XAVIER UNIVERSITY – ATENEO DE CAGAYAN

COLLEGE OF ENGINEERING

Bulletin of Information

June 2015

…we are

the Warriors!

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Brief History of Xavier University – College of Engineering

The College of Engineering was founded in 1979 with only 374 students. The Engineering programs offered then were Chemical, Civil, Electrical and Mechanical Engineering. In its founding year in 1979, the operations started with Engr. Ernesto B. San Juan as the Dean of the College of Engineering. He worked as part-time Dean, and was assisted by one full-time faculty (Engr. Luis Occeña) and one student assistant (now already a Jesuit priest). The College was temporarily housed at the second floor of the Science Center Building from June 1979 to May 1982.

Five (5) years after its founding there were only 51 (out of the initial 374 students) who graduated from the College in 1984. Out of the 51 students, 43 graduated in March and 8 graduated in May of 1984. Eight (8) students graduated from Chemical Engineering, 30 from Civil, 6 from Electrical and 7 from Mechanical Engineering.

The College has grown steadily through the years. In 1993, the College has grown to offer two (2) additional programs, namely, Electronics and Communications Engineering (now called Electronics Engineering) and Industrial Engineering. In 1995, the College began offering Master of Engineering Program (MEP).

The Engineering Building

During the presidency of Rev. Fr. Ernesto O. Javier, SJ., the 5-storey Engineering Building was erected in the northern portion of the campus parade grounds near Mortola and Victoria Sts. (now Arch James T.G. Hayes St.) on a 500-square meter lot.

The groundbreaking and blessing ceremonies for the construction of the P7.065 Million engineering building was held on August 3, 1981. It was officiated by the then Father Superior General Pedro Arrupe of the Society of Jesus. The Clemente C. Puno Construction Company undertook the construction of the building and Arch. Conrado E. Puno supervised it. Engr. Felicisimo F. Acebedo was the structural engineer and Engr. Ildefonso A. Marbella as the project engineer. The inauguration of the building took place in July 31, 1982 with no less than the United Sates Ambassador to the Philippines, Michael Armacost, as the guest of honor.

From its temporary office at the Science Center Building, the College was moved to its new home in June 1982. At this time, the first batch of engineering students were already on their third year.

Linkages

Through the years, the College had established LINKAGES with academic institutions locally and abroad, and with certain industries.

In 1989, a TRIPARTITE AGREEMENT on a FACULTY EXCHANGE PROGRAM was established in the College. The signatories were XAVIER UNIVERSITY, PORTSMOUTH POLYTECHNIC (now UNIVERSITY OF PORTSMOUTH), and HONG KONG POLYTECHNIC. THE BRITISH COUNCIL funded this program. Under this program, two faculty members from the college were sent to the UK each year for a period of five years since the agreement was established.

Simultaneous with the establishment of the College's name as a producer of competitive engineers was the goal to strengthen the capability of the faculty. An Academe - Industry Linkage Program was established in cooperation with the Philippine Council for Industry and Energy Research and Development (PCIERD) of the Department of Science and Technology (DOST). Xavier University College of Engineering represented by its president, Fr. Bienvenido F. Nebres, Jr. and the following companies signed the memorandum of agreement on February 29, 1992:

- RI Chemical Corporation
- Pilipinas Kao, Incorporated
- Philippine Sinter Corporation
- Del Monte Philippines, Incorporated
- Mabuhay Vinyl Corporation
- Cagayan Electric Power & Light Company, Incorporated
- Nestle' Philippines, Incorporated

- Procter & Gamble Philippines, Incorporated
- Iligan Cement Corporation

Professorial Chairs For Engineering faculty was established through the generous support of the following companies:

- Del Monte Philippines, Incorporated
- Philippine Sinter Corporation
- Cagayan Electric Power & Light Company, Incorporated
- Oroville Resources & Ventures, Incorporated

In August 2003 the Xavier University College of Engineering and Technology entered into an agreement with SMART Communications, Inc., under the Smart Wireless Engineering Education Program (SWEEP), which expands the College's laboratory facilities in wireless technology.

The College's partners have grown to include the BPI Foundation, Inc., which has, among its roster of BPI Science Awardees, students of the Xavier University College of Engineering since 1990. It is also in partnership with Globe Telecommunications which has been giving due recognition to the college for its "sustained dedication in molding the future of the youth" since 1996.

The College was in partnership with the University of Portsmouth (United Kingdom), De La Salle University (Philippines), Royal Institute of Technology (Sweden), and the University Teknologi Malaysia (Malaysia) under the Asia- Link Programme, for a project on "Open Learning Provision for Postgraduate Training in Sustainable Technology" from 2007-2010.

In 2009, the Memorandum of Agreement between XU College of Engineering and most of the bigger industrial corporations in the region was renewed. A Memorandum of Understanding was also signed between the Department of Science and Technology (DOST X) for the formalization of the engagement of College of Engineering faculty members as part of the Cleaner Production Assessment Team of the region. It aims to provide training, consultancy, and other technical services to small to medium sized enterprises (SMEs) with Region 10 to assist them in developing eco-friendly management systems and implementing cleaner production options.

In April 2013, the MOU for Collaborative Service Learning Program (CSLP) of College of Engineering and College of Computer Studies was forged. This program is an engagement of XU in partnership with the City of Cagayan de Oro (CDO) where competent engineers and computer scientists/technologists/researchers assist CDO in undertaking the necessary survey activities at CDO's various relocation site projects and web-based traffic information system/response, routes and urban road network through the CSLP being facilitated by KKP-SIO.

XU coordinated with concerned offices of CDO, the Shelter and Housing Multi-Sectoral Task Force, City Engineer's Office, Estate Management Division, Regional Transportation Authority and HAPSAY DALAN Task Force.

Accreditation and Evaluation Status

PAASCU

In January 1997, when the Colleges of Arts and Sciences, Education and Commerce that had Level III accreditations with PAASCU had their re-survey formal accreditation, and the College of Agriculture had a formal survey visit, the College of Engineering also had its preliminary survey visit at the same time. The results of the PAASCU accreditation visits to the University in late January 1997 made the College of Engineering eligible for a formal survey visit after one year.

In early February 1998, the College of Engineering received formal accreditation (Level II-Initial Accreditation) for three years for its four engineering programs, namely, ChE, CE, EE, and ME. In February 2001, the same four (4) programs received reaccreditation for a period of five years until 2006. This reaccreditation was renewed for another five years to expire in 2011. In 2008, the College was informed that it is eligible to apply for Level III accreditation.

The IE and ECE programs also received formal accreditation in 2006. And on December 2009, the IE and ECE programs were awarded Level II re-accreditation status which will expire on December 2014.

The CE, ChE, ME and EE programs were again awarded with Level II re-accreditation starting SY 2014-2015.

FEED-PEP

The College of Engineering had its evaluation visit on September 25-26, 1997 by the Foundation for Engineering Education Development, Incorporated. Through the Foundation's ***Peer Evaluation Process*** **(FEED-PEP)**, a system for quality assurance and continuous improvement of engineering schools, the overall quality of the BS Chemical, Electronics & Communications, and Mechanical Engineering programs were evaluated. An important feature of the PEP is the direct participation of experienced engineers and scientists from industry, academe, and professional organizations in the conduct of actual evaluation of engineering schools.

CHED-COD

Through the actual evaluation of Technical Panel for Engineering, Technology and Architecture (TPETA) on April 1998, the Commission on Higher Education (CHED) named the College of Engineering as ***Center of Development (COD)*** in the following categories:

- COD-1 (Center of Development – 1) for Electrical Engineering and
- COD-2 for Chemical, Civil, and Mechanical Engineering programs.

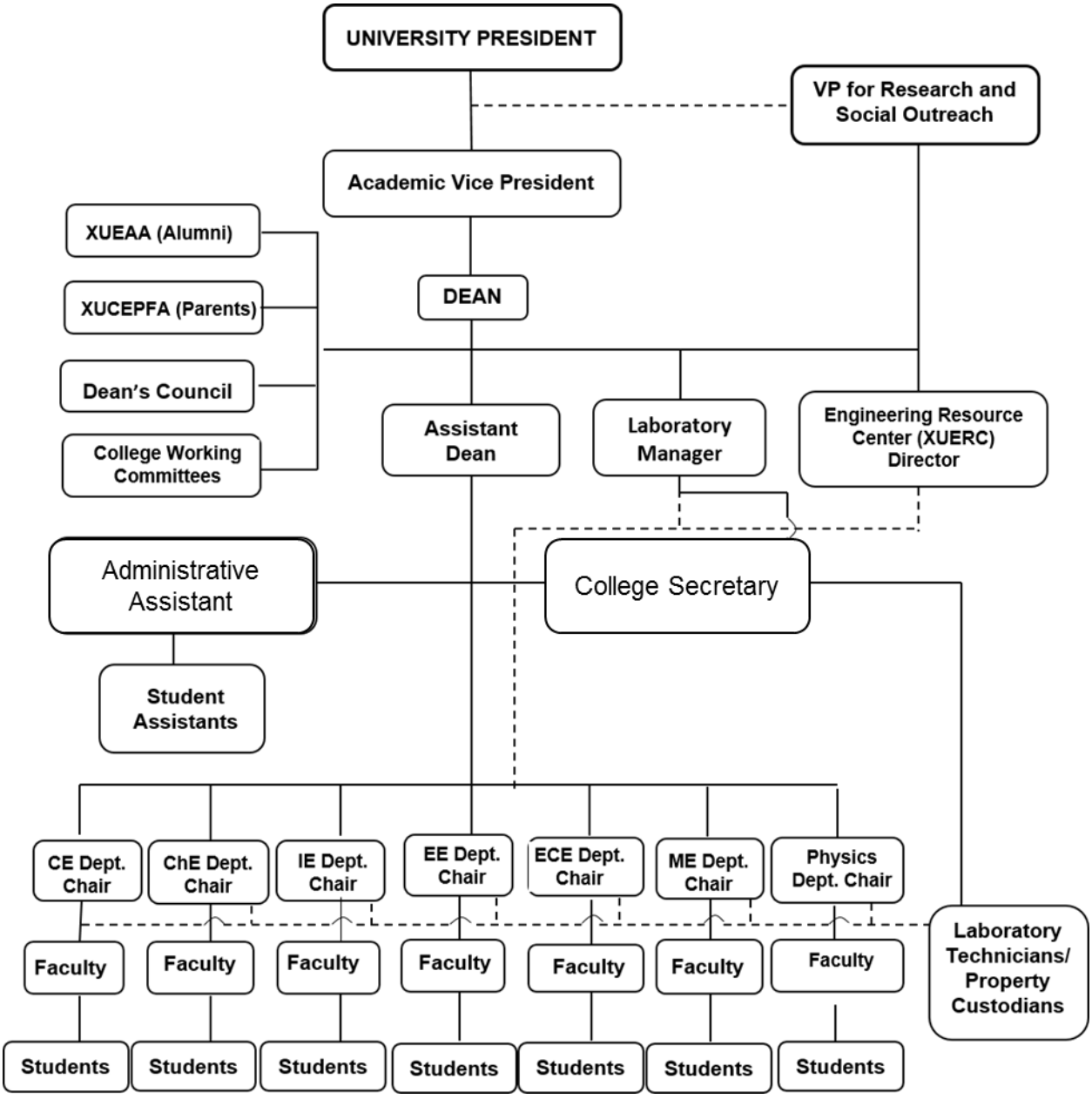
The COD-1 programs were entitled to PhP 1 Million grant per year for a period of 3 years. The COD-2 programs were entitled to PhP 0.5 Million grant per year for a period of 3 years. These engineering programs have been identified by the CHED based on the recommendations of TPETA then.

In 2009, Centers of Development (COD) were awarded by CHED to the following four (4) programs of the College: ***Chemical Engineering, Civil Engineering, Electrical Engineering, and Electronics Engineering***. COD status will expire on 2012.

Looking Forward

For its Vision for the Golden Anniversary of the College, it is hoped that it will have produced a world-class and competent technical human resource in the country through its alumni. It will have a stronger faculty community wherein majority have PhD degrees and are competent and committed to their respective fields of specialization. This faculty community, together with the staff, will continue to educate and form Atenean Engineers who have strong reverence to God through service for and with others in the College of Engineering which continues to live a tradition of excellence that serves the interest of Mindanao and the Filipino people. Finally, it will lead the technological and infrastructure development of the region thru a well-balanced engineering education that does academic excellence, community involvement and researches, and most importantly an engineering education that will be most beneficial to environment and human societies.

Organizational Structure of the College of Engineering



College Administration, Faculty & Staff

College Administration, Faculty & Staff

Hercules R. Cascon, PhD – Dean

Maria Theresa I. Cabaraban, PhD – Assistant Dean

Gerardo P. Apor, MSCE – CE Department Chair

Engr. Edwin Richard R. Ortiz – OIC- ChE Department

Cyril G. Fabrea, MSME – ME Department Chair

Gunnar Marc Shane C. Cabaraban, M.Eng. – EE Department Chair

Ian Giovanni R. Pabillaran, M.Eng – ECE Department Chair

Glenn B. Paclijan, M.Eng. – IE Department Chair

Richel A. de Villa, MBA – Administrative Assistant

Engr. Pauline Rose A. Pacquiao – College Secretary

Dexter S. Lo, MSCE – XUERC Director

Kasandra Macababayao– ERC Administrative Assistant

Nestor G. Ipanag, M. Eng. – College Laboratory Manager

Patricio G. Cabading – Laboratory Technician

Carl Angelo B. Fallares – Laboratory Technician

Johny A. Daculan –Laboratory Technician

Johanne L. Timbal – Laboratory Technician

Rouelito Archie B. Malabanan - Physics Laboratory Technician

Maximino V. Padua – Physics Laboratory Technician

FULLTIME FACULTY ROSTER

(AS OF 1ST SEMESTER SY 2015-2016)

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XU Mission and Vision

Vision

To be a leading ASEAN university forming leaders of character by 2033.

Mission Statement

Xavier University (Ateneo de Cagayan)
is a Filipino, Catholic and Jesuit educational community
dedicated to the integral development of the person
for the needs of Mindanao, the Philippines and Asia-Pacific.

As a University, Xavier engages
in the authentic search for the truth
through teaching, formation, research and social outreach;
it is dedicated to the renewal, discovery, safeguarding
and communication of knowledge and human values;
and it trains men and women to think rigorously,
so as to act rightly and serve humanity justly.

As a Filipino University, Xavier is devoted
to the appreciation, preservation and enrichment
of the Filipino culture and heritage;
to the sustainable development of the nation;
and to the pursuit of the common good.

As a Catholic University, Xavier is committed
to the proclamation of the joy of the Gospel;
its commitment is rooted in a deep personal friendship
with Jesus Christ manifested by loyalty to the Church
characterized by a preferential option for the poor;
it shares in the privileged task of fostering
the interdisciplinary and integrated encounter
between faith, reason and the sciences.

