, propel the national economy, and engage the world for sustainable development

University Core Values

Leading Innovations, Transforming Lives. This is the official tagline or motto of the university. It was registered at the Intellectual Property Office of the Philippines on April 15, 2016 with Certificate of Registration No. 4/2014/00013632. This is used in all official publications, newsletters, pamphlets, and brochures published by the University, as well as in official university merchandise sold at the University Shop. It carries with it the University's long-standing tradition of service, excellence, and virtue, as specified in its official seal, and is anchored on the goal of maximizing its relevance and transformative impact through innovations in instruction, research, and community service.

Patriotism. This value extends from promoting love of country to taking pride in being a Filipino. The University advocates a strong sense of commitment to national ideals through its active promotion of the Philippine culture and heritage, as well as concern for the environment and the nations, all of which lead to the creation of a pool of professionals who are instrumental for nation building.

Integrity. This pertains to the University's steadfast adherence to morally-sound principles and ideals in the pursuit of institutional goals and objectives. It covers the values of accountability, honesty, righteousness, incorruptibility, and decency in the governance and implementation of academic, administrative, financial policies.

Excellence. This represents the drive of the University to pursue greatness. It includes the cultivation of a culture of excellence in the hearts and minds of the stakeholders, and the continuous improvement in the systems by which the University operates on. This value pushes the institution to go beyond the standard levels of performance, and be in a position of leadership that would inspire the people and other institutions to serve the country in the highest degree.

Service. This refers to the genuine desire of the University to respond to the growing needs of the community. It encompasses the selfless performance of the University's mandates, and its

duty to constantly meet the challenges of development in the country in the spirit of uplifting the lives of the Filipino people.

Resilience. This refers to the ability to conquer the different challenges, hardships and tests of time. This value encompasses the commitment of the University to support the government in pursuing sustainable development, and foster disaster risk reduction and management by dedicating its efforts towards strengthening readiness and capacity of the community and its people.

Faith. The University’s initiatives and activities are guided by a strong faith in a Supreme Being. These are anchored on high regard and respect for the beliefs and orientation of each member of the academic community for a productive and meaningful co-existence.

Philosophy or Rationale of the Program

Based on the Guidelines for the Implementation of CMO No. 46, Series of 2012, the BS Fisheries PSG implements the “shift to learning competency-based standards/outcomes-based education.” It specifies the “core competencies” expected of BS Fisheries graduates “regardless of the type of Higher Education Institution they graduated from.” However, in “recognition of the spirit of outcomes-based education and of the typology of HEIs,” the PSG also provides “ample space for HEIs to innovate the curriculum in line with the assessment of how best to achieve learning outcomes in their contexts and their respective missions...” In addition, with the implementing integration of the ASEAN economies, it is also important to make the BS in Fisheries curriculum compliant with the regional standards so the graduates may be able to practice their profession throughout the ASEAN Region and vice-versa. Likewise, it also enhances the chance of graduates to pass the fisheries professional licensure examination of the Professional Regulation Commission.

Program Educational Objectives

The Program PEOs are considered attained if at least 95% of graduates achieved at least one (1) Key Performance Indicator (KPI) for each PEO.

The following are the Program Educational Objectives (PEOs) with Statements of Key Performance Indicators (KPI)

PEO 1	Globally Competitive Graduates	
	Globally competitive graduates in the areas of sustainable aquaculture, capture fisheries, post-harvest and aquatic resources and ecology	
	KPI 1	Graduates are able to recognize the need for sustaining and expanding their technical competence and engage in learning opportunities relevant to their field throughout their careers.
	KPI 2	Graduates are currently furthering or have furthered their studies like master’s and doctorate degree in fisheries and aquatic sciences and/or other allied fields.
KPI 3	Graduates are able to provide the technical and scientific fisheries and aquatic sciences’ knowledge and skills in social development projects.	
PEO 2	Fisheries Professionals	
	Fisheries professionals imbued with high level of integrity, nationalism and ethical standards	
	KPI 1	Graduates are holders of license in Fisheries or Fisheries Technology.
KPI 2	Graduates are members of an Accredited Integrated Professional Organization	

		of Fisheries Professionals and other fisheries organizations.
	KPI 3	Graduates carry out continual professional development with high regard on integrity, nationalism, and ethical standards.
PEO 3	Leadership	
	Leaders in their profession and respective communities	
	KPI 1	Graduates assume leadership position in industry, academe, community, government, or private sector with consideration to social and ethical responsibility.
	KPI 2	Graduates skillfully use participatory strategies in planning, implementing, monitoring and evaluating fisheries and aquatic sciences' programs.
	KPI 3	Graduates demonstrate management and leadership skills through ethical and sound decision making.
PEO 4	Professionalism	
	Professionals with knowledge, skills and positive attitudes in fisheries research, resource management, instruction, extension, production and marketing	
	KPI 1	Graduates are able to practice their role in fisheries and aquatic sciences in order to enhance their knowledge, skills and positive attitudes in their own fields.
	KPI 2	Graduates are active participants in developing and engaging in fisheries and aquatic sciences-driven researches, resource management, instruction, extension, production and marketing.
	KPI 3	Graduates are employed in the Bureau of Fisheries and Aquatic Resources (BFAR), in the National Fisheries Research and Development Institute (NFRDI) and affiliated with other fisheries-related offices.

Assessing the Bachelor of Science in Fisheries and Aquatic Sciences' Program Educational Objectives (PEOs) is imperative on the account that it determines whether or not the defined educational objectives were attained by the graduates after they are engaged in employment. If not, corrective and improvement actions must be taken. The following are the instruments and methods to be employed in the assessment process with reference to the BSFAS PEOs: 1) the instruments intended to be used to collect data for the assessment of PEOs may include the following: the Program/Industry Advisory Council Meetings, focus group survey (virtual or face-to-face), alumni survey (virtual or face-to-face), employer survey (virtual or face-to-face), and face-to-face meetings with alumni in their workplaces. These assessment instruments may also utilize other significant attributes including frequency of assessment, from whom the data is collected, who collects the data, how the data is maintained, and many others; 2) the data collected through the PEOs instruments are analyzed to identify clearly potential issues. A set of criteria or standards are designed based on the data in order to serve as indicators relative to the attainment of targets; 3) an Enhancement Plan consisting of a list of improvement actions are then decided based on the analysis of the findings for the non-attained targets. These improvement actions can impact any element of the BSFAS Program including the curriculum, PEOs, SOs, facilities, faculty members, and many others; 4) then another assessment cycle is conducted in order to assess whether the changes brought to the BSFAS Program based on the previous cycle's assessment have resolved the identified issues or not. The BSFAS PEOs assessment must be evidence-based. That is, each assessment applied on PEOs must be documented and kept as a proof. The involvement of the BSFAS Program Chairperson and all faculty members in the assessment process and continuous improvement is very vital.

Career Opportunities

The following are the specific professions/careers/occupation for the BSFAS graduates:

1. fisheries resource management;
2. fisheries research;
3. fisheries extension service;
4. fisheries entrepreneurship;
5. fisheries industry management;
6. fisheries education;
7. fisheries engineering;
8. fisheries nutrition; and
9. fisheries biotechnology.

Allied Programs

Its Allied Programs include:

1. Biology;
2. Zoology;
3. Botany;
4. Chemistry;
5. Aquatic Sciences;
6. Environmental Science;
7. Food Sciences;
8. Environmental Science;
9. Food Service,
10. Biotechnology;
11. Agriculture; and
12. Veterinary Medicine.

Institutional Graduate Attributes

IGA 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
IGA 2	Creativity and Innovation
	Experiment with new approaches, challenge existing knowledge boundaries and design novel solutions to solve problems
IGA 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
IGA 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 Filipino
IGA 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
IGA 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 cultures
IGA 7	Global Outlook
	Demonstrate an awareness and understanding of global issues and willingness to work, interact effectively and show sensitivity to cultural diversity
IGA 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

Student Outcomes

A Student Outcomes (SOs) are considered attained if at least 60% of the students achieved at least 75% in the assessment of a particular SO.

The graduates of the Bachelor of Science in Fisheries and Aquatic Sciences program should have developed the ability to:

SO 1	Developments in Fisheries and Aquatic Sciences	
	Articulate and discuss the latest developments in the specific field of practice	
	KPI 1	Students articulate and discuss the latest developments in the field of Aquaculture.
	KPI 2	Students articulate and discuss the latest developments in the field of Capture Fisheries.
	KPI 3	Students articulate and discuss the latest developments in the field of Post-Harvest Fisheries.
SO 2	Communication in Fisheries	
	Effectively communicate orally and in writing	
	KPI 1	Students articulate orally and in writing the basic and complex theories, principles, laws, ideas, and information effectively leading to shared understanding of Aquaculture.
	KPI 2	Students articulate orally and in writing the basic and complex theories, principles, laws, ideas and information effectively leading to shared understanding of Capture Fisheries.
	KPI 3	Students articulate orally and in writing the basic and complex theories, principles, laws, ideas and information effectively leading to shared understanding of Post-Harvest Fisheries.
SO 3	Multi-disciplinary and Multi-Cultural Teams	
	Work effectively and independently in multi-disciplinary and multi-cultural teams	
	KPI 1	Students work independently based on shared principles.