As a Jesuit University, Xavier participates
in the Jesuit mission of reconciliation with God,
with others and with creation; it seeks to serve the faith,
promote justice, dialogue with culture and religions,
and protect the environment; it upholds the Ignatian values
of magis, cura personalis and finding-God-in-all-things.

In sum, Xavier University forms men and women
of competence, conscience and commitment
in service of the Church, the global community
and the Filipino people.

Xavier University
ATENEO DE CAGAYAN

PROFILE OF THE UNIVERSITY GRADUATE

The XU graduate, formed and trained through Jesuit liberal education is someone deeply rooted in the Catholic faith and a person of competence, conscience, and commitment.

1. COMPETENCE - knowledgeable in his/her field, and convinced of the necessity of continuing learning; equipped with basic communication skills, critical thinking and work ethics.

1.1. The XU graduate has undergone a program of studies made up of a core curriculum which, in the Jesuit tradition, provides a liberal education for the man/woman of the 21st century, and specialized training in one's academic discipline/profession.

1.2. The XU graduate, aware of continuing developments in all fields, constantly updates him/her self.

1.3. The XU graduate is able to read, write, and speak effectively in English and Filipino/local languages, and utilizes modern means of electronic communication.

1.4. The XU graduate has learned to think, decide, and act critically and creatively.

1.5. The XU graduate has learned the values of seriously applying his/her efforts and energies to any task at hand.

2. CONSCIENCE - lives a life of moral values rooted in his/her religious faith and convictions, and strives for a life and lifestyle in solidarity with the marginalized and the poor.

2.1. The XU graduate discerns, decides, and does what is right, striving for truth, goodness and beauty, within the context of his/her religious faith and convictions.

2.2. The XU graduate, grateful for his/her talents and gifts, and conscious of his/her responsibilities to others, will opt for a simple lifestyle and will seek to assist and support others, especially in the context of widespread poverty in our country.

3. COMMITMENT - a person dedicated to a solid understanding of self and of his/her duties and responsibilities to family and community, church, country and the world, and willing and able to act accordingly.

3.1. The XU graduate appreciates his/her own individual uniqueness and talents, and seeks to know his/her self and his/her relationships and responsibilities to others, including the Almighty and the rest of creation.

3.2. The XU graduate endeavors to achieve sustainable development of people, and communities with special emphasis on the needs of Mindanao.

3.3. The XU graduate is involved actively, whatever the risks might be, in developing, and implementing options that concern such issues as environment, poverty, peace and justice, good governance, moral and legislative matters, and other critical issues.

The College of Engineering Vision and Mission Statements

Vision

The College of Engineering shall be a center of excellence for engineering education, research, and social development in the Asia Pacific region.

The graduates of the College shall be engineers with Christian precepts who are globally competent leaders.

Mission

The College of Engineering is a dynamic learning community committed to the growth of society in the areas of energy and environmental management, techno-preneurship, agro- industrial processes and urban - rural development. It embodies XU's basic thrust of forming persons for others.

As an academic institution, the College responds to the human resources needs of the region by producing quality graduates with appropriate knowledge of, skills in, and attitude for engineering and technology in the fields of chemical, civil, electrical, and mechanical industrial and electronics engineering.

As a resource center, the College spearheads industrialization by providing pool of experts and facilities. It actively collaborates with institutions for technological advancement. It pursues topnotch researches and innovation opportunities in next-generation technologies, services, and businesses. It serves as a venue for dialogues on the application and social impact of technology.

As an organization, the College is committed to the continuing development of its personnel and programs.

Outcomes Based Education in XU College of Engineering

In response to ASEAN integration challenge and compliance with the Commission of Higher Education (CHED) Memorandum Order No. 37 series of 2012, the College of Engineering adopts the Outcomes-Based Education (OBE) system in its academic program implementation.

The OBE Implementation Framework of the XU College of Engineering (XU-CoE)

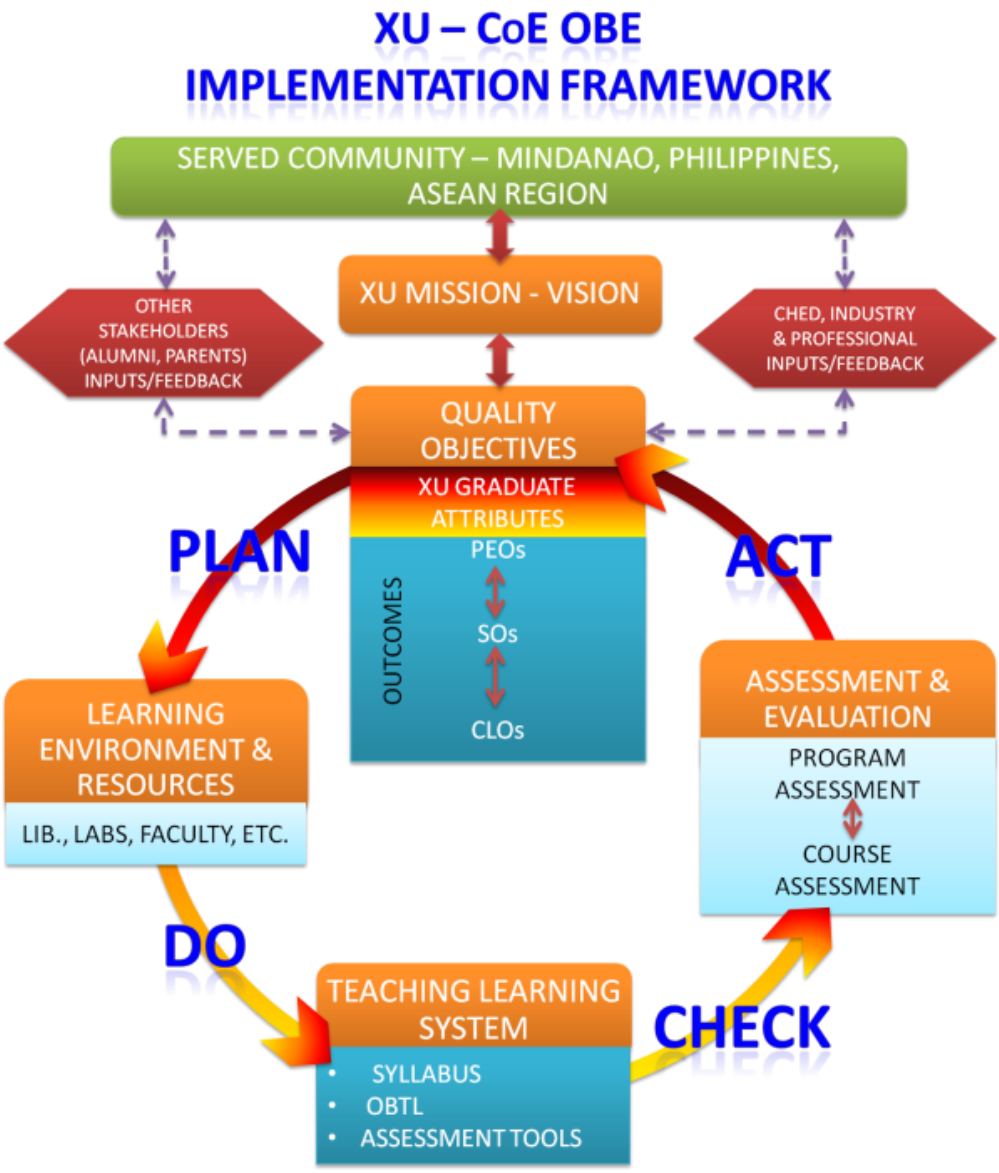


Figure 1. College of Engineering OBE implementation framework.

The framework basically includes the following components:

1. XU Mission and Vision
2. Program Educational Outcomes (PEOs)
3. Student/Program Outcomes (SOs or POs)
4. Curriculum Mapping showing correspondence of courses with SOs
5. Outcomes-Based Teaching and Learning (OBTL) Delivery Process
6. Program Assessment and Evaluation Process
7. Continuing Quality Improvement Program

Our OBE framework anchors on XU's noble purpose to form leaders of character (embodying the core values of competence, conscience and commitment). Together with the various needs and inputs from the served community, these serve as the bases of XU graduate profile and from it we articulated the Program Educational Objectives (PEOs) and Program Outcomes (POs) for each of the engineering programs.

As an education philosophy, OBE offers stronger focus on student-centered learning and program outcomes which are constructively aligned to our mission and vision statements. The importance of traditional program inputs such as faculty and faculty development, libraries, laboratory facilities, lectures, etc. are recognized and not ignored; more focus is on how these inputs are utilized so that graduates meet an internationally acceptable level of knowledge, skills, and attitude demanded by the different fields of engineering practice. Furthermore, the OBE framework necessitates that every component in our OBE system is supported by a continuous quality improvement program where our existing quality assurance processes are integrated.

Undergraduate Engineering Programs

BACHELOR OF SCIENCE IN ENGINEERING PROGRAMS

1. BS Chemical Engineering
2. BS Civil Engineering
3. BS Electrical Engineering
4. BS Mechanical Engineering
5. BS Electronics Engineering
6. BS Industrial Engineering

The Physics department is also under the College of Engineering. It is a service department catering to Physics course offering needs of all programs of the University.

Civil Engineering

Program Description

Civil Engineering is an engineering field that deals with planning, analysis, design and construction of structures such as bridges, building, dams, airports, ports and harbors, highway, tunnels, tower and water distribution systems. The profession has expanded to embrace new concepts on urban and environmental planning, sustainable development and new technologies in line with environmental protection, restoration of degraded landscapes and conversation of historic structures. Emphasis is given to the economic, efficient and sustainable use of natural resources and built environment.

Accreditation: PAASCU Level II, COD

Program Educational Objectives

The XU Civil Engineering (XU CE) graduates, formed and trained through Jesuit liberal education are deeply rooted in the Catholic faith and are persons of competence, conscience, and commitment. Thus, consistent with these goals, the XU CE program is geared towards producing graduates, who, within three to five years from graduation, have:

1. (Competence) Become competent and engaged civil engineering professionals who are proficient in the application of their knowledge and skills in the design, construction, maintenance and management of reliable infrastructures and/or technical activities in support of civil engineering projects.

2. (Competence) Manifested professional growth and career advancement through satisfactory progress towards positions of higher responsibility, completion of an advanced degree, or by successful transition into the allied fields of business, government, academe, etc.

3. (Competence, Conscience, Commitment) Worked as effective, conscientious and committed team members or leaders who embody ethical and professional excellence rooted in Jesuit liberal education and Christian humanism. They have equipped with excellent communication and people skills and are actively participating in their community, church and professional organizations.

4. (Competence, Conscience, Commitment) Become significant contributors to society by creating civil engineering designs and solutions that are safe and sustainable. Being men and women for others, the XU CE graduates discern, decide and do what is right and strive for truth and will seek to support others, especially in the context of widespread poverty in the country.

5. (Competence, Commitment) Will pursue an active life-long purpose of advancing their professional expertise, either by attaining advanced degrees in engineering or furthering research activities that tackle on critical areas of civil engineering field.

Program Outcomes

The graduates of the XUCE program shall demonstrate the following:

a) The ability to apply their knowledge of the fundamentals in mathematics, physical and engineering sciences to solve civil engineering problems.

b) The ability to design and conduct civil engineering experiments, as well as to analyze and interpret data.

c) The ability to design, build, improve, and install systems or processes in structural design, geotechnics, hydraulics and water resource engineering, transportation engineering, highway engineering, environmental science, and construction technology and management in order to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical and sustainability.

d) The ability to work effectively, responsibly and committedly in multi-disciplinary and multi-cultural teams

e) The ability to recognize, formulate and solve civil engineering problems.

f) The broad education necessary for the understanding of the effects and impacts of civil engineering projects on nature and society, and of the civil engineers' social and ethical responsibilities in accordance to Christian and Ignatian precepts.

g) The specialized knowledge in at least one field of civil engineering practice;

h) The ability to read, write and speak effectively in English and a local language; and to utilize modern means of communication.

i) Recognition of the need for, and an ability to engage in lifelong learning and to keep current of the development in a specific field of specialization.

j) The ability to apply the appropriate skills, techniques and modern engineering tools necessary for the practice of civil engineering.

k) Knowledge of contemporary issues.

l) Knowledge and understanding of engineering, business, public policy, leadership and management principles as team member or leader to manage projects in multidisciplinary environments and various fields of practice, including the community and the church.

m) The ability to preserve and promote Filipino historical and cultural heritage.

Chemical Engineering

Program Description

Chemical Engineering is a field that is concerned with the design, development, operation and management of industrial processes in which materials are transformed by chemical reaction and/or physical means.

The Chemical Engineering curriculum provides a challenging academic and research environment for learning the concepts of unit processes operations. These includes conceptualization, development, design, improvement and application of safe, healthy, ethical, economic and environmentally-sound ways of utilizing materials and energy. The program offers broad and rigorous lectures and laboratory instructions on the fundamentals of chemical engineering, and subject as diverse as the flow of gases, liquids, and particulate solid, physical phenomena such as heat transfer, mass transfer and molecular diffusion, and physical methods such as distillation, absorption, evaporation, drying and filtration. The lectures and instructions are primarily designed to develop the student's ability to analyze, invent, innovate and apply chemical processes and products. Considered equally important in the program is the development of the student's independence, resourcefulness, creativity, discipline and professional ethics in the appreciation of the societal impact of chemical engineering and the value of continuing growth.

Accreditation: PAASCU Level II, COD

Program Educational Objectives

The XU Chemical Engineering (XU ChE) graduates, formed and trained through Jesuit liberal education are deeply rooted in the Catholic faith and are persons of competence, conscience, and commitment. Thus, consistent with these goals, the XUChE program is geared towards producing graduates, who, within three to five years from graduation, have:

1. (Competence) Become competent ChE professionals, who are proficient in the application of their knowledge and skills in basic sciences and engineering principles in the design, innovation, improvement, supervision and management of chemical engineering

processes and systems in the presence of practical constraints to solve real-world technical problems.

2. (Competence) Manifested professional growth and career advancement through satisfactory progress towards positions of higher responsibility, completion of an advanced degree, or by successful transition from the "traditional" chemical engineering career path into the allied fields of business, government, academe, etc.

3. (Competence, Conscience, Commitment) Worked as effective, conscientious and committed team members or leaders who embody ethical and professional excellence rooted in Jesuit liberal education and Christian humanism. They have equipped with excellent communication and people skills and are actively participating in their community, church and professional organizations.

4. (Competence, Conscience, Commitment) Become significant contributors to society by creating chemical engineering designs and solutions that are safe and sustainable. Being men and women for others, the XU ChE graduates discern, decide and do what is right and strive for truth and will seek to support others, especially in the context of widespread poverty in the country.

5. (Competence, Commitment) Embraced an active life-long purpose of advancing their expertise by continuing professional education, attaining advanced degrees or furthering research activities that tackle on critical areas of the chemical engineering field.

Program Outcomes

The graduates of the XUChE program shall demonstrate the following:

a) Ability to apply knowledge of mathematics, physical sciences, biotechnology and engineering sciences to solve chemical engineering problems.

b) Ability to design and conduct experiments to test hypothesis and verify assumptions, as well as analyze and interpret data and to simulate processes.

c) Ability to design, improve, innovate and supervise a system, process or component to meet desired needs within realistic constraints.

d) Ability to work effectively, responsibly and committedly in multi-disciplinary and multi-cultural teams.

e) Ability to identify, formulate and solve chemical engineering problems.

f) Understanding of the effects and impact of the chemical engineering profession on the environment and the society, as well as the social and ethical responsibilities of the profession in accordance to Christian and Ignatian precepts.

g) Specialized knowledge in at least one field of chemical engineering practice.

h) Ability to read, write and speak effectively in English and a local language; and to utilize modern means of communication.

i) Recognition of the need for, and an ability to engage in lifelong learning and to keep current of the development in a specific field of specialization.

j) Ability to apply appropriate techniques, skills and modern engineering tools necessary for chemical engineering practice.

k) Knowledge of contemporary issues.

l) Knowledge and understanding of engineering, business, public policy, leadership and management principles as team member or leader to manage projects in multidisciplinary environments and various fields of practice.

m) The ability to preserve and promote Filipino historical and cultural heritage.

Electrical Engineering

Program Description

Electrical Engineering is a profession that deals with the generation, transmission, distribution and utilization of electricity. It is the science of developing, applying, and controlling the electrical and related phenomena of nature for the benefit of mankind notably in the field of light, heat, power, sustainable alternative sources of energy and environment, communication, and transportation.

Accreditation: PAASCU Level II, COD

Program Educational Objectives

The XU Electrical Engineering (XU EE) graduates, formed and trained through Jesuit liberal education are deeply rooted in the Catholic faith and are persons of competence, conscience, and commitment. Thus, consistent with these goals, the XU EE program is geared towards producing graduates, who, within three to five years from graduation, have:

1. (Competence) Become competent and engaged electrical engineering professionals who are proficient in the practice of the profession using a systems perspective to analyze, design, develop, optimize and implement complex electrical systems to solve real-world problems within the appropriate technological, global, societal, ethical and organizational context.

2. (Competence) Manifested professional growth and career advancement through satisfactory progress towards positions of higher responsibility, completion of an advanced degree, or by successful transition from the "traditional" electrical engineering career path into the allied fields of business, government, academe, etc.

3. (Competence, Conscience, Commitment) Worked as effective, conscientious and committed team members or leaders who embody ethical and professional excellence rooted in Jesuit liberal education and Christian humanism. They have equipped with excellent communication and people skills and are actively participating in their community, church and professional organizations.

4. (Competence, Conscience, Commitment) Become significant contributors to society by producing designs and solutions that are safe and sustainable. Being men and women for others, the XU EE graduates discern, decide and do what is right and strive for truth and will seek to support others, especially in the context of widespread poverty in the country.

5. (Competence, Commitment) Embraced active life-long purpose of advancing their expertise by continuing professional education, attaining advanced degrees or furthering research activities that tackle on critical areas of the chosen field of expertise.

Program Outcomes

The graduates of the XU EE program shall demonstrate the following:

a) Ability to apply knowledge of mathematics, physical and engineering sciences to solve electrical engineering problems.

b) Ability to design and conduct experiments, as well as to analyze and interpret data.

c) Ability to design a system, component, or process to meet desired needs within identified constraints.

d) Ability to work effectively, responsibly and committedly in multi-disciplinary and multi-cultural teams.

e) Ability to recognize, formulate, solve and implement options for electrical engineering problems.

f) Specialized knowledge in at least one field of electrical engineering practice.

g) Ability to recognize professional, social ethical and moral responsibility in accordance to Christian and Ignatian precepts.

h) Ability to read, write and speak effectively in English and Filipino/local languages; and to utilize modern means of communication.

i) Awareness and understanding of the effects of engineering solutions in a comprehensive context.

j) Ability to engage in life-long learning and continuing professional development and an understanding of the need to keep current in electrical engineering fields.

k) Sufficient knowledge and exposure in contemporary issues.

l) Ability to apply the appropriate skills, techniques, use modern engineering tools necessary for the practice of electrical engineering.

m) Knowledge and understanding of engineering, business, public policy, leadership and management principles as team member or leader to manage projects in multidisciplinary environments and various fields of practice.

n) The ability to preserve and promote Filipino historical and cultural heritage.

Mechanical Engineering

Program Description

Mechanical Engineering is concerned with the generation, transmission and utilization of heat and mechanical power. It also includes the design and production of mechanical tools, machinery and their products.

The Bachelor of Science in Mechanical Engineering curriculum included lectures and laboratory instructions on designing equipment and machines for setting up, commissioning and operating equipment for industrial plants. Areas of specification are Machine Design, Power Plant Heating, Ventilating, Air Conditioning and Refrigeration (HVAC/R), Industrial Machinery, Instrumentation and Control.

Accreditation: PAASCU Level II

Program Educational Objectives

The XU Mechanical Engineering (XU ME) graduates, formed and trained through Jesuit liberal education are deeply rooted in the Catholic faith and are persons of competence, conscience, and commitment. Thus, consistent with these goals, the XU ME program is geared towards producing graduates, who, within three to five years from graduation, have:

1. (Competence) Become competent and engaged mechanical engineering professionals who are proficient in the application of their knowledge and skills in basic sciences and engineering principles in the design, innovation, improvement, supervision and management of both thermal and mechanical processes and systems in the presence of practical constraints to solve real-world technical problems.

2. (Competence) Manifested professional growth and career advancement through satisfactory progress towards positions of higher responsibility, completion of an advanced degree, or by successful transition into the allied fields of business, government, academe, etc.

3. (Competence, Conscience, Commitment) Worked as effective, conscientious and committed team members or leaders who embody ethical and professional excellence rooted in Jesuit liberal education and Christian humanism. They have equipped with excellent communication and people skills and are actively participating in their community, church and professional organizations.

4. (Competence, Conscience, Commitment) Become significant contributors to society by producing designs and solutions that are safe and sustainable. Being men and women for others, the XU ME graduates discern, decide and do what is right and strive for truth and will seek to support others, especially in the context of widespread poverty in the country.

5. (Competence, Commitment) Embraced active life-long purpose of advancing their professional expertise by continuing professional education, attaining advanced degrees or furthering research activities that tackle on critical areas of the mechanical engineering field.

Program Outcomes

The graduates of XU ME program shall demonstrate the following:

a) Ability to apply knowledge of mathematics, physical and engineering sciences to solve mechanical engineering problems.

b) Ability to design and conduct experiments, as well as to analyze and interpret data.

c) Ability to design, innovate and supervise a system, process or component to meet desired needs within realistic concerns.

d) Ability to work effectively, responsibly and committedly in multi-disciplinary and multi-cultural teams.

e) Ability to identify, formulate and solve engineering problems.

f) Recognition of the need for and ability to practice professional, social, ethical and moral responsibility that is rooted in Christian and Ignatian precepts.

g) Specialized knowledge in at least one field of mechanical engineering practice.

h) Ability to communicate effectively in English and Filipino/local languages and utilize modern means of communication.

i) Understanding of the effects and impact of engineering solutions on the environment and the society in a comprehensive context.

j) Ability to use techniques, skills and modern engineering tools necessary for mechanical engineering practice.

k) Recognition of the need for, and an ability to engage in lifelong learning and to keep current of the development in a specific field of specialization.

l) Knowledge of contemporary issues.

m) Knowledge and understanding of engineering, business, public policy, leadership and management principles as team member or leader to manage projects in multidisciplinary environments and various fields of practice.

n) The ability to preserve and promote Filipino historical and cultural heritage.

Electronics Engineering

Program Description

Electronics Engineering is a profession that specializes in the conceptualization, design and implementation of new, improved or innovative electronic, computer and communication systems.

The Bachelor of Science in Electronics Engineering curriculum includes wire and wireless communications, data communications, communication system analysis and design, digital signal processing unit, broadcast engineering, logic circuits and switching theory, navigational aid, instrumentation and microprocessor system. The course is geared towards the areas of specialization namely telecommunication, microelectronics and instrumentation and control.

Accreditation: PAASCU Level II, COD

Program Educational Objectives

The XU Electronics Engineering (XU ECE) graduates, formed and trained through Jesuit liberal education are deeply rooted in the Catholic faith and are persons of competence, conscience, and commitment. Thus, consistent with these goals, the XU ECE program is geared towards producing graduates, who, within three to five years from graduation, have:

1. (Competence) Become competent and engaged electronics engineering professionals who will demonstrate proficiency in the application of their knowledge and skills in basic sciences and engineering principles in the design, innovation, improvement, supervision and management of electronic processes and systems to solve real-world problems within the appropriate technological, organizational, ethical, societal and global context.

2. (Competence) Manifested professional growth and career advancement through satisfactory progress towards positions of higher responsibility, completion of an advanced degree, or by successful transition into the allied fields of business, government, academe, etc.

3. (Competence, Conscience, Commitment) Worked as effective, conscientious and committed team members or leaders who embody ethical and professional excellence rooted in Jesuit liberal education and Christian humanism. They have equipped with

excellent communication and people skills and are actively participating in their community, church and professional organizations.

4. (Competence, Conscience, Commitment) Become significant contributors to society by creating electronic engineering designs and solutions that are safe and sustainable. Being men and women for others, the XU ECE graduates discern, decide and do what is right and strive for truth and will seek to support others, especially in the context of widespread poverty in the country.

5. (Competence, Commitment) Will pursue active life-long purpose of advancing their professional expertise by continuing professional education, attaining advanced degrees or furthering research activities that tackle on critical areas of the chosen field of expertise.

Program Outcomes

The graduates of the XU ECE program shall demonstrate the following:

a) Ability to apply knowledge of mathematics, physical and engineering sciences to solve electronics engineering problems.

b) Ability to design and conduct experiments, as well as to analyze and interpret data.

c) Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, in accordance with standards.

d) Ability to work effectively in multi-disciplinary and multi-cultural groups, in both capacities as team leader or member, in various fields of practice.

e) Ability to identify, formulate, solve and implement options for electronics engineering problems.

f) An ability to understand professional, social ethical and moral responsibility that is rooted in Christian and Ignatian precepts.

g) Specialized knowledge in at least one field of electronics engineering practice.

h) Ability to read, write and speak effectively in English and Filipino/local languages; and to utilize modern means of communication.

i) Ability to understand the impacts of engineering solutions in a global, economic, environmental and societal context.

j) Ability to engage in life-long learning and continuing professional development and an understanding of the need to keep current in electronics engineering fields.

k) Sufficient knowledge and exposure in contemporary issues.

l) Ability to apply the appropriate skills, techniques, use modern engineering tools necessary for the practice of electronics engineering.

m) Ability to understand and apply engineering, business and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments.

n) The ability to preserve and promote Filipino historical and cultural heritage.

Industrial Engineering

Program Description

Industrial Engineering is a profession that deals with the design, improvement and installation of integrated systems of men, materials, methods and equipment. It integrates human formation, material, monetary and technological resources to produce quality and cost-competitive goods and services in a health and efficient work environment. It is a field that deals with production planning and control, manufacturing systems and processes, facilitates design, human factors, occupational safety, quality control, system reliability, and system analysis and design with advanced computing.

Accreditation: PAASCU Level II

Program Educational Objectives

The XU Industrial Engineering (XU IE) graduates, formed and trained through Jesuit liberal education are deeply rooted in the Catholic faith and are persons of competence, conscience, and commitment. Thus, consistent with these goals, the XU IE program is geared towards producing graduates, who, within three to five years from graduation, have:

1. (Competence, Commitment) Advanced professionally and assume roles of increasing responsibility and impact, pursuing graduate work, research and other professional activities.

2. (Competence, Conscience, Commitment) Manifested technical competence, polished communication and interpersonal relation skills and effectively managed and lead multidisciplinary teams to create solutions with significant societal benefits.

3. (Competence, Conscience) Emerged as professional leaders and have significantly contributed to society by designing efficient processes and systems that give high regard to cost, safety and sustainability. Being men and women for others, the XU IE graduates discern, decide and do what is right and strive for truth and will seek to support others, especially in the context of widespread poverty in the country.

4. (Commitment, Conscience) Demonstrated commitment to the community, church and professional organizations through significant support and involvement that embody ethical and professional excellence rooted in Jesuit liberal education and Christian humanism.

Program Outcomes

The graduates of the XU IE program shall demonstrate the following:

a) Ability to apply knowledge of mathematics, physical and engineering sciences to solve problems of industrial engineering.

b) Ability to design and conduct experiments, as well as analyze and interpret data proficiently.

c) Ability in designing, building, improving and installing optimized integrated systems or processes which are efficient, effective, as well as robust to meet desired needs within identified constraints.

d) Ability to work effectively, responsibly and committedly in multi-disciplinary and multi-cultural teams

e) Ability to identify, formulate, solve and implement options for industrial engineering problems.

f) Ability to recognize professional, social ethical and moral responsibility that is rooted in Christian and Ignatian precepts.

g) Ability to read, write and communicate effectively in English and in Filipino/local languages; and to utilize modern means of communication.

h) Ability to be conscious of the effects of engineering solutions in a comprehensive context to include among other concerns, issues on the environment, poverty, etc.

i) Specialized knowledge in at least one field of industrial engineering practice.

j) Ability to engage in life-long learning and an understanding of the need to keep current of the developments in industrial engineering fields.

k) Ability to exercise the appropriate skills, techniques, tools and ethics necessary for the practice of industrial engineering, and of business, including research and development.

l) Ability to perform services in the form of analysis, design, preparation of plans, specifications, estimates, and implementation of work standards, statistical process control systems, production planning and materials control systems, manufacturing and service facilities, operations research models for production and operations, and/or information systems.

m) Knowledge and understanding of engineering, business, public policy, leadership and management principles as team member or leader to manage projects in multidisciplinary environments and various fields of practice.

n) The ability to preserve and promote Filipino historical and cultural heritage.