	KPI 2	Students co-create and collaborate with their peers so that all the different skill sets become complementary to each other.
	KPI 3	Students demonstrate respect and appreciation with their peers by being open to the traditions and values of other cultures.
	KPI 4	Students organize cross-cultural activities to minimize cultural barriers, to improve their social skills, and to aim their attention on common principles rather than differences.
SO 4	Professional, Social and Ethical Responsibility	
	Act in recognition of professional, social, and ethical responsibility	
	KPI 1	Students demonstrate professional responsibility in displaying professional courtesy in dealing with colleagues and stakeholders.
	KPI 2	Students demonstrate social responsibility in diverse ways such as but not limited to making commitments to promote environmental protection, preservation and conservation, and to reduce environmental footprints.
	KPI 3	Students demonstrate ethical responsibility in identifying, addressing and resolving ethical issues as they arise in the practice of the field.
	KPI 4	Students apply the learned rights, responsibilities and accountabilities in the fisheries profession to ensure maximum productivity at work.
SO 5	Historical and Cultural Heritage	
	Preserve and promote “Filipino historical and cultural heritage”	
	KPI 1	Students promote awareness and appreciation of the Filipino historical heritage through information dissemination anchored on accepted conservation standards and principles in relation to the field of historic conservation.
	KPI 2	Students promote and preserve various Indigenous Knowledge Systems (IKS) in relation to fisheries and aquatic sciences’ practices employed by the various minority/cultural groups in the Philippines.
	KPI 3	Students identify and record tangible forms of Filipino heritage relative to fisheries practices.
KPI 4	Students identify and record various endemic fisheries (marine and freshwater) species found in the Philippines as part of historical and cultural heritage.	
SO 6	Formulation of Fisheries Plans and Programs	
	Formulate plans and programs in the conservation, protection, development and sustainability of resources, and in the marketing of products	
	KPI 1	Students formulate plans relative to the conservation, protection, development and sustainability of aquatic marine resources.
	KPI 2	Students involve themselves in the implementation of programs related to conservation, protection, development and sustainability of aquatic resources.
	KPI 3	Students involve themselves in monitoring the programs related to conservation, protection, development and sustainability of fisheries and aquatic resources.
	KPI 4	Students develop and market products for sustainable livelihood.
SO 7	Education, Research, Development, and Extension-Related Activities	
	Engage in activities related to education and/or research-development-extension continuum	

	KPI 1	Students engage themselves in academic-related activities.
	KPI 2	Students engage themselves in research-related activities.
	KPI 3	Students engage themselves in development-related activities.
	KPI 4	Students engage themselves in extension and community involvement activities.
SO 8	Development, Operation and Management of Aquaculture	
	Develop, operate and manage aquaculture using innovative fishing methods which are responsible and sustainable	
	KPI 1	Students develop, operate and manage aquaculture facilities such as fishponds, hatchery, fish cages/pens using innovative fishing methods.
	KPI 2	Students produce aquatic plants and animals in a cost-effective manner.
	KPI 3	Students provide and monitor the necessary environment and nutritional requirements of aquatic resources for desired growth and survival of the stock.
	KPI 4	Students maintain a healthy and wholesome fish stock and detect and manage fish diseases.
SO 9	Utilization of Fisheries Resources	
	Utilize fisheries resources using innovative fishing methods which are responsible and sustainable	
	KPI 1	Students actively engage themselves in the implementation of the Philippine's Fisheries Law and policies.
	KPI 2	Students determine data and catch reconstruction to be used in implementing open and close fishing seasons.
	KPI 3	Students encourage sustainable fisheries management through the use of responsible and sustainable fishing methods such as spearfishing and cast-net fishing.
	KPI 4	Students engage themselves in the use of updated scientific monitoring systems and information technologies for a sustainable fish catch and marketing.
SO 10	Application of Post-harvest Practices	
	Apply post-harvest practices that are compliant to international standards for food safety and quality	
	KPI 1	Students acquire sound knowledge of food safety practices, and post-harvest handling of fishery and other aquaculture products to increase their nutritional value.
	KPI 2	Students acquire sound knowledge in the selection of post-harvest technologies appropriate to situations and in extending appropriate levels of post-harvest information.
	KPI 3	Students acquire sound knowledge in packing, storage, marketing strategy and transportation of fisheries and other aquaculture products to increase its value, economic activity and livelihood of the fishery sector.
	KPI 4	Students apply various post-harvest practices that are compliant to international standards for food safety and quality geared towards food security, economic security, human health and well-being, knowledge transfer and capacity building, and many others.

SO 11	Management and Protection of Aquatic Ecosystem and Resources	
	Manage and protect the integrity and quality of aquatic ecosystems and resources	
	KPI 1	Students formulate plans and programs for the management and protection of the local aquatic ecosystems and resources.
	KPI 2	Students actively engage in the management and protection of aquatic ecosystems through information dissemination in the community anchored on accepted conservation standards and principles.
	KPI 3	Students conduct fishery assessment and support local fisheries to help maintain healthy populations of fish and aquatic resources in the community.
KPI 4	Students actively engage in the protection of the integrity and quality of aquatic ecosystems and in various research projects on catch documentation to be used in the reduction of illegal fishing.	

The Student Outcomes are being assessed through the following tools: Major Requirements such as: Midterm Examination, Final Examination, Semestral Project, and Additional Requirements such as Assignments, Projects, Reports, Term Papers, Case Studies, Class Involvement and Participation, Quizzes, Seatwork, and other assessment methods applicable to the course.

Teaching, Learning and Assessment Pedagogies

The Bachelor of Science in Fisheries and Aquatic Sciences curriculum adheres to a learner-centered paradigm. It begins with clearly stated competencies the students must acquire and demonstrate at the end of the four-year program. Appropriate teaching-learning strategies facilitate the acquisition of these competencies. Under this paradigm, students are the subject of the learning process enabling them to achieve their full potential. The teaching-learning process is interactive, participatory, collaborative, and experiential. The teacher is a mentor, facilitator and collaborator.

The following methodologies/strategies are utilized in the delivery of Bachelor of Science in Fisheries and Aquatic Sciences courses: lectures and discussions, digital /online activities as blended learning strategies, laboratory experiments, film showing, Focused Group Discussion, soil and water analysis, conduct of pond culture and hatchery trials, evaluation of potential culture sites, design/cost estimates of aquaculture production facilities such as hatchery, pond, cage, pen, submission of business plan for aquaculture production, immersion in commercial aquaculture operations, fabrication of fishing gears, participation in commercial and municipal fishing operations, chemical evaluation of aquatic products, observation of fish processing operations, visit/observation of fishing port/fish landings/fish trading centers, field work with course-relevant outputs/exposure/field trips (if applicable), conduct of thesis/special problem/On-the-Job Training with performance evaluation, journal, and internship program assessment/, and many others. The use of Massive Open Online Courses (MOOC) and Open Educational Resources to enhance teaching and learning process is promoted and pursued.

The potential 21st Century Skills that could be achieved upon completion of the BSFAS courses highlights a broad set of knowledge, skills, work habits, and character traits that are perceived by educators, academic reformers, university professors, employers, and others to be critically significant to success in today's world, particularly in collegiate programs and contemporary careers and workplaces. These skills can be applied in all academic courses, and in all educational, career, and civic settings throughout a student's life.

Each 21st Century Skill is broken into one of three categories: Learning skills, Literacy skills, and Life skills. The Learning skills (the four C's) teaches students about the mental processes required to adapt and improve upon a modern work environment. The Literacy skills (IMT) underscores how students can discern facts, publishing outlets, and the technology behind them. There's a strong focus on determining trustworthy sources and factual information to separate it from the misinformation that floods the Internet. The Life skills (FLIPS) emphasizes

the intangible elements of a student’s daily life. These intangibles centers on both personal and professional qualities. Altogether, these categories cover all twelve 21st Century Skills that contribute to a College student’s future career.

The 4 C's of 21st Century Skills include: 1) Critical Thinking Skills: Finding solutions to problems (critical thinking, problem solving, reasoning, analysis, interpretation, synthesizing information); 2) Creativity Skills: Thinking outside the box (creativity, artistry, curiosity, imagination, innovation, personal expression); 3) Collaboration Skills: Working with others (teamwork, open-mindedness, long-term thinking, constructive criticism); and 4) Communication Skills: Talking to others (oral and written communication, public speaking, presenting, and listening).

The three 21st Century literacy skills are: 1) Information Literacy Skills: Understanding facts, figures, statistics, and data (academic and research writing skills, critical thinking skills, computer technology skills and communication skills); 2) Media Literacy Skills: Understanding the methods and outlets in which information is published (theoretical skills, applied skills, contextual skills, and communication skills); and 3) Technology and Data Literacy Skills: Understanding the machines that make the Information Age possible (information and communication technology literacy, computer programming, data sources, data terms and data knowledge, data interpretation, curiosity and passion for data).