XU Engineering Curricula

The XU Engineering Curricula
(2008-2009 Curricula, 3rd Editions)

Prospectuses:

- BS Civil Engineering
- BS Chemical Engineering
- BS Electrical Engineering
- BS Mechanical Engineering
- BS Electronics Engineering
- BS Industrial Engineering

Course Descriptions:

- Foundation Courses
- Engineering Sciences & Allied Courses
- Professional Courses per program

1. BACHELOR OF SCIENCE IN CIVIL ENGINEERING

FIRST YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ENG	014.1	English Plus: Introduction to Study and Thinking Skills	(3)	0	(3)	
CE	01	Orientation to Civil Engineering	1	0	1	
CHEM	81	General Chemistry (Lecture)	3	0	3	
CHEM	81L	General Chemistry (Laboratory)	0	1	1	
ES	01	Engineering Drawing	0	1	1	
FIL	22	Komunikasyon sa Akademikong Filipino	3	0	3	
FFP	10	Freshmen Formation Program	3	0	3	
MA	81	College Algebra	3	0	3	
MA	82	Plane and Spherical Trigonometry	3	0	3	
PE	1	Physical Fitness	2	0	2	
		Total	**(21) 18**	**2**	**(23) 20**	

FIRST YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ECON	20.1	Principles of Economics with Taxation, Agrarian Reform and Consumer Education	3	0	3	
ENG	16.1	Study, Thinking and Language Skills in English	3	0	3	
ES	02	Computer-Aided Drafting	0	1	1	ES 01
FIL	33	Pagbasa at Pagsulat Tungo sa Pananaliksik	3	0	3	FIL 22
MA	83	Advanced Algebra	2	0	2	MA 81
MA	84	Analytic Geometry	2	0	2	MA 81, MA 82
MA	85	Solid Mensuration	2	0	2	MA 81, MA 82
PSYC	1	General Psychology	3	0	3	
RS	15	The Old Testament	3	0	3	
PE	2	Rhythmic Activities	2	0	2	PE 1
		Total	**23**	**1**	**24**	

SECOND YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ENG	17	Effective Speech Communication	3	0	3	ENG 16.1
ENG	34.1	The Literatures of the World	3	0	3	ENG 16.1
ES	03	Computer Fundamentals and Programming	0	2	2	2ND YEAR LEVEL
HIST	11.1	Rizal's Life, Works and Writings	3	0	3	
MA	86	Differential Calculus	4	0	4	MA 83, MA 84, MA 85
PHYS	21	General Physics 1	3	0	3	MA 81, MA 82
PHYS	21L	General Physics 1 Laboratory	0	1	1	MA 81, MA 82
PHILO	01	Logic	3	0	3	
NSTP	1	National Service Training Program 1	3	0	3	
PE	3	Individual/Dual Sports	2	0	2	PE 2
		Total	**24**	**3**	**27**	

SECOND YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ENG	41	Humanities: Arts, Aesthetics and Society	3	0	3	ENG 16.1
MA	87	Integral Calculus	4	0	4	MA 86
MA	89	Probability and Statistics	3	0	3	MA 81
PHYS	22	General Physics 2	3	0	3	PHYS 21& 21L
PHYS	22L	General Physics 2 Laboratory	0	1	1	PHYS 21 & 21L
RS	20	Christology	3	0	3	RS 15
PHILO	15.1	Philosophy of Man and the Human Person	3	0	3	PHILO 01
NSTP	2	National Service Training Program 2	3	0	3	NSTP 1
PE	4	Team Sports/Games	2	0	2	PE 3
		Total	**24**	**1**	**25**	

THIRD YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ACE	01	Basic Mechanical Engineering	3	0	3	MA 81, MA 82, PHYS 22,22L
CE	30	Elementary and Higher Surveying	3	1	4	MA 82, MA 83, ES 01
ENG	27	Writing Term Paper in the Discipline and Business Correspondence	3	0	3	ENG. 16.1
ES	04	Statics of Rigid Bodies	3	0	3	PHYS 21, 21L, MA 87
ES	07	Engineering Economy and Accounting	3	0	3	3RD YEAR LEVEL
MA	88	Differential Equations	3	0	3	MA 87
PHILO	30.1	Generic Ethics with PERSON (Philosophical Enrichment and Regeneration for Social Orientation and Networking Program)	3	0	3	PHILO 15.1
		Total	**21**	**1**	**22**	

Note 1: ***Students who do not qualify are required by the English Department to take ENG 014.1, a non-credit subject.***

Note 2: ***FFP10 must be taken within the first year of entry to the University.***

Note 3: ***Subjects taken without completing the required pre-requisite will not be credited.***

Note 4: ***Year Level is determined based on completion of at least 75% of the required number of units of the preceding year level prescribed by the curriculum.***

Note 5: ***The regular load of a student per semester is as prescribed in this curriculum indicated as TOTAL number of units, which is the MAXIMUM number of units that a student can take in the semester.***

2. BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

FIRST YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ChE	01	Orientation to Chemical Engineering	1	0	1	
CHEM	81	General Chemistry (Lecture)	3	0	3	
CHEM	81L	General Chemistry (Laboratory)	0	1	1	
ENG	014.1	English Plus: Introduction to Study and Thinking Skills	(3)	0	(3)	
ES	01	Engineering Drawing	0	1	1	
FFP	10	Freshmen Formation Program	3	0	3	
FIL	22	Komunikasyon sa Akademikong Filipino	3	0	3	
MA	81	College Algebra	3	0	3	
MA	82	Plane and Spherical Trigonometry	3	0	3	
PSC	10.1	Politics and Governance with Philippine Constitution	3	0	3	
PE	1	Physical Fitness	2	0	2	
		Total	(24)	2	(26)	
			21	2	23	

FIRST YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
CHEM	82	General Chemistry Calculations	2	1	3	CHEM 81,81L
ENG	16.1	Study, Thinking and Language Skills in English	3	0	3	
FIL	33	Pagbasa at Pagsulat Tungo sa Pananaliksik	3	0	3	FIL 22
HIST	11.1	Rizal's Life, Works and Writings	3	0	3	
MA	83	Advanced Algebra	2	0	2	MA 81
MA	84	Analytic Geometry	2	0	2	MA 81, MA 82
MA	85	Solid Mensuration	2	0	2	MA 81, MA 82
PSYC	1	General Psychology	3	0	3	
RS	15	The Old Testament	3	0	3	
PE	2	Rhythmic Activities	2	0	2	PE 1
		Total	25	1	26	

SECOND YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
CHEM	83	Analytical Chemistry	3	2	5	CHEM 82
ES	03	Computer Fundamentals and Programming	0	2	2	2ND YEAR LEVEL
MA	86	Differential Calculus	4	0	4	MA 83, MA 84, MA 85
PHYS	21	General Physics 1	3	0	3	MA 81, MA 82
PHYS	21L	General Physics 1 Laboratory	0	1	1	MA 81, MA 82
RS	20	Christology	3	0	3	RS 15
PHILO	01	Logic	3	0	3	
NSTP	1	National Service Training Program 1	3	0	3	
PE	3	Individual/Dual Sports	2	0	2	PE 2
		Total	21	5	26	

SECOND YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
CHEM	84	Organic Chemistry	4	1	5	CHEM 82
ENG	34.1	The Literatures of the World	3	0	3	ENG 16.1
ENG	17	Effective Speech Communication	3	0	3	ENG 16.1
MA	87	Integral Calculus	4	0	4	MA 86
PHYS	22	General Physics 2	3	0	3	PHYS 21,21L
PHYS	22L	General Physics 2 Laboratory	0	1	1	PHYS 21, 21L
PHILO	15.1	Philosophy of Man and the Human Person	3	0	3	PHILO 01
NSTP	2	National Service Training Program 2	3	0	3	NSTP 1
PE	4	Team Sports/Games	2	0	2	PE 3
		Total	25	2	27	

THIRD YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ChE	10	Chemical Engineering Calculations 1	2	1	3	CHEM 83, MA 83
ChE	20	Physical Chemistry for Engineers 1	3	1	4	CHEM 83, MA 87
CHEM	85	Industrial Chemistry	2	1	3	CHEM 84
ENG	41	Humanities: Arts, Aesthetics and Society	3	0	3	ENG 16.1
ES	04	Statics of Rigid Bodies	3	0	3	PHYS 21,21L, MA 87
MA	88	Differential Equations	3	0	3	MA 87
MA	89	Probability and Statistics	3	0	3	MA 81
RS	35	Church and Sacraments	3	0	3	RS 20
		Total	22	3	25	

Note 1: ***Students who do not qualify are required by the English Department to take ENG 014.1, a non-credit subject.***
Note 2: ***FFP10 must be taken within the first year of entry to the University.***
Note 3: ***Subjects taken without completing the required pre-requisite will not be credited.***
Note 4: ***Year Level is determined based on completion of at least 75% of the required number of units of the preceding year level prescribed by the curriculum.***
Note 5: ***The regular load of a student per semester is as prescribed in this curriculum indicated as TOTAL number of units, which is the MAXIMUM number of units that a student can take in the semester.***

THIRD YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ChE	11	Chemical Engineering Calculations 2	2	1	3	ChE 10
ChE	12	Advanced Engineering Mathematics in Chemical Engineering	3	0	3	MA 88
ChE	21	Physical Chemistry for Engineers 2	3	1	4	ChE 20
ChE	22	Chemical Engineering Thermodynamics 1	3	0	3	ChE 20
ChE	30	Principles of Transport Processes	3	0	3	MA 88, ChE 10
ENG	27	Writing Term Paper in the Discipline and Business Correspondence	3	0	3	ENG 16.1
ES	02	Computer-Aided Drafting	0	1	1	ES 01, 3rd YEAR LEVEL
ES	05	Dynamics of Rigid Bodies	2	0	2	ES 04
PHILO	30.1	Generic Ethics with PERSON (Philosophical Enrichment and Regeneration for Social Orientation and Networking Program)	3	0	3	PHILO 15.1
		Total	22	3	25	

THIRD YEAR Summer

Code		Description	Hours	Lect.	Lab.	Unit	Pre-Req.
ChE	70	Industry Immersion 1	120	0	1	1	4TH YEAR LEVEL
			Total			1	

FOURTH YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ACE	05	Basic Electrical and Electronics Engineering Lecture	2	0	2	PHYS 22, 22L
ACE	05L	Basic Electrical and Electronics Engineering Laboratory	0	1	1	PHYS 22, 22L
ChE	23	Chemical Engineering Thermodynamics 2	3	0	3	ChE 22
ChE	31	Momentum Transfer	3	0	3	ChE 30
ChE	32	Heat and Mass Transfer	3	0	3	ChE 30
ChE	60	Fundamentals of Materials Science and Engineering	3	0	3	CHEM 84
ES	06	Mechanics of Deformable Bodies	3	0	3	ES 04
RS	55	Christian Morality with Social Teachings of the Church	3	0	3	RS 35
SOC	01.1	Principles of Sociology w/ Population, Family Planning and HIV/AIDS Education	3	0	3	
		Total	23	1	24	

FOURTH YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ACE	08	Methods of Research	3	0	3	MA 89, 4th YEAR LEVEL
ChE	13	Process Dynamics and Control	2	1	3	ChE 12
ChE	24	Chemical Reaction Engineering	4	0	4	ChE 23, ChE 12
ChE	33	Separation Processes	3	0	3	ChE 32, ChE 23
ChE	34	Chemical Engineering Laboratory 1	0	1	1	ChE 30, ChE 31, ChE 32
ChE	40	Introduction to Biotechnology	3	0	3	CHEM 84
ChE	50	Chemical Process Industries	2	1	3	CHEM 84
ES	10.1	Safety Management/Engineering	1	0	1	3rd YEAR LEVEL
PHILO	25	Philosophy of Religion	3	0	3	PHILO 30.1
		Total	21	3	24	

FOURTH YEAR Summer

Code		Description	Hours	Lect.	Lab.	Unit	Pre-Req.
ChE	80	On the Job Training	300	0	2	2	5TH YEAR LEVEL
			Total			2	

FIFTH YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ChE	14	Computer Applications in Chemical Engineering	0	1	1	5th YEAR LEVEL
ChE	35	Chemical Engineering Laboratory 2	0	1	1	ChE 34
ChE	41	Biochemical Engineering	3	0	3	ChE 40, ChE 24
ChE	61	Process Equipment Design	1	1	2	ChE 33
ChE	62	Process Design and Project Feasibility	2	1	3	5TH YEAR LEVEL, ACE 08
ES	07	Engineering Economy and Accounting	3	0	3	4th YEAR LEVEL
ES	08	Engineering Management	3	0	3	3RD YEAR LEVEL
ES	09	Environmental Engineering	2	0	2	CHEM 81, 81L
		Technical Elective 1*	3	0	3	5th YEAR LEVEL
		Technical Elective 2*	3	0	3	5th YEAR LEVEL
		Total	20	4	24	

FIFTH YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req. (Co_Req.)
ACE	09	Quantitative Methods in Management	3	0	3	ES 08
ChE	51	Safety in Process Industries	2	0	2	5th YEAR LEVEL
ChE	52	Industrial Waste Management and Control	3	0	3	(ChE 51)
ChE	53	Field Trips and Seminars	0	1	1	5th YEAR LEVEL
ChE	63	Chemical Engineering Plant Design	3	2	5	ChE 61, ChE 62, ES 07
ChE	64	Laws and Ethics for ChE	2	0	2	5th YEAR LEVEL
ChE	65	Introduction to Particle Technology	2	0	2	ChE 31
ECON	20.1	Principles of Economy with Taxation, Agrarian Reform, and Constitution Education	3	0	3	
		Technical Elective 3*	3	0	3	5th YEAR LEVEL
		Total	21	3	24	

Note 6: ***At least two of the Technical Electives must be under the same track or area of specialization: Food and Drug Manufacturing, Environmental Management, Energy Engineering, Paints and Coating Technology, Entrepreneurship, Packaging Technologies, Petrochemical Engineering, Biotechnology, Semiconductor Technology, Emerging Technologies. Electives to be chosen are subject to available offerings and must be with the approval of the Department.***

ChETE 10	Food Science and Engineering		ChETE 18	Energy Management
ChETE 26	Food Safety Systems		ChETE 19	Renewable Energy Technologies
ChETE 12	Food Processing Technologies		ChETE 20	Cell and Molecular Biology
ChETE 13	Oleochemical Processing Technologies		ChETE 21	Nanotechnology
ChETE 14	Wastewater Engineering		ChETE 22	Introduction to Polymer Engineering
ChETE 15	Solid Waste Management		ChETE 23	Enzyme Technologies
ChETE 16	Air Pollution Control		ChETE 24	Statistical Process Control for Chemical Engineers
ChETE 17	Hazardous Waste Management		ChETE 25	Entrepreneurship for Chemical Engineers

3. BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

FIRST YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req
ENG	014.1	English Plus: Introduction to Study and Thinking Skills	(3)	0	(3)	
EE	01	Orientation to Electrical Engineering	1	0	1	
ES	01	Engineering Drawing	0	1	1	
FFP	10	Freshman Formation Program	3	0	3	
FIL	22	Komunikasyon sa Akademikong Filipino	3	0	3	
MA	81	College Algebra	3	0	3	
MA	82	Plane and Spherical Trigonometry	3	0	3	
PSC	10.1	Politics and Governance with Philippine Constitution	3	0	3	
PSYC	1	General Psychology	3	0	3	
PE	1	Physical Fitness	2	0	2	
		Total	(24)21	1	(25)22	

FIRST YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
CHEM	81	General Chemistry (Lecture)	3	0	3		
CHEM	81L	General Chemistry (Laboratory)	0	1	1		
ENG	16.1	Study, Thinking and Language Skills in English	3	0	3		
ES	03	Computer Fundamentals & Programming	0	2	2		
FIL	33	Pagbasa at Pagsulat Tungo sa Pananaliksik	3	0	3	FIL 22	
MA	83	Advanced Algebra	2	0	2	MA 81	
MA	84	Analytic Geometry	2	0	2	MA 81, MA 82	
MA	85	Solid Mensuration	2	0	2	MA 81, MA 82	
RS	15	The Old Testament	3	0	3		
SOC	01.1	Principles of Sociology w/ Population, Family Planning & HIV/AIDS Education	3	0	3		
PE	2	Rhythmic Activities	2	0	2	PE 1	
		Total	23	3	26		

SECOND YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req	
ES	09	Environmental Engineering	2	0	2	CHEM 81,81L	
ES	02	Computer Aided Drafting	0	1	1	ES 01	
HIST	11.1	Rizal's Life, Works, & Writings	3	0	3		
MA	86	Differential Calculus	4	0	4	MA 83, MA 84, MA 85	
PHILO	01	Logic	3	0	3		
PHYS	21	General Physics 1	3	0	3	MA 81, MA 82	
PHYS	21L	General Physics 1 Laboratory	0	1	1	MA 81, MA 82	PHYS 21
RS	20	Christology	3	0	3	RS 15	
NSTP	1	National Service Training Program 1	3	0	3		
PE	3	Individual/Dual Sports	2	0	2	PE 2	
		Total	23	2	25		

SECOND YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	
ACE	22	Fundamentals of Material Science and Engineering	3	0	3	CHEM 81,81L	
ENG	34.1	The Literatures of the World	3	0	3	ENG 16.1	
ENG	17	Effective Speech Communication	3	0	3	ENG 16.1	
MA	87	Integral Calculus	4	0	4	MA 86	
MA	89	Probability & Statistics	3	0	3	MA 81	
PHILO	15.1	Philosophy of Man and the Human Person	3	0	3	PHILO 01	
PHYS	22	General Physics 2	3	0	3	PHYS 21, PHYS 21L	
PHYS	22L	General Physics 2 Laboratory	0	1	1	PHYS 21, PHYS 21L	PHYS 22
NSTP	2	National Service Training Program 2	3	0	3	NSTP 1	
PE	4	Team Sports/Games	2	0	2	PE 3	
		Total	27	1	28		

THIRD YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req
ECE	31	Electronic Devices and Circuits	3	1	4	MA 87,PHYS22,22L, ACE 22
EE	33	Electromagnetics	3	0	3	MA 87, PHYS 22,22L
EE	35	Electrical Circuit 1	3	1	4	MA 87, PHYS 22,22L
ENG	41	Humanities: Arts, Aesthetics and Society	3	0	3	ENG 16.1
ES	04	Statics of Rigid Bodies	3	0	3	PHYS 21,21L, MA 87
ES	07	Engineering Economy and Accounting	3	0	3	3rd Yr. Standing
MA	88	Differential Equations	3	0	3	MA 87
PHILO	30.1	Generic Ethics with PERSON (Philosophical Enrichment and Regeneration for Social Orientation and Networking Program)	3	0	3	PHILO 15.1
		Total	24	2	26	

Note 1: ***Students who do not qualify are required by the English Department to take ENG 014.1, a non-credit subject.***

Note 2: ***FFP10 must be taken within the first year of entry to the University.***

THIRD YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req
ACE	02	Basic Thermodynamics	3	0	3	MA 87, PHYS 22,22L
ECE	32	Electronic Circuit Analysis and Design	3	1	4	ECE 31, EE 35
EE	30	Advanced Engineering Mathematics for EE	3	0	3	MA 88
EE	36	Electrical Circuit 2	3	1	4	EE 35
ENG	27	Writing, Term Paper in the Discipline and Business Correspondence	3	0	3	ENG 16.1
ES	10.1	Safety Management/Engineering	1	0	1	3rd Yr. Standing
ES	05	Dynamics of Rigid Bodies	2	0	2	ES 04
ES	06	Mechanics of Deformable Bodies	3	0	3	ES 04
RS	35	Church and Sacraments	3	0	3	RS 20
		Total	24	2	26	

FOURTH YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req
COM	01	Principles of Communications	3	1	4	EE 30, ECE32
ECE	42	Logic Circuits & Switching Theory	3	1	4	ECE 31
EE	42	Electrical Circuit 3	2	1	3	EE 36
EE	43	DC Machinery	2	1	3	EE 36
EE	48	Numerical Methods with Computer Applications	2	1	3	EE 30
EE	45	Control System Analysis	3	0	3	EE 30
RS	55	Christian Morality with Social Teachings of the Church	3	0	3	RS 35
		Total	18	5	23	

FOURTH YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
ACE	40	Mechanics Fluid	2	0	2	ES 06	
ECE	51	Industrial Electronics	3	0	3	ECE 32	
ECE	51L	Industrial Electronics Laboratory	0	1	1	ECE 32	ECE 51
EE	47	Microprocessor Systems	2	1	3	ES 03,ECE 32 ECE 42	
EE	44	AC Machinery	3	1	4	EE 42, EE 43	
EE	46	AC Apparatus and Devices	2	1	3		EE 44
EE	49	Electrical Engineering Safety	1	0	1	ES 10, 4th Yr. Standing	
EE	40	Research Methods for EE	1	0	1	MA 89, 4th Yr Standing	
EETE	01	Technical Elective 1	3	0	3	4th Yr. Standing	
PHILO	25	Philosophy of Religion	3	0	3	PHILO 30.1	
		Total	20	4	24		

FOURTH YEAR Summer

Code		Description	Hours	Lect.	Lab.	Unit	Pre-Req.
EE	80	On the Job Training	300	0	2	2	EE 46
		Total				2	

FIFTH YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
ACE	41	Information Technology	2	1	3	COM 01	
EE	50	EE Research Project 1	1	1	2	EE 40	
EE	51	Electrical Transmission & Distribution System	3	1	4	EE 44	
EE	52	Illumination Engineering Design	2	1	3		EE 53
EE	53	Electrical System Design	2	1	3	EE 46	
EE	54	Instrumentation and Control	2	1	3	ECE 51/51L	
EETE	2	Technical Elective 2	3	0	3	5th Yr. Standing	
EETE	3	Technical Elective 3	3	0	3	5th Yr. Standing	
		Total	18	6	24		

FIFTH YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
ECON	20.1	Principles of Economics with Taxation, Agrarian Reform and Consumer Education	3	0	3		
EE	55	EE Laws, Contract and Ethics	2	0	2	5th Yr. Standing	
EE	56	Electrical Equipment Operation & Maintenance	3	0	3	EE 46	
EE	57	Power System Analysis & Design	3	1	4	EE 53	
EE	58	Power Plant Engineering	2	1	3		EE 57
EE	59	Seminars and Field Trips	0	1	1	5th Yr. Standing	
EE	60	EE Research Project 2	1	1	2	EE 40	
EETE	4	Technical Elective 4	3	0	3	5th Yr. Standing	
ES	08	Engineering Management	3	0	3	5th Yr Standing	
		Total	20	4	24		

Note 3: ***Subjects taken without completing the required pre-requisite will not be credited.***
Note 4: ***Year Level is determined based on completion of at least 75% of the required number of units of the preceding year level prescribed by the curriculum.***
Note 5: ***The regular load of a student per semester is as prescribed in this curriculum indicated as TOTAL number of units, which is the MAXIMUM number of units that a student can take in the semester.***
Note 6: ***At least two (2) of the Technical Electives must be under the same track of specialization.***
Note 7: ***Prerequisite subjects of offered Technical Elective is as declared by the EE Department.***

Technical Elective Tracks:
1. Advance Electrical Design 2. Machine Automation & Process Control 3. Renewable Energy Resources Design

4. BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

FIRST YEAR FIRST SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-req.
ENG	014.1	English Plus: Introduction to Study and Thinking Skills	(3)	0	(3)	
ES	01	Engineering Drawing	0	1	1	
FFP	10	Freshmen Formation Program	3	0	3	
FIL	22	Komunikasyon sa Akademikong Filipino	3	0	3	
HIST	11.1	Rizal's Life, Works, and Writings	3	0	3	
MA	81	College Algebra	3	0	3	
MA	82	Plane & Spherical Trigonometry	3	0	3	
ME	01	Orientation to Mechanical Engineering	1	0	1	
SOC	01.1	Principles of Sociology with Population, Family Planning and HIV/AIDS Education	3	0	3	
PE	1	Physical Fitness	2	0	2	
		Total	**(24) 21**	**1**	**(25) 22**	

FIRST YEAR SECOND SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-req.	Co-req.
ENG	16.1	Study, Thinking and Language Skills in English	3	0	3		
FIL	33	Pagbasa at Pagsulat Tungo sa Pananaliksik	3	0	3	FIL 22	
MA	83	Advanced Algebra	2	0	2	MA 81	
MA	84	Analytic Geometry	2	0	2	MA 81, MA 82	
MA	85	Solid Mensuration	2	0	2	MA 81, MA 82	
PHYS	21	General Physics 1 Lecture	3	0	3	MA 81, MA 82	
PHYS	21 L	General Physics 1 Laboratory	0	1	1	MA 81, MA 82	PHYS 21
PSC	10.1	Politics and Governance with Philippine Constitution	3	0	3		
PSYC	1	General Psychology	3	0	3		
RS	15	The Old Testament	3	0	3		
PE	2	Rhythmic Activities	2	0	2	PE 1	
		Total	**26**	**1**	**27**		

SECOND YEAR FIRST SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-req.	Co-req.
CHEM	81	General Chemistry (Lecture)	3	0	3		
CHEM	81 L	General Chemistry (Laboratory)	0	1	1		
ES	02	Computer-Aided Drafting	0	1	1	ES 01	
ES	10.1	Safety Management/Engineering	1	0	1		
MA	86	Differential Calculus	4	0	4	MA 83, MA 84, MA 85	
PHILO	01	Logic	3	0	3		
PHYS	22	General Physics 2	3	0	3	PHYS 21	
PHYS	22L	General Physics 2 Laboratory	0	1	1	PHYS 21,21L	PHYS22
RS	20	Christology	3	0	3	RS 15	
NSTP	1	National Service Training Program 1	3	0	3		
PE	3	Individual/Dual Sports	2	0	2	PE 2	
		Total	**22**	**3**	**25**		

SECOND YEAR SECOND SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-req.	Co-req.
ENG	34.1	The Literatures of the World	3	0	3	ENG 16.1	
ENG	17	Effective Speech Communication	3	0	3	ENG 16.1	
ES	03	Computer Fundamentals & Programming	0	2	2	2nd year standing	
ES	04	Statics of Rigid Bodies	3	0	3	PHYS 21,21L	MA 87
MA	87	Integral Calculus	4	0	4	MA 86	
ME	21	Workshop Theory & Practice	0	2	2	ES 01, ME 01	
PHILO	15.1	Philosophy of Man and the Human Person	3	0	3	PHILO 01	
NSTP	2	National Service Training Program 2	3	0	3	NSTP 1	
PE	4	Team Sports/Games	2	0	2	PE 3	
		Total	**21**	**4**	**25**		

.THIRD YEAR FIRST SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-req.	Co-req.
ACE	03	Basic Electrical Engineering	2	1	3	PHYS 22,22L	
ES	05	Dynamics of Rigid Bodies	2	0	2	ES 04	
MA	88	Differential Equations	3	0	3	MA 87	
MA	89	Probability and Statistics	3	0	3	MA 81	
ME	22	Thermodynamics 1	3	0	3	MA 87, PHYS 22,22L	
ME	23	Machine Elements 1	2	1	3	ES 04	ES 05
ME	24	Machine Shop Theory	0	2	2	ME 21	
PHILO	30.1	Generic Ethics with PERSON (Philosophical Enrichment and Regeneration for Social Orientation and Networking Program)	3	0	3	PHILO 15.1	
RS	35	Church and Sacraments	3	0	3	RS 20	
		Total	**21**	**4**	**25**		

Note 1: ***Students who do not qualify are required by the English Department to take ENG 014.1, a non-credit subject.***

Note 2: ***FFP10 must be taken within the first year of entry to the University.***

THIRD YEAR SECOND SEMESTER

Code	Number	Description	Lect	Lab	Unit	Pre-req.	Co-req.
ACE	04	Basic Electronics 1 (Lecture)	2	0	2	ACE 03, 03L	
ACE	04 L	Basic Electronics 1 (Laboratory)	0	1	1	ACE 03, 03L	ACE 04
ECON	20.1	Principles of Economics with Taxation, Agrarian Reform and Consumer Education	3	0	3		
ES	06	Mechanics of Deformable Bodies	3	0	3	ES 04	
ES	09	Environmental Engineering	2	0	2	CHEM 81, 81L	
ME	25	Thermodynamics 2	3	0	3	ME 22, ES 05	
ME	26	Machine Elements 2	2	1	3	ME 23	
ME	27	Fluid Mechanics	3	1	4	ME 22, ES 05	
ME	28	Engineering Economy for ME	3	0	3	Third year standing	
PHILO	25	Philosophy of Religion	3	0	3	PHILO 30.1	
		Total	**24**	**3**	**27**		

FOURTH YEAR FIRST SEMESTER

Code	Number	Description	Lect	Lab	Unit	Pre-req.	Co-req.
ACE	10	DC/AC Machinery 1	3	0	3	ACE 03	
ACE	10 L	DC/AC Machinery 1L	0	1	1	ACE 03	
ENG	27	WritingTerm Paper in the Discipline and Business Correspondence	3	0	3	ENG 16.1	
ME	29	ME lab. 1	0	2	2	ME 27	
ME	30	Machine Design 1	3	1	4	ME 26, ES 06	ME 31
ME	31	Materials Engineering	3	1	4	CHEM 81, ES 06	
ME	32	Heat Transfer	3	0	3	ME 22, MA 88, ME 27	
METE	40	Technical Elective 1	3	0	3	Fourth year standing	
		Total	**18**	**5**	**23**		

FOURTH YEAR SECOND SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-req.
ME	33	Combustion Engineering	3	0	3	ME 25, ME 32
ME	34	ME Lab. 2	0	2	2	ME 29, ME 32
ME	35	Machine Design 2	3	1	4	ME 30
ME	36	Refrigeration Systems	3	0	3	ME 25, ME 32
ME	37	Methods of Research for ME	3	0	3	MA 89, Eng 27
ME	38	Fluid Machinery	3	0	3	ME 27
ME	39	Safety Engineering for ME	2	0	2	Fourth year standing
METE	50	Technical Elective 2	3	0	3	Fourth year standing
RS	55	Christian Morality with Social Teachings of the Church	3	0	3	RS 35
		Total	**23**	**3**	**26**	