The five 21st Century life skills consist of: 1) Flexibility Skills: Deviating from plans as needed (adaptability, values, proactivity, mindfulness, diverse skills, optimism and resilience); 2) Leadership Skills: Motivating a team to accomplish a goal (analytical decision making, communication, delegation, teamwork, adaptability, creative problem-solving, trustworthiness, technology savviness); 3) Initiative Skills: Starting projects, strategies, and plans on one’s own (thinking ahead and taking action, self-starter, self-motivated or proactive, self-direction, self-discipline); 4) Productivity Skills: Maintaining efficiency in an age of distractions (setting and meeting goals, prioritizing needs, managing time and distractions, working ethically, collaborating and cooperating with colleagues and clients, economic and financial literacy, entrepreneurialism); and 5) Global, Cultural Awareness and Social Responsibility Skills: Meeting and networking with others for mutual benefit (global awareness, multicultural literacy, humanitarianism, civic and ethical responsibility, social-justice literacy, environmental and conservation literacy, ecosystems understanding).

Cognizant of the concept that the 21st Century Skills is anchored on the belief that teaching students the most relevant, useful, in-demand, and universally applicable skills, it is noteworthy to mention that these skills are prioritized in today’s Higher Education Institutions specifically in BatStateU ARASOF-Nasugbu Campus College of Arts and Sciences.

Curriculum Structure

COURSES	UNITS	TOTAL
A. General Education Courses		27
GEd 101 - Understanding the Self	3	
GEd 102 - Mathematics in the Modern World	3	
GEd 103 - The Life and Works of Rizal	3	
GEd 104 - The Contemporary World	3	
GEd 105 - Readings in Philippine History	3	
GEd 106 - Purposive Communication	3	
GEd 107 - Ethics	3	
GEd 108 - Art Appreciation	3	
GEd 109 - Science, Technology and Society	3	
B. General Education Electives		12
FILI 101 - Kontekswalisadong Komunikasyon sa Filipino	3	
FILI 102 - Filipino sa Iba’t Ibang Disiplina	3	
LITR 101 - Sosyedad at Literatura / Panitikang Panlipunan	3	
LITR 102 - ASEAN Literature	3	
C. Physical Education (PE) 1 to 4	8	8
PE 105 - Basic Swimming	2	

COURSES	UNITS	TOTAL
PE 106 - Survival Swimming	2	
PE 107 - Boating and Life Saving	2	
PE 108 - Scuba Diving	2	
D. National Service Training Program (NSTP) 1 and 2	6	6
NSTP 101 - National Service Training Program 1		
NSTP 102 - National Service Training Program 2		
E. Foundation (Core) Courses		26
FAS - FC 101 - Zoology	5	
FAS-FC 102 - Inorganic Analytical Chemistry	5	
FAS- FC 103 - Organic Chemistry	5	
FAS - FC 104 - Botany	5	
FAS - FC 105 - Microbiology	3	
FAS - FC 106 - Biochemistry	3	
F. Professional (Major) Courses		82
FAS - PC 101 - General Fisheries	3	
FAS - PC 102 - Fisheries Meteorology	3	
FAS - PC 103 - Oceanography	3	
FAS - PC 104 - Physiology of Aquatic Organisms	3	
FAS - PC 105 - Ichthyology	5	
FAS - PC 106 - Aquatic Ecology and Resources	5	
FAS - PC 107 - Aquaculture	5	
FAS - PC 108 - Aquaculture Engineering	3	
FAS - PC 109 - Fish Nutrition	3	
FAS - PC 110 - Fish Health Management	3	
FAS - PC 111 - Fish Genetics and Breeding	3	
FAS - PC 112 - Post-Harvest Fisheries	5	
FAS - PC 113 - Fishery Products, Safety and Quality	3	
FAS - PC 114 - Capture Fisheries	5	
FAS - PC 115 - Fisheries Laws, Policies and Regulations	3	
FAS - PC 116 - Thesis Writing 1	3	
FAS - PC 117 - On-the-Job Training/ Special Problem (Survey/Experiments)	3	
FAS - PC 118 - Project Development and Management	3	
FAS - PC 119 - Fisheries Management	5	
FAS - PC 120 - Thesis Writing 2	3	
FAS - PC 121 - Coastal Resource Management	3	
FAS - PC 122 - Fisheries Entrepreneurship	3	
FAS - PC 123 - Fisheries Extension	3	
FAS - PC 124 - Seminar on Current Fisheries Breakthroughs	1	
G. Elective Courses		18
FAS - ELECT 101 - Advanced Fisheries Statistics	3	
FAS - ELECT 102 - Fish Stock Assessment	3	
FAS - ELECT 103 - Geographic Information System and Remote Sensing for Fisheries	3	
FAS - ELECT 104 - Ornamental Fish Culture and Marketing	3	
FAS - ELECT 105 - Hatchery Management	3	
FAS - ELECT 106 - Fisheries Trade and Marketing	3	
FAS - ELECT 107 - Fishery Product Analysis	3	
FAS - ELECT 108 - Product Development and Value Addition	3	
FAS - ELECT 109 - Philippine Fishing Grounds	3	
FAS - ELECT 110 - Aquatic Invertebrates	3	
FAS - ELECT 111 - Fisheries Biotechnology	3	
FAS - ELECT 112 - Phycology	3	
FAS - ELECT 113 - Marine Machineries	3	
FAS - ELECT 114 - Navigation and Seamanship	3	

COURSES	UNITS	TOTAL
FAS - ELECT 115 - Fishing Systems	3	
FAS - ELECT 116 - Fish Processing Plant Management	3	
FAS - ELECT 117 - Minor Fishery Products and By-Product Processing	3	
FAS - ELECT 118 - Food Engineering Applications in Fisheries	3	
FAS - ELECT 119 - Post-Harvest Handling and Low Temperature Preservation	3	
FAS - ELECT 120 - Chemical Evaluation of Water and Aquatic Products	3	
FAS - ELECT 121 - Fisheries Economics	3	
TOTAL		179

Summary	Number of Units CMO No 33, Series 2021	Number of Units BatStateU
A. General Education Courses	27	27
B. General Education Electives	12	12
C. Physical Education Courses	8	8
D. National Service Training Program	6	6
E. Foundation (Core) Courses	26	26
F. Professional (Major) Courses	76	82
G. Elective Courses	18	18
Total	173	179

**FIRST YEAR
FIRST SEMESTER**

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
GEd 101	Understanding the Self	3	3	-	-
GEd 102	Mathematics in Modern World	3	3	-	-
GEd 105	Readings in Philippine History	3	3	-	-
GEd 106	Purposive Communication	3	3	-	-
FILI 101	Kontekswalisadong Komunikasyon sa Filipino	3	3	-	-
FAS-PC 101	General Fisheries	3	3	-	-
P.E. 105	Basic Swimming	2	2	-	-
NSTP 101	National Service Training Program 1	3	3	-	-
	TOTAL	23	23	-	

**FIRST YEAR
SECOND SEMESTER**

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
GEd 103	The Life and Works of Rizal	3	3	-	-
GEd 104	The Contemporary World	3	3	-	-
FILI 102	Filipino sa Iba't Ibang Disiplina	3	3	-	-
FAS-FC 101	Zoology	5	3	6	-
FAS-FC 102	Inorganic Analytical Chemistry	5	3	6	-
FAS-PC 102	Fisheries Meteorology	3	3	-	FAS-PC 101
PE 106	Survival Swimming	2	2	-	PE 105
NSTP 102	National Service Training Program 2	3	3	-	NSTP 101
	TOTAL	27	23	12	

**SECOND YEAR
FIRST SEMESTER**

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
GEd 107	Ethics	3	3	-	-
GEd 108	Art Appreciation	3	3	-	-
LITR 101	Sosyedad at Literatura / Panitikang Panlipunan	3	3	-	-
FAS-FC 103	Organic Chemistry	5	3	6	-
FAS-FC 104	Botany	5	3	6	-
FAS-PC 103	Oceanography	3	3	-	-
FAS-PC 104	Physiology of Aquatic Organisms	3	3	-	FAS-FC 101
P.E. 107	Boating and Life Saving	2	2	-	PE 106
TOTAL		27	23	12	

**SECOND YEAR
SECOND SEMESTER**

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
GEd 109	Science, Technology and Society	3	3	-	-
LITR 102	ASEAN Literature	3	3	-	-
FAS-FC 105	Microbiology	3	2	3	FAS-FC 101 FAS-FC 104
FAS-FC 106	Biochemistry	3	2	3	FAS-FC 103
FAS-PC 105	Ichthyology	5	3	6	FAS-FC 101
FAS-PC 106	Aquatic Ecology and Resources	5	3	6	FAS-FC 101
P.E. 108	Scuba Diving	2	2	-	PE 107
TOTAL		24	18	18	

**THIRD YEAR
FIRST SEMESTER**

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
FAS-PC 107	Aquaculture	5	3	6	FAS-PC 101 FAS-PC 105
FAS-PC 108	Aquaculture Engineering	3	3	-	GEd 102
FAS-PC 109	Fish Nutrition	3	3	-	FAS-FC 106
FAS-PC 110	Fish Health Management	3	3	-	FAS-PC 105
FAS-PC 111	Fish Genetics and Breeding	3	3	-	FAS-PC 105
FAS-ELECT 10_	Elective 1	3	3	-	
TOTAL		20	17	6	