FOURTH YEAR Summer

Code		Description	Hours	Lect.	Lab.	Unit	Pre-Req.
ME	80	On the Job Training	300	0	2	2	ME 01, ME 39
			Total			2	

FIFTH YEAR FIRST SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-requisite	Co-req.
ME	41	Adv. Engg. Math for ME	3	0	3	MA 88	
ME	42	ME Lab. 3	0	2	2	ME 34	
ME	43	Instrumentations & Control Engineering.	2	1	3	ACE 04, ACE 04L	
ME	44	Air-conditioning & Ventilation System	2	1	3	ME 36	
ME	45	Industrial Processes	2	0	2	ME 34, ME 39	
ME	46	Seminars & Plant Inspections	0	1	1	5th year standing	ME 45
ME	47	ME Final Year Project Study 1	1	1	2	ME 37, ME 32, ME 38	
METE	60	Technical Elective 3	3	0	3	5th year standing	
ENG	41	Humanities: Arts, Aesthetics & Society.	3	0	3	ENG 16	
		Total	16	6	22		

FIFTH YEAR SECOND SEMESTER

Code	Number	Description	Lect.	Lab.	Unit	Pre-requisite
ME	48	Power Plant Engineering	4	2	6	ME 33, ME 38, ME 32
ME	49	Industrial Plant Engineering	3	1	4	ME 45, ME 80
ME	51	ME Laws, Ethics, Codes & Standards.	3	0	3	ME O1, 5th year standing
ME	52	Engineering Management for ME	3	0	3	ME 28, 5th year standing
ME	53	ME Final Year Project Study 2	1	1	2	ME 47
ME	54	Vibration Engineering	2	0	2	MA 88, ES 05
METE	70	Technical Elective 4	3	0	3	5th year standing
		Total	19	4	23	

Note 3: ***Subjects taken without completing the required pre-requisite will not be credited.***

Note 4: ***Year Level is determined based on completion of at least 75% of the required number of units of the preceding year level prescribed by the curriculum***

Note 5: ***The regular load of a student per semester is as prescribed in this curriculum indicated as TOTAL number of units, which is the MAXIMUM number of units that a student can take in the semester.***

Note 6: ***At least two(2) of the Technical Electives must be under the same track or area of specialization.1.*** **Energy Engineering and Management 2. Heating, Ventilating, Air-conditioning and Refrigeration 3. Terotechnology 4. Environmental Engineering**

5. BACHELOR OF SCIENCE IN ELECTRONICS ENGINEERING

FIRST YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req
ENG	014.1	English Plus: Introduction to Study and Thinking Skills	(3)	0	(3)	
ECE	01	Orientation to Electronics Engineering	1	0	1	
ES	01	Engineering Drawing	0	1	1	
FFP	10	Freshman Formation Program	3	0	3	
FIL	22	Komunikasyon sa Akademikong Filipino	3	0	3	
HIST	11.1	Rizal's Life, Works, & Writings	3	0	3	
MA	81	College Algebra	3	0	3	
MA	82	Plane and Spherical Trigonometry	3	0	3	
PSC	10.1	Politics and Governance with Philippine Constitution	3	0	3	
PSYC	1	General Psychology	3	0	3	
PE	1	Physical Fitness	2	0	2	
		Total	(25)22	3	(28)25	

FIRST YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
CHEM	81	General Chemistry (Lecture)	3	0	3		
CHEM	81L	General Chemistry Laboratory	0	1	1		
ENG	16.1	Study, Thinking and Language Skills in English	3	0	3		
FIL	33	Pagbasa at Pagsulat Tungo sa Pananaliksik	3	0	3	FIL 22	
ES	03	Computer Fundamentals & Programming	0	2	2		
MA	83	Advanced Algebra	2	0	2	MA 81	
MA	84	Analytic Geometry	2	0	2	MA 81, MA 82	
MA	85	Solid Mensuration	2	0	2	MA 81, MA 82	
RS	15	The Old Testament	3	0	3		
SOC	01.1	Principles of Sociology w/ Population, Family Planning & HIV/AIDS Education	3	0	3		
PE	2	Rhythmic Activities	2	0	2	PE 1	
		Total	23	3	26		

SECOND YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req	
ACE	21	Discrete Mathematics	3	0	3	MA 81	
ENG	17	Effective Speech Communication	3	0	3	ENG 16.1	
ES	09	Environmental Engineering	2	0	2	CHEM 81, CHEM 81L	
MA	86	Differential Calculus	4	0	4	MA 83, MA 84, MA 85	
PHYS	23	General Physics 1 for ECE	4	0	4	MA 81, MA 82	
PHYS	23L	General Physics 1 for ECE Laboratory	0	1	1		PHYS 23
RS	20	Christology	3	0	3	RS 15	
PHILO	01	Logic	3	0	3		
NSTP	1	National Service Training Program 1	3	0	3		
PE	3	Individual/Dual Sports	2	0	2	PE 2	
		Total	27	1	28		

SECOND YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	
ACE	22	Fundamentals of Material Science and Engineering	3	0	3	CHEM 81,81L	
ENG	34.1	The Literatures of the World	3	0	3	ENG 16.1	
MA	87	Integral Calculus	4	0	4	MA 86	
MA	89	Probability & Statistics	3	0	3	MA 81	
PHYS	24	General Physics 2 for ECE	4	0	4	PHYS 23, PHYS 23L	
PHYS	24L	General Physics 2 for ECE Laboratory	0	1	1	PHYS 23, PHYS 23L	PHYS 24
PHILO	15.1	Philosophy of Man and the Human Person	3	0	3	PHILO 01	
NSTP	2	National Service Training Program 2	3	0	3	NSTP 1	
PE	4	Team Sports/Games	2	0	2	PE 3	
		Total	22	1	26		

THIRD YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
ECE	30	Vector Analysis	3	0	3	MA 87	
ECE	31	Electronic Devices and Circuits	3	1	4	MA 87,PHYS24, 24L, ACE22	EE 31
EE	31	Electric Circuit Theory 1	3	0	3	MA 87, PHYS 24,24L	MA 88
EE	31L	Electric Circuit Theory 1 Laboratory	0	1	1		EE 31
ES	02	Computer Aided Drafting	0	1	1	ES 01	3rd Yr Standing
ES	04	Statics of Rigid Bodies	3	0	3	PHYS 23/23L, MA 87	
ES	07	Engineering Economy and Accounting	3	0	3	3rd Yr. Standing	
ES	10.1	Safety Management/Engineering	1	0	1	3rd Yr. Standing	
MA	88	Differential Equations	3	0	3	MA 87	
PHILO	30.1	Generic Ethics with PERSON (Philosophical Enrichment and Regeneration for Social Orientation and Networking Program)	3	0	3	PHILO 15.1	
		Total	22	3	25		

Note 1: ***Students who do not qualify are required by the English Department to take ENG 014.1, a non-credit subject.***
Note 2: ***FFP10 must be taken within the first year of entry to the University.***
Note 3: ***Subjects taken without completing the required pre-requisite will not be credited.***
Note 4: ***Year Level is determined based on completion of at least 75% of the required number of units of the preceding year level prescribed by the curriculum.***
Note 5: ***The regular load of a student per semester is as prescribed in this curriculum indicated as TOTAL number of units, which is the MAXIMUM number of units that a student can take in the semester***.

THIRD YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
ACE	02	Basic Thermodynamics	3	0	3	MA 87, PHYS 24,24L	
ECE	32	Electronic Circuit Analysis and Design	3	1	4	ECE 31 EE 31, EE 31L	
ECE	33	Advanced Engineering Mathematics for ECE	3	0	3	MA 88, ACE 21	
ECE	34	Electromagnetics	3	0	3	ECE 30, PHYS 24/24L, MA 87	
EE	32	Electric Circuit Theory 2	3	0	3	EE 31,EE 31L	
EE	32L	Electric Circuit Theory 2 Laboratory	0	1	1		EE 32
ES	05	Dynamics of Rigid Bodies	2	0	2	ES 04	
ES	06	Mechanics of Deformable Bodies	3	0	3	ES 04	
RS	35	Church and Sacraments	3	0	3	RS 20	
		Total	23	2	25		

FOURTH YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
ACE	08	Methods of Research	3	0	3	MA 89, 4th Yr Standing	
COM	01	Principles of Communications	3	1	4	ECE 32, ECE33	ECE 41/41L
ECE	41	Signals, Spectra and Signal Processing	3	0	3	ECE 33, MA 89	
ECE	41L	Signals, Spectra and Signal Processing Lab.	0	1	1		ECE 41
ECETE	1	Technical Elective 1	3	0	3	4th Yr. Standing	
EE	41	Energy Conversion	3	0	3	EE 32,EE 32L, ECE 34	
EE	41L	Energy Conversion Laboratory	0	1	1		EE 41
ENG	27	Writing Term Paper in the Discipline and Business Correspondence	3	0	3	ENG 16.1, 4th Year Standing	
ES	08	Engineering Management	3	0	3	4th Yr Standing	
		Total	21	3	24		

FOURTH YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
COM	02	Digital Communications	3	0	3	COM 01	
COM	02L	Digital Communications Laboratory	0	1	1	COM 01	COM 02
ECE	42	Logic Circuits & Switching Theory	3	1	4	ECE 31	
ECE	43	ECE Safety Engineering	2	0	2	4th Yr. Standing	
ECE	44	Numerical Methods	3	0	3	ECE 33, ES 03	
ECE	44L	Numerical Methods Laboratory	0	1	1	ECE 33, ES 03	ECE 44
ECETE	2	Technical Elective 2	3	0	3	4th Yr. Standing	
ECE	45	Feedback and Control Systems	3	0	3	ECE 33	
ECE	45L	Feedback and Control Systems Laboratory	0	1	1	ECE 33	EE 45
PHILO	25	Philosophy of Religion	3	0	3	PHILO 30.1	
		Total	20	4	24		

FOURTH YEAR Summer

Code		Description	Hours	Lect.	Lab.	Unit	Pre-Req
ECE	80	On-The-Job Training Program (300 hours minimum)	300	0	2	2	Comm 02

FIFTH YEAR First Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
COM	03	Transmission Media & Antenna System	3	0	3	COM 02,02L, ECE 34	
COM	03L	Transmission Media & Antenna System Laboratory	0	1	1	COM 02,02L, ECE 34	COM 03
ECE	51	Industrial Electronics	3	0	3	ECE 32	
ECE	51L	Industrial Electronics Laboratory	0	1	1	ECE 32	ECE 51
ECE	52	Microprocessor Systems	3	0	3	ES 03, ECE 32, ECE 42	
ECE	52L	Microprocessor Systems Laboratory	0	1	1	ES 03, ECE 32, ECE 42	ECE 51
ECE	53	ECE Laws, Contracts, and Ethics	3	0	3	5th Yr. Standing	
ECE	54	ECE Final Year Project Study 1	1	1	2	ACE 08, 5th Yr. Standing	
ECETE	3	Technical Elective 3	3	0	3	5th Yr. Standing	
ENG	41	Humanities: Arts, Aesthetics and Society	3	0	3	ENG 16.1	
		Total	19	4	23		

FIFTH YEAR Second Semester

Code		Description	Lec	Lab	Unit	Pre-Req	Co-Req
COM	04	Wireless Communications	3	0	3	COM 03, COM 03L	
COM	05	Data Communications	3	0	3	COM 02, COM 02L	
COM	05L	Data Communications Laboratory	0	1	1	COM 02, COM 02L	COM 05
COM	06	Broadcast Engineering and Acoustics	3	0	3	COM 03, COM 03L	
COM	06L	Broadcast Engineering and Acoustics Laboratory	0	1	1	COM 03, COM 03L	COM 06
ECE	55	ECE Final Year Project Study 2	1	1	2	ECE 54, 5th Yr. Standing	
ECE	56	Seminars and Field Trips	0	1	1	5th Yr. Standing	
ECETE	4	Technical Elective 4	3	0	3		
ECON	20.1	Principles of Economics with Taxation, Agrarian Reform and Consumer Education	3	0	3		
RS	55	Christian Morality with Social Teachings of the Church	3	0	3	RS 35	
		Total	19	4	23		

Note 6: ***At least two (2) of the Technical Electives must be under the same track of specialization.***
Note 7: ***Prerequisite subjects of offered Technical Elective is as declared by the ECE Department.***

Elective Track Areas:

- **Microelectronics**
- **Instrumentation and Control**
- **Biotech/Biomedical Engineering**

6. BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

FIRST YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
CHEM	81	General Chemistry (Lecture)	3	0	3	
CHEM	81L	General Chemistry (Laboratory)	0	1	1	
ENG	014.1	English Plus: Introduction to Study and Thinking Skills	(3)	0	(3)	
ES	01	Engineering Drawing	0	1	1	
FFP	10	Freshmen Formation Program	3	0	3	
FIL	22	Komunikasyon sa Akademikong Filipino	3	0	3	
MA	81	College Algebra	3	0	3	
MA	82	Plane and Spherical Trigonometry	3	0	3	
PE	1	Physical Fitness	2	0	2	
		Total	**(20) 17**	**2**	**(22)19**	

FIRST YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ECON	20.1	Principles of Economics with Taxation, Agrarian Reform and Consumer Education	3	0	3	
ENG	16.1	Study, Thinking and Language Skills in English	3	0	3	
ES	02	Computer-Aided Drafting	0	1	1	ES 01, 2nd year
FIL	33	Pagbasa at Pagsulat Tungo sa Pananaliksik	3	0	3	FIL 22
IE	01	Introduction to Industrial Engineering	1	0	1	
MA	83	Advanced Algebra	2	0	2	MA 81
MA	84	Analytic Geometry	2	0	2	MA 81, MA 82
MA	85	Solid Mensuration	2	0	2	MA 81, MA 82
RS	15	The Old Testament	3	0	3	
PE	2	Rhythmic Activities	2	0	2	PE 1
		Total	**21**	**1**	**22**	

SECOND YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ENG	41	Humanities: Arts, Aesthetics and Society	3	0	3	ENG 16.1
ES	03	Computer Fundamentals and Programming	0	2	2	2nd Year Level
MA	89	Probability and Statistics	3	0	3	MA 81
MA	86	Differential Calculus	4	0	4	MA 83, MA 84, MA 85
PHYS	21	General Physics 1	3	0	3	MA 82, MA 81
PHYS	21L	General Physics 1 Laboratory	0	1	1	MA 82, MA 81
PHILO	01	Logic	3	0	3	
NSTP	1	National Service Training Program 1	3	0	3	
PE	3	Individual/Dual Sports	2	0	2	PE 2
		Total	**21**	**3**	**24**	

SECOND YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ENG	34.1	The Literatures of the World	3	0	3	ENG 16.1
ENG	17	Effective Speech Communication	3	0	3	ENG 16.1
MA	87	Integral Calculus	4	0	4	MA 86
PHILO	15.1	Philosophy of Man and the Human Person	3	0	3	PHILO 01
PHYS	22	General Physics 2	3	0	3	PHYS 21, 21L
PHYS	22L	General Physics 2 Laboratory	0	1	1	PHYS 21, 21L
RS	20	Christology	3	0	3	RS 15
NSTP	2	National Service Training Program 2	3	0	3	NSTP 1
PE	4	Team Sports/Games	2	0	2	PE 3
		Total	**24**	**1**	**25**	

THIRD YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ECON	216	Industrial Economics	3	0	3	ECON 20.1
ES	04	Statics of Rigid Bodies	3	0	3	PHYS 21, 21L, MA 87
ES	08	Engineering Management	3	0	3	3rd Year Level
ES	10.1	Safety Management/Engineering	1	0	1	3rd Year Level
IE	21	Industrial Materials and Processes	2	1	3	CHEM 81, PHYS 21, ES 01
IE	31	Advanced Statistics	3	0	3	MA 89
IE	32	Financial Accounting	3	0	3	2nd Year Level
MA	88	Differential Equations	3	0	3	MA 87
PHILO	30.1	Generic Ethics with PERSON (Philosophical Enrichment and Regeneration for Social Orientation and Networking Program)	3	0	3	PHILO 15.1
		Total	**24**	**1**	**25**	

Note 1: ***Students who do not qualify are required by the English Department to take ENG 014.1, a non-credit subject.***
Note 2: ***FFP10 must be taken within the first year of entry to the University.***
Note 3: ***Subjects taken without completing the required pre-requisite will not be credited.***
Note 4: ***Year Level is determined based on completion of at least 75% of the required number of units of the preceding year level prescribed by the curriculum.***
Note 5: ***The regular load of a student per semester is as prescribed in this curriculum indicated as TOTAL number of units, which is the MAXIMUM number of units that a student can take in the semester.***

THIRD YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ES	05	Dynamics of Rigid Bodies	2	0	2	ES 04
ES	09	Environmental Engineering	2	0	2	CHEM 81, 81L, 3rd Year
ES	07	Engineering Economy and Accounting	3	0	3	3rd Year
IE	34	Methods Study	2	1	3	IE 21, MA 89, ES 08
IE	35	Advanced Mathematics for IE	3	0	3	MA 88
IE	36	Management Accounting	3	0	3	IE 32
IETE	11	Technical Elective 1	3	0	3	MA 89
RS	35	Church and Sacraments	3	0	3	RS 20
		Total	**21**	**1**	**22**	

FOURTH YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ENG	27	Writing Term Paper in the Discipline and Business Correspondence	3	0	3	ENG 16.1
ES	06	Mechanics of Deformable Bodies	3	0	3	ES 04
IE	41	Industrial Quality Control	3	0	3	IE 31, IE 34
IE	42	Operations Research 1	3	0	3	IE 35
IE	43	Ergonomics	2	1	3	IE 34
IETE	12	Technical Elective 2	3	0	3	
PSC	10.1	Politics and Governance with Philippine Constitution	3	0	3	
RS	55	Christian Morality with Social Teachings of the Church	3	0	3	RS 35
		Total	**23**	**1**	**24**	

FOURTH YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
ACE	03	Basic Electrical Engineering	2	1	3	PHYS 22, 22L
ACE	02	Basic Thermodynamics	3	0	3	MA 87, PHYS 22, 22L
HIST	11.1	Rizals Life, Works and Writings	3	0	3	
IE	44	Undergraduate Research	0	2	2	
IE	45	Operations Research 2	3	0	3	IE 42
IE	46	Production Systems	3	0	3	IE 42, IE 41
IETE	13	Technical Elective 3	3	0	3	
PHILO	25	Philosophy of Religion	3	0	3	PHILO 30.1
PSYC	1	General Psychology	3	0	3	
		Total	**23**	**3**	**26**	

FIFTH YEAR First Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
IE	51	Engineering Values and Ethics	3	0	3	5th Year Level
IE	52	Facilities Planning and Design	3	0	3	IE 46
IE	53	Project Feasibility	2	2	4	IE 36, IE 46
IE	54	Information Systems	3	0	3	ES 03, 5th Year Level
IE	55	Systems Engineering	3	0	3	5th Year Level
IETE	14	Technical Elective 4	3	0	3	5th Year Level
SOC	01.1	Principles of Sociology w/ Population, Family Planning and HIV/AIDS Education	3	0	3	
		Total	**20**	**2**	**22**	

FIFTH YEAR Second Semester

Code		Description	Lect.	Lab.	Unit	Pre-Req.
IE	56	Industrial Engineering Internship Program (800 hrs)	0	6	6	

Technical Electives:

Project Management
Job Evaluation and Wage Administration
Product Design and Development
Energy Management

Descriptions/Specifications of Courses

Descriptions/Specifications of Courses offered in XU Engineering Programs

A. Mathematics

1. **College Algebra (MA 81- 3 Units)**
   This course deals with discussion on set theory; real numbers; algebraic expressions and equations; solution sets of algebraic equations in one variable; linear, quadratic, polynomial of degree *n*, fractional, radical equations, quadratic form, exponential and logarithmic equations; decomposition of fractions into partial fractions; solution sets of systems of linear equations involving up to three variables.

2. **Plane and Spherical Trigonometry (MA 82 - 3 Units)**
   This course is about Trigonometric functions; identifies and equations; solutions of triangles; law of sines; law of cosines; inverse trigonometric functions; spherical trigonometry.

3. **Advanced Algebra (MA 83 - 3 Units)**
   This course covers the basic combinatorial mathematics; matrices and determinants; progression; binomial theorem; mathematical induction; partial fractions.

4. **Analytic Geometry (MA 84 - 3 Units)**
   This course deals with equations of lines and conic sections; curve tracing in both rectangular and polar coordinates in two-dimensional space.

5. **Solid Mensuration (MA 85- 3 Units)**
   This course discusses topics on concept of lines and planes; Cavalieri's and volume theorems; formulas for areas of plane figures, volumes for solids; volumes and surfaces areas for spheres, pyramids, and cones; zone, sector and segment of a sphere; theorems of Pappus.

6. **Differential Calculus (MA 86- 3 Units)**
   This course deals primarily on the basic concepts of calculus such as limits, continuity and differentiability of functions; differentiation of algebraic and transcendental functions involving one or more variables; applications of differential calculus to problems on optimization, rates of change, related rates, tangents and normals, and approximations; partial differentiation and transcendental curve tracing.

7. **Integral Calculus (MA 87- 3 Units)**
   This course offers discussion on concept of integration and its application to physical problems such as evaluation of areas, volumes of revolution, force, and work; fundamental formulas and various techniques of integration applied to both variable and multi-variable functions; tracing of two functions of two variables.

8. **Differential Equations (MA 88- 3 Units)**
   This is an undergraduate course that deals largely on the introduction to the study of differential equations and their solution. Topics include differentiation and integration in solving first order, first degree differential equations, linear differential equations of order *n;* Laplace transforms in solving differential equations, power series solutions

9. **Probability And Statistics (MA 89- 3 Units)**
   A course that discusses the basic principles of statistics; presentation and analysis of data; average, median, mode; deviations ; probability distribution; normal curves and applications; regression analysis and correlation; application to engineering problems.

B. Allied, Engineering Sciences and Other Technical Courses:

1. **Engineering Drawing (ES 01- 3 units)**
   This course is designed to introduce the students about techniques of graphical communication; application of drafting instruments, lettering scale, and units of measure; descriptive geometry, orthographic projections; auxiliary views; dimensions; sectional views; pictorial drawings; requirements of engineering working drawings; and assembly and exploded detail drawings.

2. **Computer Aided- Drafting (ES 02- 3 Units)**
   The course introduces the concepts of computer –aided drafting (CAD); introduction to the CAD environment; terminologies; and the general operating procedures and techniques in entering basic CAD commands.

3. **Computer Fundamentals an Programming(ES 03- 3 Units)**
   This course, which consists of lectures and laboratory computer exercises and machine problems, discusses about logic formulation, fundamentals of development; high-level language and programming applications and flowcharting. Laboratory session will cover discussion of the fundamentals of the C++ programming language, and interpretation of the algorithm and flowchart by programming using C++.

4. **Statics of Rigid Bodies(ES 04-3 Units)**
   This is a course covering topics on statics of rigid bodies including force systems, structure analyses, frictions, centroids and centers of gravity and moments of inertia.

5. **Dynamics of Rigid Bodies(ES 05 – 3 Units)**
   This is a lecture course covering the topics on dynamics of rigid bodies including kinetics and kinematics of a particle, kinetics and kinematics of rigid bodies, work energy method and impulse and momentum.

6. **Mechanics of Deformable Bodies (ES 06- 3 Units)**
   This course tackles the mathematical terms of the mechanics involved in materials under load conditions, with topics on axial stress and strain; stresses for torsion and bending; combined stresses; beam deflections; indeterminate beams; and elastic instability. It also focuses on the properties of the material under consideration and the effects of relations between externally applied loads and their internal effects on bodies.

7. **Engineering Economy and Accounting (ES 07- 3 Units)**
   This course is a combination of two major areas, namely engineering economy and accounting. Engineering economy deals with the basic concepts and principles of engineering economy as a tool in decision making process. The other topic covers the fundamentals of accounting. Topics include the time value of money and equivalence; basic economy study methods; decisions under certainty; decisions recognizing risk; and decisions admitting uncertainty.

8. **Engineering Management(ES 08- 3 Units)**
   This course integrates the different theories in management and applies the four basic managerial functions in their actual practice of their respective profession and ultimately become an effective employers/employees in the future. Topics include Decision-making; the function of management, managing production and service-operations; managing the marketing function; managing the finance function.

9. **Environmental Engineering(ES 09- 2 Units)**
   This non-laboratory course is intended for undergraduate students for an introductory study on environmental engineering including topics in ecological framework of sustainable development, pollution environments; water; air; and solid; waste treatment processes, disposal, and management; government legislation, rules and regulation related to the environment and waste management; and environmental management system.

10. **Safety Management/Engineering (ES 10.1, 1 unit)**
    This course covers the engineering and management principles of safety in engineering practice. Topics include evolution of safety management; safety terminology; safety programs adopted by high risk industries; hazards in the construction, manufacturing, gas and power plants, and other engineering industries and how to prevent or mitigate them; techniques in hazard identification and analysis in workplaces; off-the-job safety; disaster prevention and mitigation; and Incident investigation.

11. **Basis Mechanical Engineering(ACE 01- 3 Units)**
    This course is an introduction to fundamental concepts of thermodynamics; heat transmissions in building structures; ventilating and air-conditioning systems; air distribution system design; and indoor air quality. It includes study of design considerations of electrical services, elevator and escalator, fire protection system, illumination, acoustics and automated system for buildings.

12. **Basic Thermodynamics(ACE 02- 3 Units)**
    This is a course dealing with the thermodynamic properties of pure substances, ideal and real gases and the study and application of the laws of thermodynamics in the analysis of processes and cycles. It includes introduction to vapor and gas cycles.

13. **Basic Electrical Engineering (ACE 03- 3 Units)**
    This is a course that introduces the fundamentals of circuit analysis. Beginning with the basic concepts such as voltage, current, sources and Ohm's law; then it proceeds to develop general and powerful procedures used in analyzing electric circuits. These methods are first applied in resistive circuits and later to circuits with more complex elements such as capacitors, inductors and operational amplifiers.

14. **Basic Electronics Laboratory and Lecture (ACE 04- 2 Units lec & 1 Unit Lab)**
    This course comprises of a lecture and a laboratory component that covers the concepts and application of the construction, operation and characteristics of basic electronics devices such as PN junction diode, light emitting diode, Zener diode, Bipolar Junction Transistor and Field Effect Transistor. Diode circuit applications such as clipper, clamper and switching diode circuits will be a part of the lecture; Operation of a DC regulated

power supply as well as analysis of BJT and FET amplifier circuit; the operation and characteristics of operational amplifiers.

15. **Basic Electrical and Electronics Engineering (ACE 05- 2 Units lec & 1 Unit lab)**
    This course, with lectures and laboratory exercises, deals with the basic principles of electrical and electronics engineering of relevance to all students who are taking engineering courses. Topics include DC and AC Circuits, basic electrical and electronic devices, electromagnetic theories, electrical power technology.

16. **Methods of Research (ACE 08- 3 Units)**
    This is an undergraduate introductory course to the process of inquiry, research and writing of a research, project or design proposal. It presents the basic techniques or qualitative research applicable to engineering. Topics include the types and application of research, characteristics of a good research, research design, problem formulation, research instrument and data gathering procedures, and data analysis.

17. **Quantitative Methods in Management (ACE 09- 3 Units)**
    The course introduces the students to quantitative decision-making tools. It covers decision models for planning, decision-making, resource allocation, and control. More specifically, these models are discussed in the context of linear programming, transportation and assignment, network models, queuing and waiting times, project control, and inventory management. These models are applied in solving decision problems to improve the efficiency of operations.

18. **Discrete Mathematics (ACE 21-3 Units)**
    This course covers the basic concepts in discrete mathematics that deal with logic, sets, proofs, growth of functions, theory of numbers, counting techniques, trees and graph theory.

19. **Fundamentals of Material Science and Engineering (ACE 22- 3 Units)**
    This course introduces the students to a broad study on the structure and composition of materials (metals, polymers, ceramics, and composite materials) and their properties and behavior in service environments.

C. Natural/ Physical Sciences

1. **General Chemistry (CHEM 81, 3 units); General Chemistry Laboratory (CHEM 81L)**
   This course covers the basic concepts of matter and its classification; mass relationships in chemical reactions; properties of gases, liquids, and solids; concepts of thermochemistry; quantum theory and electronic behavior; periodic relationship of elements in the periodic table; intermolecular forces; and solutions. Lecture and Laboratory can be taken separately.

2. **General Physics 1 (PHYS 21, 3 units); General Physics 1 Laboratory (PHYS 21L, 1 unit)**
   This course deals with the essential concepts, principles, theories, laws and applications in Mechanics. The study includes physical quantities and measurements; vectors; kinematics; dynamics; the Newton's laws of motion and their applications; work, energy and power; momentum; rational motion. Lecture and Laboratory can be taken separately.

3. **General Physics 2 (PHYS 22, 3 units); General Physics 2 Laboratory (PHYS 22L, 1 unit)**
   The course tackles heat and transfer, thermodynamics, electricity, Fluids, thermal expansion, thermal stress; calorimetry; wave; electrostatic; electricity; magnetism; optics; image formation by plane and curved mirrors; and image formation by thin lenses. Lecture and Laboratory can be taken separately.

D.1. Professional Course Specifications for BS Civil Engineering

1. **Orientation to Civil Engineering (CE 01)**
   This course presents an introduction to engineering and engineering study, the different engineering disciplines, careers in engineering especially in Civil Engineering, skills of a Civil Engineer, various opportunities of Civil Engineers, fundamental concepts in problem solving; as well as strategies for pursuing engineering courses.