THIRD YEAR

SECOND SEMESTER

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
FAS-PC 112	Post-Harvest Fisheries	5	3	6	FAS-FC 102 FAS-FC 105
FAS-PC 113	Fishery Products, Safety and Quality	3	3	-	FAS-FC 105 FAS-PC 107
FAS-PC 114	Capture Fisheries	5	3	6	FAS-ELECT 101
FAS-PC 115	Fisheries Laws, Policies and Regulations	3	3	-	-
FAS-PC 116	Thesis Writing 1	3	3	-	FAS-ELECT 101
FAS-ELECT 10_	Elective 2	3	2	3	
	TOTAL	22	17	15	

THIRD YEAR

SUMMER

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
FAS-PC 117	On-the-Job Training/Special Problem (Surveys/Experiments)	3		200 hours	Junior Standing
	TOTAL	3		200 Hours	

FOURTH YEAR

FIRST SEMESTER

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
FAS-PC 118	Project Development and Management	3	3	2	-
FAS-PC 119	Fisheries Management	5	3	6	FAS-PC 115
FAS-PC 120	Thesis Writing 2	3	3	-	FAS-PC 116
FAS-ELECT 10_	Elective 3	3	2	3	
FAS-ELECT 10_	Elective 4	3	2	3	
	TOTAL	17	13	14	

FOURTH YEAR

SECOND SEMESTER

Course Code	Course Title	Units	Lec	Lab	Prerequisite/s
FAS-PC 121	Coastal Resource Management	3	3	-	-
FAS-PC 122	Fisheries Entrepreneurship	3	3	-	-
FAS-PC 123	Fisheries Extension	3	3	-	-
FAS-PC 124	Seminar on Current Fisheries Breakthroughs	1	1	-	-
FAS-ELECT 10_	Elective 5	3	2	3	

FAS-ELECT 10_	Elective 6	3	2	3	
	TOTAL	16	14	6	-

Curriculum Mapping

CODE	TITLE OF THE COURSE	CREDIT	SO1	SO2	SO3	SO4	SO5	SO6	SO7	SO8	SO9	SO10	SO11
A. General Education Courses													
GEEd 101	Understanding the Self	3	P	P	D	D	I						
GEEd 102	Mathematics in the Modern World	3	P	P									
GEEd 103	The Life and Works of Rizal	3	P	P		D	P						
GEEd 104	The Contemporary World	3	P	P			P						
GEEd 105	Readings in Philippine History	3	P	P		D							
GEEd 106	Purposive Communication	3	I	P	D	P			I				
GEEd 107	Ethics	3	P	P		D	D						
GEEd 108	Art Appreciation	3	P	P		D	D						
GEEd 109	Science, Technology and Society	3	P	P	D		D						
B. General Education Electives													
FILI 101	Kontekswalisadong Komunikasyon sa Filipino	3	P	D		I	I		I				
FILI 102	Filipino sa Iba't Ibang Disiplina	3	P	D			I						
LITR 101	Sosyedad at Literatura/Panitikang Panlipunan	3	P	P	P	P	I	I					
LITR 102	ASEAN Literature	3	P	P	P	P	I	I					
C. Physical Education (P.E.)													
PE 105	Basic Swimming	2	I		P								
PE 106	Survival Swimming	2	I		P								
PE 107	Boating and Life Saving	2	I		P								
PE 108	SCUBA Diving	2	I		P								
C. National Service Training Program (NSTP)													
NSTP 101	National Service Training Program 1	3	I	P	D	D	P						

CODE	TITLE OF THE COURSE	CREDIT	S01	S02	S03	S04	S05	S06	S07	S08	S09	S010	S011
NSTP 102	National Service Training Program 2	3	I	P	D	D	P						
D. Foundation (Core) Courses													
FAS-FC 101	Zoology	5	I		I		I	P	P				
FAS-FC 102	Inorganic Analytical Chemistry	5	I		I			P					
FAS-FC 103	Organic Chemistry	5	I	I	I	D		P					
FAS-FC 104	Botany	5	I		I		I	I	P				I
FAS-FC 105	Microbiology	3	I		I			I	P				
FAS-FC 106	Biochemistry	3	I		I			I	P				
E. Professional (Major) Courses													
FAS-PC 101	General Fisheries	3	I	I	I	P		P					
FAS-PC 102	Fisheries Meteorology	3	P	P									
FAS-PC 103	Oceanography	3	I	P									
FAS-PC 104	Physiology of Aquatic Organisms	3	I	P									
FAS-PC 105	Ichthyology	5	P	P									
FAS-PC 106	Aquatic Ecology and Resources	5	I	I				P					P
FAS-PC 107	Aquaculture	5	P	P		I		P		D		P	
FAS-PC 108	Aquaculture Engineering	3	P	P				P					
FAS-PC 109	Fish Nutrition	3	I	P		I	I	P	P				
FAS-PC 110	Fish Health Management	3	P	P				P					
FAS-PC 111	Fish Genetics and Breeding	3	P	P				P					
FAS-PC 112	Post-Harvest Fisheries	5	P	P				P				D	
FAS-PC 113	Fishery Product, Safety and Quality	3	I	P	P		I	I	P				
FAS-PC 114	Capture Fisheries	5	P	P				P			P	P	
FAS-PC 115	Fisheries Laws, Policies and Regulations	3	I	P									I
FAS-PC 116	Thesis Writing 1	3	P	P		I		P	D				

CODE	TITLE OF THE COURSE	CREDIT	S01	S02	S03	S04	S05	S06	S07	S08	S09	S010	S011
FAS-PC 117	On-the-Job Training/Special Problem (Surveys or Experiments)	3	P	D	P	P		P					
FAS-PC 118	Project Development and Management	3	P	D				I					
FAS-PC 119	Fisheries Management	5	P	P				P					I
FAS-PC 120	Thesis Writing 2	3	P	P		I		P	D				
FAS-PC 121	Coastal Resource Management	3	I	P	P	I	I	P	P				P
FAS-PC 122	Fisheries Entrepreneurship	3	I	P		I	P	P					
FAS-PC 123	Fisheries Extension	3	I	D	P	P	P	P	D				I
FAS-PC 124	Seminar on Current Fisheries Breakthroughs	1	P	P	I	P		P	I				
F. Elective Courses													
FAS-ELECT 101	Advanced Fisheries Statistics	3	I	I		P							
FAS-ELECT 102	Fish Stock Assessment	3	I	I				P					
FAS-ELECT 103	Geographical Information System and Remote Sensing for Fisheries	3	P		P	P							
FAS-ELECT 104	Ornamental Fish Culture and Marketing	3	P										
FAS-ELECT 105	Hatchery Management	3	P	P								D	
FAS-ELECT 106	Fisheries Trade and Marketing	3	I	P				I					
FAS-ELECT 107	Fishery Product Analysis	3	I	I				P			I		
FAS-ELECT 108	Product Development and Value Addition	3	P	P				P					
FAS-ELECT 109	Philippine Fishing Grounds	3	I	I			I						
FAS-ELECT 110	Aquatic Invertebrates	3	I										
FAS-ELECT 111	Fisheries Biotechnology	3	I										

CODE	TITLE OF THE COURSE	CREDIT	S01	S02	S03	S04	S05	S06	S07	S08	S09	S010	S011
FAS-ELECT 112	Phycology	3	I										
FAS-ELECT 113	Marine Machineries	3	I	I									
FAS-ELECT 114	Navigation and Seamanship	3	I	P									
FAS-ELECT 115	Fishing Systems	3	P	P						P		I	
FAS-ELECT 116	Fish Processing Plant Management	3	I	I							P		
FAS-ELECT 117	Minor Fishery Products and By-Product Processing	3	I	P							P		
FAS-ELECT 118	Food Engineering	3	I	I							I		
FAS-ELECT 119	Post-Harvest Handling and Low Temperature Preservation	3	P	P							P		
FAS-ELECT 120	Chemical Evaluation of Water and Aquatic Products	3	I										
FAS-ELECT 121	Fisheries Economics	3	I	P				I					

Note: I-introduced P-practiced D-demonstrated

Course Description

First Year - First Semester Courses

GED 101 Understanding the Self (3 units / 3 hours per week)

This course deals with the nature of identity, as well as the factors and forces that affect the development and maintenance of personal identity. The course is intended to facilitate the exploration of the issues and concerns regarding self and identity to arrive at a better understanding of one's self. It strives to meet this goal by stressing the integration of the personal with the academic contextualizing matters discussed in the classroom and in the everyday experiences of students- making for better learning, generating a new appreciation for the learning process, and developing a more critical and reflective attitude while enabling them to manage and improve their selves to attain a better quality of life.

GED 102 Mathematics in the Modern World (3 units / 3 hours per week)

This course deals with the nature of mathematics, appreciation of its practical, intellectual, and aesthetic dimensions, and application of mathematical tools in daily life. It begins with an introduction to the nature of mathematics as an exploration of patterns (in nature and in environment) and as an application of inductive and deductive reasoning. By exploring these topics, students are encouraged to go beyond the typical understanding of mathematics as merely a set of formulas that is study of mathematical language and symbols but as a source of aesthetics in patterns of nature, for example, and a rich language in solving problem in itself (and of science) governed by logic and reasoning. The course then proceeds to survey ways in which mathematics

provides a tool for understanding and dealing with various aspects of present-day living. These mathematics as a tool include mathematical systems, data management, logic, and mathematics of graphs. These aspects will provide opportunities for actually doing mathematics in a broad range of exercises that bring out the various dimensions of mathematics as a way of knowing, and test the students' understanding and capacity.

GED 105 Readings in Philippine History (3 units / 3 hours per week)

This course analyzes Philippines history from multiple perspectives through the lens of selected primary sources. Students are expected to do content and context analysis such as the author's background and main arguments, compare different points of view, identify biases and examine the evidence presented in the document. The discussion tackles traditional topics in history and other interdisciplinary themes that will deepen and broaden the students' understanding of Philippine political, economic, cultural, social, scientific and religious history. The end goal is to develop the historical and critical consciousness of the students so that they will become versatile, articulate, broadminded, morally upright and responsible citizens.

GED 106 Purposive Communication (3 units / 3 hours per week)

This course is designed to develop students' communicative competence and enhances their cultural and intercultural awareness through multimodal tasks. These provide them opportunities for communicating effectively and appropriately to a multicultural audience in a local or global context, in a physical or virtual environment. It equips students with tools for critical evaluation of a variety of texts and focuses on the power of language and the impact of images to emphasize the importance of conveying messages responsibly. The knowledge, skills, and insights that students gain from this course may be used in their other academic endeavors, their chosen disciplines, and their future careers as they compose and produce relevant oral, written, audio-visual and/or web-based output for various purposes.

FILI 101 Kontekswalisadong Komunikasyon sa Filipino (3 units / 3 hours per week)

Ang praktikal na kursong ito ay nagpapalawak at nagpapalalim sa kontekstwalisadong komunikasyon sa wikang Filipino ng mga mamamayang Pilipino sa kani-kanilang mga komunidad sa partikular, at sa buong lipunang Pilipino sa pangkalahatan. Nakatuon ang kursong ito sa makro kasanayang pakikinig at pagsasalita, gayundin sa kasanayan sa paggamit ng iba'tibang tradisyonal at modernong midya na makabuluhan sa kontekstong Pilipino sa iba'tibang antas at larangan.

FAS-PC-101 General Fisheries (3 units / 3 hours per week)

This course revolves on the general concepts and principles of fisheries. Specifically, it deals with the study of the major divisions of fisheries - aquaculture, capture fisheries, post-harvest fisheries and aquatic resources management. This course is designed to help students develop competence in the field of fisheries and prepare them to become professionals who manifest deep understanding and skills of their chosen field.

PE 105 Basic Swimming (2 units / 2 hours per week)

This course introduces the fundamental skills in swimming such as floating, threading, bubbling skills, the fundamental strokes such as freestyle, backstroke, breaststrokes, and butterfly, proper swimming conduct and the conditioning exercises.

NSTP 101 National Service Training Program 1 (3 units / 3 hours per week)

Reserved Officers Training Course. This course provides military training to tertiary level students in order to motivate, train, organize and mobilize them for national defense preparedness.

Literacy Training Service. This course trains the students to teach literacy and numeracy skills to school children, out-of-school youth and other segments of society which are considerably in need of their services.

Year - Second Semester Courses

GED 103 The Life and Works of Rizal (3 units / 3 hours per week)

This course is designed to study the life and works of Jose Rizal, particularly his two novels - *Noli Me Tangere* and *El Filibusterismo*. This legislated course (R.A 1425) will inspire Filipino youth to cultivate the life values and interests of the hero, thus, rekindling and strengthening the spirit of nationalism making them proud of being Filipinos.

GED 104 The Contemporary World (3 units / 3 hours per week)

This course introduces students to the contemporary world by examining the multifaceted phenomenon of globalization. Using the various disciplines of the social sciences, it examines the social, political, technological and other transformations that have created an increasing awareness of the interconnectedness of peoples and places around the globe. To this end, the course provides an overview of the various debates in global governance, development, and sustainability. Beyond exposing the student to the world outside the Philippines, it seeks to inculcate a sense of global citizenship and global ethical responsibility.

FILI 102 Filipino sa Iba't Ibang Disiplina (3 units / 3 hours per week)

Ang praktikal na kursong ito ay nagpapalawak at nagpapalalim sa kasanayan sa malalim at mapanuring pagbasa, pagsulat, at pananaliksik sa wikang Filipino sa iba't ibang larangan, sa konteksto ng kontemporaryong sitwasyon at mga pangangailangan ng bansa at ng mga mamamayang Pilipino. Nakatuon ang kursong ito sa makrong kasanayang pagbasa at pagsulat, gamit ang mga makabuluhang pananaliksik sa wikang Filipino, bilang lunsaran ng pagsasagawa ng pananaliksik (mula sa pangangalap ng datos at pagsulat ng borador ng pananaliksik hanggang sa publikasyon at/o presentasyon nito) na nakaugat sa mga suliranin at realidad ng mga komunidad ng mga mamamayan sa bansa at maging sa komunidad ng mga Pilipino sa iba pang bansa. Saklaw rin ng kursong ito ang paglinang sa kasanayang pagsasalita, partikular sa presentasyon ng pananaliksik sa iba't ibang porma at venue.

FAS-FC 101 Zoology (5 units / 3 hours lecture; 6 hours laboratory per week)

This course is designed to provide students with a fundamental understanding of the diversity, anatomy, physiology, and ecology of animals that live in and around water. It requires a scientific process that will help students understand how fisheries technologists understand organization of animal diversity and involved ecological processes, and how these approaches can solve societal problems through gaining scientific knowledge about the world. It also provides strong foundations in the different approaches to zoology by allowing the students conduct their own investigations and research on fisheries.

FAS-FC 102 Inorganic Analytical Chemistry (5 units / 3 hours lecture; 6 hours laboratory per week)

This course introduces students to the fundamental concepts, principles and practice of qualitative and quantitative analyses of specific components in a given sample. Specifically, it includes introduction to qualitative analysis, gravimetric analysis, volumetric analysis, spectrophotometric and chromatographic methods of analysis and the instrumentation and calculations involved. It also finds application in everyday life ranging from the analysis and quality control of food and many other consumer products to providing aid in solving problems of legal concerns and informing people how materials are analyzed and its components determined.

FAS-PC- 102 Fisheries Meteorology (3 units / 3 hours per week)

This course focuses on the elements of weather – forecasting methods and techniques as applied to fisheries investigation.

PE 106 Survival Swimming (2 units / 2 hours per week)

This course aims to enable students to practice strategies of survival swimming with a clear and life- saving purpose, guided by the techniques of effective water survival and the appropriate skills. Specifically, it aims to develop the students' ability to float and breathe, regardless of the water's depth, for an indefinite period of time.

NSTP 102 National Service Training Program 2 (3 units / 3 hours per week)

Reserved Officers Training Course. This course provides military training to tertiary level students in order to motivate, train, organize and mobilize them for national defense preparedness.

Literacy Training Service. This course trains the students to teach literacy and numeracy skills to school children, out-of-school youth and other segments of society which are considerably in need of their services.

Second Year - First Semester Courses**GEEd 107 Ethics (3 units / 3 hours per week)**

This course discusses the context and principles of ethical behavior in modern society at the level of individual, society, and in interaction with the environment and other shared resources. It also teaches students to make moral decisions by using dominant moral frameworks and by applying a seven-step moral reasoning model to analyze and solve moral dilemmas. The course is organized according to the three (3) main elements of the moral experience: (a) agent, including context-cultural, communal, and environmental; (b) the act, and (c) reason or framework (for the act). This course includes the mandatory topic on taxation.

GEEd 108 Art Appreciation (3 units / 3 hours per week)

This course aims to provide students the opportunity to observe, participate in, or otherwise experience works of art in order to appreciate their role and purpose in life. Students will be exposed to various works of art, ranging from the classical art forms to modern art installations, performance art, indie films, enhanced e-books and multimedia aesthetics. These works of art will be examined from an aesthetic point of view and also as reflections or critiques of the societies that produced them. The course will thus build upon and hone the skills of understanding, critical appreciation and expression of one's views. The course also aims to further strengthen the youth's awareness and deep appreciation for the arts. Apart from focusing on Philippine Arts, this course shall further try to situate the local arts in the global perspective and compare its status to standards of arts in the global arena.

LITR 101 Sosyedad at Literatura / Panitikang Panlipunan (3 units / 3 hours per week)

Ang kursong ito ay naka-sentro sa pag-aaral at paglikha ng panitikang Filipino na nagtuturo sa mga mag-aaral na bigyang-tuon ang bahagi nila sa kabuluhang panlipunan sa pamamagitan ng mga tekstong literari sa iba't ibang bahagi ng kasaysayan ng bansang Pilipinas. Tumutulong ang kursong ito na mabuksan ang kaisipan ng mga mag-aaral sa mga isyung panlipunan na tinalakay ng mga akdang Filipino tulad ng kahirapan, malawak na agwat ng mayayaman at mahirap, reporma sa lupa, globalisasyon, pagsasamantala sa mga manggagawa, karapatang pantao, isyung pangkasarian, sitwasyon ng mga pangkat minorya at/o marhinalisado, at iba pa.

FAS-FC 103 Organic Chemistry (5 units / 3 hours lecture; 6 hours laboratory per week)

This course deals with the chemistry of different classes of organic compounds like alkanes, alkenes, alkynes, cyclic hydrocarbons, alkyl halides, alcohols, esters, thiols, carboxylic acid and carboxylic and phenols. This gives emphasis on their structure and nomenclature, physical and chemical properties, sources and uses, preparation and structural effects. The course also covers activities and experiments that will enable students to experience and observe the concepts taken. This will help the student to be able to use molecular structures, bonding concepts and electron distribution in understanding physical properties and chemical reactivity of organic compounds and do simple synthesis problems.

FAS-FC 104 Botany (5 units / 3 hours lecture; 6 hours laboratory per week)

This course focuses on the study of the morphological and anatomic structure, physiology, growth and development and economic uses and relationship of plants. A thorough understanding of the subject is essential in successful preparation of students for the higher biology courses such as Plant Taxonomy, Physiology and Ecology as well as careers in Biology. This will provide the students a broad rigorous introduction to plant concepts. The course also offers the opportunity to

learn what makes our real world as it is and to gain insights into the role plants play in our everyday lives.

FAS-PC 103 Oceanography (3 units / 3 hours per week)

This course centers on the physical, geological, chemical and biological properties of the oceans; discuss the interactions and processes involved in the ocean; and explain the effects of the ocean on the atmosphere. This course will also familiarize the students with instruments that are used to obtain water parameters and teach them how to perform water sampling and analysis.

FAS-PC 104 Physiology of Aquatic Organism (3 units / 3 hours per week)

This course focuses on the physiological adaptation of marine animals to the marine environment. It discusses some principles, concepts, and mechanisms on physiological adaptation of aquatic organisms to different marine environments.

PE 107 Boating and Life Saving (2 units / 2 hours per week)

This course builds upon the understanding of the meaning, components, benefits and scientific bases of boating and lifesaving, as well as the administration of swimming skills tests. It also includes skill in paddling and maneuvering of small boats. It is believed that this subject will help the students adopt positive attitudes and scientific skills and approach in water rescue and lifesaving towards their future profession.

Second Year - Second Semester Courses

GEEd 109 Science, Technology and Society (3 units / 3 hours per week)

This course deals with interactions between science and technology and social, cultural, political, and economic contexts that shape and are shaped by them. This interdisciplinary course engages students to confront the realities brought about by science and technology in society. Such realities pervade the personal, the public, and the global aspects of our living and are integral to human development. Scientific knowledge and technological development happen in the context of society with all its socio-political, cultural, economic, and philosophical underpinnings at play. This course seeks to instill reflective knowledge in the students that they are able to live the good life and display ethical decision making in the face of scientific and technological advancement. This course includes mandatory topics on climate change and environmental awareness.

LITR 102 ASEAN Literature (3 units / 3 hours per week)

This course introduces students to fundamental prose and poetry from across Asia. These literary works shape awareness and viewpoints among people in the ASEAN region. It orients the learners on the diverse culture the member states have, which nurture and build their identities as states and identity as a region as the learners find commonality in the diversity. More so, this course opens awareness of being part of a region to embrace the ASEAN identity through literature.

FAS-FC 105 Microbiology (3 units / 2 hours lecture; 3 hours laboratory per week)

This course is designed to assist students in the study of important microorganisms and parasites. It explains the physiology and pathogenic properties of bacteria, fungi and viruses as an introduction to disease causation, their biology, the infections they cause, host response to these infections and their mode of transmission, prevention, and treatment. The laboratory experiences provide specimen collection, handling and processing of specimens for isolation and identification of microorganisms and parasites involved in the infectious process.

FAS-FC 106 Biochemistry (3 units / 2 hours lecture; 3 hours laboratory per week)

This course covers the fundamentals aspects of biochemistry and structure and dynamics of important cellular components. The structure, properties, functions and metabolism of carbohydrates, proteins, lipids and other important biochemical compounds are also discussed. Most chemical reactions in cells involve different elements and compounds that vary in properties and function, which are all important in maintaining life. This course will enrich understanding of the major biomolecules and biological processes which are all essential in living organisms.

FAS-PC 105 Ichthyology (5 units / 3 hours lecture; 6 hours laboratory per week)

This course aims to provide information on the general aspects of ichthyology in two major themes which are adaptation and diversity. It will attempt to understand the adaptive significance of an anatomical, physiological, ecological, or behavioral trait, pointing how the trait affects fish's survival and reproduction. It will also provide numerous lists of species that display particular traits, emphasizing the parallel evolution that has occurred repeatedly in the history of fishes.

FAS-PC 106 Aquatic Ecology and Resources (5 units / 3 hours lecture; 6 hours laboratory per week)

This course centers on the science of bodies of water and the communities of organisms that they support. It covers the biotic and abiotic properties of aquatic ecosystems. It will also discuss chemical ecology in aquatic ecosystems, as well as various factors that are affecting them today. The laboratory component of this course will familiarize the students with the instruments and techniques that are used by aquatic ecologists.

PE 108 Scuba Diving (2 units / 2 hours per week)

This course is designed to provide students the knowledge about underwater terrain, its marine life, and the rich history that lies on the ocean floor will provide a lifetime of rewarding adventure, inspiration, and fun. Likewise, it provides them the important knowledge to maximize the safety and enjoyment of diving; become familiar with diving skills consistent with safe diving practices and ways to maximize their comfort in the water; and understand the various opportunities available to them that will expand their knowledge, skills, and enjoyment of diving.

Third Year - First Semester Courses**FAS-PC 107 Aquaculture (5 units / 3 hours lecture; 6 hours laboratory per week)**

This course focuses on the basics of aquaculture specifically the breeding, rearing, and harvesting of organisms in all types of water environments. It also discusses the ecology of aquaculture, biological interactions between aquaculture and the environment, sustainability, and current issues in aquaculture. The laboratory component of this course will familiarize the students with the skills and techniques that are used by aquaculturists.

FAS-PC 108 Aquaculture Engineering (3 units / 3 hours per week)

This course covers application of engineering principles in aquaculture. It gives the students a general overview of aquaculture systems, designs and requirements. It also introduces the students to gain perspectives on site selection, survey methodology, designs, constructions, installations, operation and maintenance of aquaculture facilities which are based on the biological characteristics and requirements of important aquaculture species. It also introduces the multidisciplinary nature of aquaculture such as but not limited to mathematics, biological science, chemistry, physics architecture and social sciences.

FAS-PC 109 Fish Nutrition (3 units / 3 hours per week)

This course deals with the basic principles of animal nutrition focusing on fish and crustaceans. It also covers digestive physiology of aquaculture species, nutritional biochemistry, bioenergetics, feed formulation, feeding practices and other environmental factors influencing nutrition of fish and crustaceans.

FAS-PC 110 Fish Health Management (3 units / 3 hours per week)

This course provides students with understanding of aquatic animal health issues relevant to aquaculture and wild fisheries. It also covers the identification, prevention, control of disease-causing organisms and other factors and treatment of affected commercially important farmed species.

FAS-PC 111 Fish Genetics and Breeding (3 units / 3 hours per week)

This course deals with the application of the theories and principles of genetics and breeding to aquaculture. It also introduces the students to qualitative and quantitative genetics in fisheries, brood stock management, and biotechnology in aquaculture.

ELECTIVE 1**Third Year - Second Semester Courses****FAS-PC 112 Post-Harvest Fisheries (5 units / 3 hours lecture; 6 hours laboratory per week)**

This course introduces the students with the principles, methods, and developments in handling fish and other fishery resources, preservation/processing, value addition, quality control, packaging, plant management and marketing of fish and fishery products.

FAS-PC 113 Fishery Products, Safety and Quality (3 units / 3 hours per week)

This course aims to provide information on the general aspects of fishery products, safety and quality that deals with food products for which it has direct control with respect to its biochemical composition. This course covers the general methods of analysis of fish/fishery products.

FAS-PC 114 Capture Fisheries 5 units / 3 hours lecture; 6 hours laboratory per week)

The course aims to provide information on the general aspects of capture fisheries specifically the harvesting of naturally occurring living resources in both marine and freshwater environments. This course covers the overview of Philippine capture fisheries both municipal and commercial fisheries. It also discussed the classification of fishing gears, as well as the various materials used for fishing gears and the development of fishing gear technology.

FAS-PC 115 Fisheries Laws, Policies and Regulations (3 units / 3 hours per week)

This course deals with the existing laws, regulations, policies, presidential decrees, administrative orders, and municipal ordinances affecting fisheries management, legislation and enforcement in the Philippine setting. It will also highlight science-based policies towards sustainable management of the fisheries sector at the different institutional levels.

FAS-PC 116 Thesis Writing 1 (3 units / 3 hours per week)

This course is designed to provide students with the opportunity to develop their group researches relevant to fisheries and aquatic sciences starting off from the preparation of the review of related literature and studies, the introduction, research methodology as well as the ethical considerations to be considered in doing researches with the end view of coming up with a good research proposal.

ELECTIVE 2**Third Year - Summer Courses****FAS-PC 117 On-the-Job Training (3 units/ 200 hours) / Special Problem (3 units / 3 hours per week)**

This course On-the-Job Training is intended to develop the students' understanding and exposure in fisheries. It aims at providing students with the fundamental, yet critical, personal traits, knowledge, and skills that each student should possess to successfully transition from the tertiary level into the workforce. It also provides opportunity to understand the economic, social, and cultural reality of the fisheries community and industry.

The course Special Problem (Surveys or Experiments) is an alternative course for the On-the-Job Training course. It aims to develop students' ability to conduct a short research study. It includes actual collection of data through survey or experimental research, processing, interpreting and presentation of research results.

Fourth Year - First Semester Courses

FAS-PC 118 Project Development and Management (3 units / 2 hours lecture; 3 hours laboratory)

This course centers on the preparation and development of project proposals and management of projects.

FAS-PC 119 Fisheries Management (5 units / 3 hours lecture; 6 hours laboratory per week)

This course centers on the principles and methods of managing and conserving fish resources in aquatic ecosystems.

FAS-PC 120 Thesis Writing 2 (3 units / 3 hours per week)

This course is designed as a continuation of their Thesis Writing 1 course. It aims to provide students with the opportunity to develop their group researches relevant to fisheries and aquatic sciences starting off from the gathering, presentation, analysis and interpretation of data with the end view of coming up with their final research paper.

ELECTIVE 3

ELECTIVE 4

Fourth Year - Second Semester Courses

FAS-PC 121 Coastal Resource Management (3 units / 3 hours per week)

This course aims to provide students with knowledge on sustainable use of marine resources. It also covers emerging issues and concerns in the management of coastal resources and providing strategies for the protection and conservation of marine habitats.

FAS-PC 122 Fisheries Entrepreneurship (3 units / 3 hours per week)

This course focuses on the principles and practices of forming and managing small and medium scale business fisheries enterprises with attention to individual, cooperative and people organization management.

FAS-PC 123 Fisheries Extension (3 units / 3 hours per week)

This course is designed primarily to teach students extension methods available for dissemination of fisheries and aquaculture research findings to the end users. The scope of this course encompasses principles and methods of program planning, extension needs, educational objectives, learning experience, clientele participation plan of work, and many others.

FAS-PC 124 Seminar on Current Fisheries Breakthroughs (1 units / 1 hour per week)

The course aims to develop the students' skills in organizing and evaluating a seminar/webinar, which aims to provide a venue to discuss current breakthroughs in the field of fisheries science.

ELECTIVE 5

ELECTIVE 6

ELECTIVE COURSES

FAS- ELECT 101 Advanced Fisheries Statistics (3 units / 3 hours per week)

This course aims to provide students with sound and solid background on statistical methods in fishery science and management. It highlights basic statistical tools such as descriptive, inferential, and multivariate statistics in understanding fisheries data. Statistical software and program will be used to facilitate calculations and hands-on exercises

FAS-ELECT 102 Fish Stock Assessment (3 units / 2 hours lecture; 3 hours laboratory)

This course aims to provide understanding on the changing fishery pattern and issues such as habitat destruction, predation, and optimal harvesting rates applicable to tropical fish and fisheries. It also provides basic concepts on the different parameters used in fish stock assessment such as length-weight relationship, growth, mortality, population size estimation and yield-per-recruit assessments.

FAS-ELECT 103 Geographical Information System and Remote Sensing for Fisheries (3 units / 2 hours lecture; 3 hours laboratory)

This course aims to provide information on the general aspects of Geographical Information Systems and Remote Sensing, which is an integration of computer hardware and software that can create, manipulate and analyze a geographically referenced data base. This course covers the importance and contributing disciplines of GIS. It also discusses the major areas of application and benefits of computerizing information.

FAS-ELECT 104 Ornamental Fish Culture and Marketing (3 units / 2 hours lecture; 3 hours laboratory)

This course is designed to provide students with technical knowledge on biology and technology on the breeding and culture of freshwater ornamental fish. It also includes hands-on training on the methods of breeding and grow-out culture of different varieties of freshwater ornamental fishes and promoting it as an aquaculture business opportunity.

FAS-ELECT 105 Hatchery Management (3 units / 2 hours lecture; 3 hours laboratory)

This course aims to provide basic operational principles of fish and shellfish hatchery management. It helps to understand the basic chemical, physical, and biological requirements in the propagation of a different cultured fish, crustaceans and mollusks.

FAS-ELECT 106 Fisheries Trade and Marketing (3 units / 2 hours lecture; 3 hours laboratory)

This course provides technical insight on various aspects of fisheries and aquaculture sustainability. It covers discussion on the socio-economics of fish producers, modes of operation, production systems and overview of fish trade and marketing.

FAS-ELECT 107 Fishery Product Analysis (3 units / 3 hours per week)

This course discusses the different aspects of seafoods such as nutritional quality, and assessment of toxicants. It also discusses techniques used in fish and fishery products analysis and waste management in seafood industry.

FAS-ELECT 108 Product Development and Value Addition (3 units / 3 hours per week)

This course introduces the students with the principles of seafood processing, value processing, value addition and innovative product development of fishery and minor fishery resources. It includes generation of concepts, consumer panel testing or sensory evaluation, shelf-life analysis, development of prototypes, and process optimization. Through this course, the student will also be given an opportunity to demonstrate innovation in product development.

FAS-ELECT 109 Philippine Fishing Ground (3 units / 3 hours per week)

This course introduces the Philippine fishing grounds, its fishery resources and utilization including its contribution to Philippine economy.

FAS-ELECT 110 Aquatic Invertebrates (3 units / 3 hours per week)

This course aims to provide knowledge on the diversity, classification, structure and life history of marine and freshwater invertebrate animal taxa.

FAS-ELECT 111 Fisheries Biotechnology (3 units / 3 hours per week)

This course deals with biotechnology and its techniques for development of fisheries and aquaculture. It provides basic knowledge on the use of molecular processes to increase fish productivity and improve quality.

FAS-ELECT 112 Phycology (3 units / 3 hours per week)

This course provides knowledge on the principles of algal diversity, structure, physiology, ecology, and evolution. It also focuses on identification of marine flora and recognition of common-genera of algae world-wide.

FAS-ELECT 113 Marine Machineries (3 units / 3 hours per week)

This course deals with the proper handling of different types of engines including main propulsion and auxiliary power generators. It also deals with the onboard electrical systems, and other moving parts and machines on a ship.

FAS-ELECT 114 Navigation and Seamanship (3 units / 3 hours per week)

This course deals with knowledge on safe navigation that includes predicting future location, route planning and collision avoidance. The course also discusses international maritime law, ship-handling, operation of deck equipment, anchors and cables, and cargo handling equipment.

FAS-ELECT 115 Fishing Systems (3 units / 3 hours per week)

This course deals with the science behind fishing techniques and how these interacts with biology, behavior and environment of a species. It focuses on how recreational fisheries is sustainably practiced by responsible fishers. The course also focuses on species habitat and behavior upon the upon the influenced of fishing techniques.

FAS-ELECT 116 Fish Processing Plant and Management (3 units / 3 hours per week)

The course deals with the basic food sanitation. It features the regulatory requirements for monitoring sanitary conditions and practices, encourages development of written SSOP and offers background information on basic sanitation. Also, this course focuses on the management of processing plant, safety and health condition of workers and exclusion of pest to prevent the cross-contamination.

FAS-ELECT 117 Minor Fishery Products and By-Product Processing (3 units / 3 hours per week)

This course deals with the post-harvest fisheries, methods of processing and preservations, fish processing (smoking, fermentation, canning) and minor fishery products. Moreover, it offers the sensory evaluation of fishery products and by-products and the development of value-added product as fish as the main ingredients.

FAS-ELECT 118 Food Engineering Applications in Fisheries (3 units / 3 hours per week)

The course deals with the major engineering interventions specifically for fish post-harvest operations and value addition to products to reduce the wastage, increased shelf-life and to ensure high oncomes or returns for fish farmers.

FAS-ELECT 119 Post-Harvest Handling and Low Temperature Preservation (3 units / 3 hours per week)

The course deals with the fish and seafood in functional foods to human, losses in fish and seafood, manifestations of spoilage in fish and seafood and post-harvest treatments and preservations in fish and seafood. Moreover, it focuses on biochemical aspects of fresh fish and seafood spoilage, characterization and quantification of fish spoilage, abiotic and biotic causes of fish and seafood spoilage and the physico-chemical manifestations of spoilage in fish and seafood.

FAS-ELECT 120 Chemical Evaluation of Water and Aquatic Products (3 units / 3 hours per week)

This course deals with the methods for chemical analysis of water and aquatic resources, which centers on the chemical analytical procedures used in the laboratories for the examination of ground and surface waters, domestic and industrial waste effluents, and treatment process samples. It provides test procedures for the measurement of physical, inorganic, and selected organic constituents and parameters. Method selection was based on the following criteria: that

the method should measure the desired property or constituent with precision, accuracy, and specificity sufficient to meet the data needs in the presence of the interfering materials encountered in water and waste samples; that the procedure should utilize the equipment and skills available in modern water pollution control laboratories; that the selected method is in use in many laboratories or has been sufficiently tested to establish its validity; and that the method should be rapid enough to permit routine use for the examination of a large number of samples.

FAS-ELECT 121 Fisheries Economics (3 units / 3 hours per week)

This course deals with the population dynamics and fishing which focuses on the growth of fish stocks, effort and production, and yield and stock effects of fishing; basic bioeconomic model that deals with license, taxes and quotas and bioeconomic equilibrium; investment analysis the long-term optimal stock levels and transition to long term optimum; Cordon-Schaefer model focuses on logistic growth model of fishery stocks; and fishing vessel economics- deals with the vessel effort and quotas in the long run. The course also, covers the topics on the extension of the basic bioeconomic model, multispecies and ecosystem harvesting and recreational fishing.

Program/Industry Advisory Council

Names	Qualifications	Occupation	Expertise
Program/Industry Advisory Council External Stakeholders			
Dr. Maria Theresa M. Mutia (IAC Chairperson)	Representative from Employers	Chief Science Research Specialist Department of Agriculture- National Fisheries Research Development Institute- Freshwater Fisheries Research and Development Council	Freshwater Aquaculture (Fish Stock Assessment)
Dr. Jayvee A. Saco (IAC Vice Chairperson)	Representative from a National Professional Organization	Vice President or Luzon of the Philippines Association of Marine Sciences	Seagrass Ecophysiology
Dr. Mario A. Cudiamat (IAC Member)	Representative from an Accredited Professional Organization	Member, Malacological Society of the Philippines Member, Association of Systematic Biologist of the Philippines	Mathematics, Biological Science, Natural Science, Fisheries, and Biology Fisheries Biology
Mr. Melecio Joseph B. Bo (IAC Member)	Representative of the Alumni	Retired BSFAS Program Chairperson, College of Arts and Sciences	Fishery Technology / Aquaculture
Mr. Edmark A. Serrano (IAC Member)	Representative of the Alumni	Data Analyst National Stock Assessment Program Bureau of Fisheries and Aquatic Resources Region IV-A	Freshwater Aquaculture (Fish Stock Assessment)
Other External Stakeholders			
Mr. Marvin M. Lumayor	Alumni	Aquacultural Technologist, Municipal Agriculture Office Calatagan, Batangas	Aquatic Resources Management

Ms. Neriza B. Perfiñan	Alumni	Technical Data Enumerator National Fisheries Research and Development Institute - Freshwater Fisheries Research and Development Center	Capture Fisheries
Internal Stakeholders			
Dr. Maria Luisa A. Valdez	Administrator/ Faculty Member	Dean College of Arts and Sciences	Research
Dr. Jonel M. Corral	Faculty Member	BSFAS Program Chairperson, College of Arts and Sciences	Fisheries (Coastal Resources Management), Zoology, and Marine Ecology / Fish Stock Assessment
Mr. Christopher A. Fernandez	Faculty Member	BSFAS Core Faculty Member	Aquaculture
Mr. Raynold O. Basco	President College of Arts and Sciences Student Council Representative	BSFAS III Student	Fisheries
Ms. Pauline C. Ruedas	College of Arts and Sciences Student Council Representative	BSFAS III Student	Fisheries

Program Administration

Based on Article VI - Required Resources (Administration) of the CHED Memorandum Order No. 33, Series of 2021 (Policies, Standards and Guidelines for the Bachelor of Science in Fisheries), the Qualifications of the Dean include the following: He/She must have a doctoral degree in Fisheries or in an allied field with his/her dissertation in Fisheries; must be a holder of a valid certificate of registration and professional license in Fisheries; must have at least three (3) years teaching experience and two (2) years on research and/or extension work in any of the disciplines for which the College offers; and must be full-time and with at least three (3) units teaching load.

Relative to this, it is noteworthy to mention that in the Batangas State University ARASOF-Nasugbu academic structure, the BSFAS Program is under the College of Arts and Sciences whose Dean is a graduate of a Doctor of Philosophy. The current Dean, Dr. Maria Luisa A. Valdez, has more than thirty-two (32) years of teaching experience (21 years in BatStateU) and twenty-five (25) years on research and extension work in the disciplines for which the College offers. She is likewise a full-time Dean with three (3) units teaching load.

Based on the same CMO, the Qualifications of the Department Chairperson or Program Chairperson include the following: Must have at least a Master's Degree in allied areas of Fisheries for which the unit/department offers a program or a Master's degree holder in an allied program identified in the policies and standards with a thesis in Fisheries; and must be a holder of a valid certificate of registration and professional license in Fisheries.

With regard to this, the currently assigned BSFAS Program Chairperson, Dr. Jonel M. Corral, is a graduate of Bachelor of Science in Fisheries major in Coastal Resources Management, Master of Science in Zoology, and Doctor of Philosophy in Marine Ecology and he is aiming to be a holder of a valid certificate of registration and professional license in Fisheries this year.

Outcomes Mapping

The Bachelor of Science in Fisheries and Aquatic Sciences Program Educational Objectives (PEOs) support the attainment of the Batangas State University Mission. The University's Mission focused on four areas; innovation, multidisciplinary research, community and industry partnership and sustainable development. Graduates of the Bachelor of Science in Fisheries and Aquatic Sciences are expected to achieved this mission based from the performance indicator on each PEOs. Achievement of these PEOs by the graduates will be assessed through the conduct of graduate tracer study. Student' current profession will be assessed to measure the attainment of the expected students' outcomes of the graduates based from the performance indicator on each SOs.

RELATIONSHIP BETWEEN PEOs AND THE MISSION STATEMENT					
No.	Program Educational Objectives (PEOs) Statements	Innovation	Multidisciplinary Research	Community and Industry Partnerships	Sustainable Development
PEO 1	Globally Competitive Graduates	x	x		
PEO 2	Fisheries Professionals		x	x	
PEO 3	Leadership			x	
PEO 4	Professionalism				x

The Bachelor of Science in Fisheries and Aquatic Sciences Student Outcomes (SOs) support the attainment of the Program Educational Objectives (PEOs) based on the indicated mapping between the SOs and the PEOs. However, SOs will not directly provide attainment of the PEOs but merely provide the students with the necessary skills ready for postgraduate level jobs. The SO-PEO mapping indicated in the matrix show that each SO is explicitly mapped to only one PEO for better measure of PEO attainment. The mapping went through a rigorous discussion and final approval of the Bachelor of Science in Fisheries and Aquatic Sciences curriculum development experts. This matrix is presented to simply show the relationship of the PEOs to the SOs. No direct assessment of the PEOs via SOs was conducted at this time.

RELATIONSHIP BETWEEN SOs AND PEOs					
No.	Student Outcomes (SOs) Statements	Globally Competitive Graduates	Fisheries Professionals	Leadership	Professionalism
		PEO 1	PEO 2	PEO 3	PEO 4
SO 1	Developments in Fisheries and Aquatic Sciences	x			
SO 2	Communication in Fisheries	x	x		x
SO 3	Multi-disciplinary and Multi-Cultural Teams	x		x	x
SO 4	Professional, Social and Ethical Responsibility			x	x

SO 5	Historical and Cultural Heritage				x
SO 6	Formulation of Fisheries Plans and Programs	x			
SO 7	Education, Research, Development, and Extension-Related Activities			x	
SO 8	Development, Operation and Management of Aquaculture	x	x		
SO 9	Utilization of Fisheries Resources	x	x		
SO 10	Application of Post-harvest Practices	x	x		
SO 11	Management and Protection of Aquatic Ecosystem and Resources	x	x		

The Bachelor of Science in Fisheries and Aquatic Sciences' Student Outcomes (SOs) support the attainment of the Institutional Graduate Attributes (IGAs). The IGAs are graduate attributes that students are expected to demonstrate upon graduation. These attributes are assessed through the SOs. The SOs via course mapped to respective SOs. The SO-IGA mapping indicated in the matrix showed that each SO is explicitly mapped to only one IGA for better of IGA attainment. The mapping went through a rigorous discussion and final approval of the Bachelor of Science in Fisheries and Aquatic Sciences curriculum development experts. In the matrix, for example, IGA 1 will be assessed using SO 1, which is related to knowledge competence. Each SO is explicitly mapped to demonstrate courses, typically from the last two years of the program. In each course, the Intended Learning Outcomes (ILOs) are explicitly mapped to weighted assessment tasks using the Introduced/Reinforced/Demonstrated indicators. Only those courses with "D" indicators are used for assessment of the SOs. Performance assessment of the program and individual student are assessed periodically.

RELATIONSHIP BETWEEN SOs AND IGAs									
No.	Student Outcomes (SOs) Statements	Knowledge Competence	Creativity and Innovation	Critical and Systems Thinking	Communication	Lifelong Learning	Leadership, Teamwork and Interpersonal	Global Outlook	Social and National Responsibility
		IGA 1	IGA 2	IGA 3	IGA 4	IGA 5	IGA 6	IGA 7	IGA 8
SO 1	Developments in Fisheries and Aquatic Sciences	x	x	x					
SO 2	Communication in Fisheries				x				
SO 3	Multi-disciplinary and Multi-Cultural Teams						x		x
SO 4	Professional, Social and Ethical Responsibility							x	x
SO 5	Historical and Cultural Heritage								x
SO 6	Formulation of Fisheries Plans and Programs	x	x	x	x			x	

SO 7	Education, Research, Development, and Extension-Related Activities					X	X		
SO 8	Development, Operation and Management of Aquaculture	X	X						
SO 9	Utilization of Fisheries Resources	X	X						
SO 10	Application of Post-harvest Practices	X	X						
SO 11	Management and Protection of Aquatic Ecosystem and Resources	X	X						

State University OBE Framework