2. **Elementary and Higher Surveying (CE 30, 3 units lec, 1 unit lab)**
   This course covers plane surveying principles and its techniques, and various types of higher engineering surveys through lectures, laboratory and field exercises. The course includes topics on measurements of distances, angles and elevations; techniques of data reduction to compute bearings, azimuths, coordinates and areas; precision and accuracy; tachometric surveys, plane table surveys, mapping, control surveys, topographic surveys, astronomical observations, hydrographic surveys; and introductory topics on modern surveys such as GIS, GPS and photogrammetry.

3. **Engineering Surveys (CE 31, 3 units lec, 1 unit lab)**
   The course comprises of lectures on the various types of engineering surveys and an actual laboratory that enhances students' knowledge on its application. The course covers the design of horizontal and vertical highway curves; volume and preliminary costs estimation of construction of highways; control and topographic surveys, route surveys, construction survey, hydrographic survey, land survey and the modern surveys such as GPS and photogrammetry.

4. **Advanced Engineering Mathematics for CE (CE 32, 3 units)**
   This course covers parameters, laws, theorems and the different methods of solutions in advanced mathematics, and their application in the field of civil engineering. Topics include Complex numbers and complex variables, Laplace and inverse Laplace transforms, Power series, Fourier series, Fourier transforms, Z-transforms, power series solution of ordinary differential equations, and partial differential equations.

5. **Building Design 1 (CE 33, 1 unit lec, 1 unit lab)**
   This course covers the theories regarding building plans, its construction, and its application into actual construction. Topics include the different building parts and its construction, i.e. from the foundation to the roofing, the National Building Code and other pertinent codes.

6. **Structural Theory 1 (CE 40, 3 units lec, 1 unit lab)**
   This course covers the principles and practical techniques for the analysis of statically determinate beams, frames, trusses, and combined structures. Theories are introduced and emphasis is given in solving practical problems to acquire conceptual understanding of how structures work and how their behavior can be predicted.

7. **Soil Mechanics (CE 41, 3 units lec, 1 unit lab)**
   Soil Mechanics is the introduction of physical and behavioral characteristics of soils as an engineering material. This course is a study of the nature of soils as a prerequisite to a wide- range of practical applications in the analysis and design techniques for geotechnical situations and in advancement of related researches. Topics covered include identification and classification of soils and rocks, Site investigation and subsurface exploration, the physical and index properties of soil, compaction, water flow through soils, subsurface stress and deformation phenomena in soils, laboratory testing, and the relevance of these topics as they affect soil strength, compressibility, stability, and drainage.

8. **Mechanics of Fluids Lecture & Laboratory (CE 34 & CE 34 L, 2 units lec, 1 unit lab)**
   This is a Lecture and Laboratory course with topics on basic principles governing the behavior of fluids at rest and in motion. It emphasizes on the various methods employed in the development of general relationships in static, kinematics, and kinetics of fluids through calculations and general observation.

9. **Building Design 2 (CE 42, 1 unit lec, 1 unit lab)**
   This course is a continuation of Building Design 1 which covers more theories regarding building plans, its construction, and its application into actual construction. Topics include plumbing code, fire code and electrical code of the Philippines, its interpretation and application in building design and construction.

10. **Construction Materials and Testing (CE 43, 3 units lec, 1 unit lab)**
    This course deals with the introduction to the physical and behavioral characteristics of various Civil Engineering materials. Topics include compositions, engineering behaviors, design methods, standard test procedures, and environmental concerns in the production/sourcing of common Civil Engineering materials, including concrete, cement, asphalt, metal, timber, aggregate, adhesive, polymer, etcetera.

11. **Highway Engineering (CE 44, 3 units)**
    This course covers the concepts and theories relevant to the analysis and design of roads, highways and related structures. Topics include highway administration; traffic, driver, pedestrian and vehicle characteristics; geometric design, roadside design, highway and related structures; intersection, interchanges, terminals; drainage structures; traffic engineering; asphalt and concrete pavements, survey, plans, estimates, contracts and supervision, earthworks, bases and sub-bases, highway maintenance and rehabilitation; with emphasis on the Standard Specification for Public Works and Highways.

12. **Structural Theory 2 (CE 45, 3 units lec, 1 unit lab)**
    The early part of this course tackles some approximate methods for analyzing statically indeterminate structures. The most part discusses various methods of analyzing indeterminate structures including an introduction to matrix structural analysis which students will be prepared in using software for structural analysis.

13. **Foundation Engineering (CE 46, 3 units lec, 1 unit lab)**
    This course is a continuation of the Soil Mechanics course focusing on the design and construction of shallow and deep foundations. Additional topics ~~will~~ include slope stability analysis and retaining wall design, subsurface investigations and soil improvements.

14. **Hydraulics (CE 47, 2 units lec, 1 unit lab)**
    This course comprises of lecture and laboratory sessions to cover the principles and theories of water behavior. Topics include the analysis and the hydraulic design of by systems such as reservoirs dams, spillways, gates, open channels, pipe networks, pumps and turbines; sediment transport in rivers and reservoir; computer hydraulic modeling.

15. **Engineering Hydrology (CE 48, 3 units)**
    The study of Engineering Hydrology is an introduction to the broad topic of water engineering, ranging from hydrologic cycle to flood and various computational tools such as deterministic modeling and probability application that will be used in the design of structures. Topics include precipitation, weather modification, evaporation, infiltration, hydrographs, probability concepts, river and reservoir routing, and storm drain design.

16. **Construction Methods and Project Management (CE 49, 3 units lec, 1 unit lab)**
    This course comprises of lecture, laboratory and field exercises which deal with principles of construction methods and equipment, management and their applications. It covers project planning, scheduling, monitoring and control. It also includes concepts on organization, safety, information systems and computer applications. Students are given opportunities to visit actual project sites and observe the application of these theories in construction projects.

17. **On-the-Job Training Program (CE 80, 2 units)**
    As part of the BS Engineering curricula, the 300-hour On-the-Job Training requires the students to be assigned to various companies and government agencies, such as in design firms, construction works, testing laboratories, where they learn practical applications of the Civil Engineering concepts they learn from the academe and at the same time learn and begin to engulf people skills.

18. **Structural Design 1 (Reinforced Concrete) (CE 50, 3 units lec, 1 unit lab)**
    This course comprises of lecture, laboratory and field exercises which cover the design, applications and code specifications used in structural reinforced concrete members to flexure (beams, girders, joists, lintels, girts, etc.), tension, and compression members (columns), combined stressed members (beam-columns), beam-column connections using the Elastic Limit Method, also known as the Alternate Stress Design (ASD) or Working Stress Design (WSD), and the Plastic Limit Method or the Ultimate Strength Design (USD).

19. **Structural Design 2(Steel and Timber) (CE 51, 4 units lec, 1 unit lab)**
    This is the continuation of Structural Design 1 which covers the basic theories and design philosophies of strength and behavior of structural concrete members and their interrelationships in complex structural systems. Theories are introduced and emphasis is given ~~in~~ to solving practical problems to acquire conceptual understanding of how structural concrete elements work and how their behavior can be predicted. Included topics are on its uses in axial and lateral members, in foundation systems, and application to buildings, bridges, and specialized structures.

20. **Transportation Engineering (CE 52, 3 units)**
    This course covers the analysis and design related to transportation structures and systems, with topics on Design and construction aspects of Highway Surfaces and Railways' Guide ways; Capacity and Level of Service of Air, Rail, and highways; Environmental impacts and their mitigation of transportation system; Traffic-Analysis Techniques; Traffic Flow and Control.

21. **Water Resources Engineering (CE 53, 3 units)**
    This course covers the principles, theories and analysis of water resources systems such as multi-purpose reservoir, water supply distribution system and storm water drainage; irrigation system and agricultural drainage system; special topics include river, flood control, drought mitigation and water resource planning management

22. **CE Laws, Contracts, Specifications and Ethics (CE 54, 3 units)**
    This course exposes the students to the study of selected engineering and business laws applicable to the engineering profession such as labor law, Civil Code and intellectual property laws. It also includes a study of the code of ethics of the engineering profession, competitive bidding practice and techniques for resolving moral problems normally encountered in the practice of profession.

23. **Final Year Project Study (FYPS 10 and 20, 1 unit lec, 1 unit lab)**
    This course involves lecture and laboratory that serve as a venue where Civil Engineering Students develop and present a research paper or study that represents in a nutshell each group's skill and knowledge in the civil engineering field.

24. **Final Year Project Study 2 (FYPS 30, 1 unit lec, 1 unit lab)**
    This course is a continuation of FYPS 1 geared towards the ultimate completion, defense and presentation of the students' study, project or research in the field of Civil Engineering.

ELECTIVES:

25. **Earthquake Engineering (CETE 10)- *Structural Engineering***
    Earthquake Engineering deals with the study of the fundamental concepts, emphasizing on methods, of analysis and design for earthquake loading effects in structural systems. The course also covers the basics of dynamic response calculation and prediction for structural systems to various common forms of loading. The analytical techniques include both spectral and time-domain methods. Other topics include principles of earthquake-resistant design, introduction to general disaster risk management.

26. **Prestressed Concrete Design (CETE 20) - *Structural Engineering***
    This course covers topics on elastic and ultimate strength analysis and design of prestressed concrete structures. The also includes calculations of stresses due to bending, shear, torsion and anchorages, losses of prestresses and deflections; and the theories related to the behavior of statically indeterminate prestressed concrete beams.

Special Topics in Construction Engineering (CETE 30) - *Construction Engineering and Management)*

Special Topics in Structural Engineering (CETE 40) – *Structural Engineering*

D.2. Professional Course Specifications for BS Chemical Engineering

1. **General Chemistry Calculations (CHEM 82, 2 units lec, 1 unit lab)**
   This course comprises of lectures and calculation laboratory exercises that cover the basic chemical theories and concepts often encountered in general chemistry and their corresponding applications in engineering and other fields. Topics include basic stoichiometric calculations, periodic properties of elements, Lewis structures of molecules, stoichiometric calculations involving gases, solutions and heats of reactions, thermodynamics of chemical reactions, chemical kinetics and equilibria, electrochemistry, nuclear reactions.

2. **Analytical Chemistry (CHEM 83, 3 units lec, 2 units lab)**
   The lectures and laboratory exercises deal with the principles and theories and their applications of gravimetric and volumetric methods of analysis, including an introduction to instrumental methods of analysis. Topics include aqueous solutions and chemical equilibria, buffer solutions, titrimetric methods, neutralization, precipitation, titration, spectrochemical methods.

3. **Organic Chemistry (CHEM 84, 4 units lec, 1 unit lab)**
   Lectures cover topics on chemistry carbon compounds and their properties, structures and reactions; principal classes of aliphatic and aromatic compounds, which in conjunction with selected experiments, mechanisms of organic reactions. The laboratory portion covers exercises on variety of techniques for the synthesis, purification, and analysis of organic compounds.

4. **Industrial Chemistry (CHEM 85, 2 units lec, 1 unit lab)**
   The course comprises of lectures and laboratory exercises dealing with the different chemical industries with emphasis on reaction mechanisms that serve the basis of the industrial chemical processes. Topics include the theoretical background of the reactions and processes behind industries on oils and fats, flavors and fragrances, sugar, fermentation, soap and detergents, hydrogen peroxide and inorganic peroxy compounds, industrial acids and bases, polymers petrochemicals, and paints, pigments and industrial coatings. Also included is a discussion of catalysis and its application in the chemical industry.

5. **Orientation to Chemical Engineering (ChE 01)**
   This course presents an introduction to engineering and engineering study, the different engineering disciplines, careers in engineering especially in Chemical Engineering, skills of a Chemical Engineer, various opportunities of Chemical Engineers, fundamental concepts in problem solving; as well as strategies for pursuing engineering courses.

6. **Chemical Engineering Calculations 1 (ChE 10, 2 units lec, 1 unit lab)**
   This course comprises of lectures and calculations laboratory exercises that cover the basic principles in material balances associated with the chemical engineering operations and processes. Topics include Lever Arm Rule, material balances without chemical reactions, stoichiometry, material balances with chemical reactions, multiphase systems and phase diagrams.

7. **Chemical Engineering Calculations 2 (ChE 11)**
   This course deals on material and energy balances in industrial process and involves the application of stoichiometric principles in fuel combustion and related process industries. This includes combustion of gaseous, liquid and solid fuels, production of sulfuric acid, nitrogen compounds, lime and cement.

8. **Advanced Mathematics for Chemical Engineering (ChE 12, 3 units)**
   This course covers parameters, laws, theorems and the different methods of solutions in advanced mathematics, and their application in the field of chemical engineering. Topics include Complex numbers and complex variables, Laplace and Inverse Laplace Transforms, Power series, Fourier series, Fourier Transforms, z-transforms, power series solution of ordinary differential equations, and partial differential equations.

9. **Process of Dynamics and Control (ChE 13, 2 units lec, 1 unit lab)**
   This course combines the mathematical, physical and chemical concepts for application to process simulation and control. Topics include control system, Laplace transforms, modeling, first order open loop systems, higher order open loop systems, feedback control systems, controller tuning.

10. **Computer Applications in Chemical Engineering (ChE 14, 1 unit lab)**
    The course involves exposure, through machine problems and activities, to modern computer applications including design simulations and numerical methods, statistical methods and uses of mathematical software packages for solving problems relevant to the chemical engineering discipline.

11. **Physical Chemistry for Engineers 1 (ChE 20, 3 units lec, 1 unit lab)**
    This course deals with the study of the physical properties and structure of matter, which laws of chemical reaction, and with the theories governing these. Topics include the physical and chemical behaviors of matters, physical systems, laws of thermodynamics and their equations.

12. **Physical Chemistry for Engineers 2 (ChE 21, 3 units lec, 1 unit lab)**
    The lectures and the accompanying laboratory exercises cover the fundamental principles of physical and chemical properties of matter covering chemical and ionic equilibria, electrochemistry, kinetics, surface phenomena and catalysis, and introduction to quantum mechanics.

13. **Chemical Engineering Thermodynamics 1 (ChE 22, 3 units)**
    This course tackles topics on the applications of the 1st and 2nd laws of thermodynamics to close and open systems, volumetric properties of pure substances, the use of Phase diagrams and thermodynamic tables, applications of equations of state for ideal and non-ideal fluids.

14. **Chemical Engineering Thermodynamics 2 (ChE 23, 3 units)**
    This course discusses topics on thermodynamic analysis of power and refrigeration cycles; solution thermodynamics and chemical Equilibria. Topics also include Vapor-liquid equilibrium, phase equilibria, molecular thermodynamics, and liquefaction.

15. **Chemical Reaction Engineering (ChE 24, 3 units)**
    This course is an introduction to the fundamentals of chemical reaction engineering, chemical kinetics and their mathematical description; the behavior, analysis and design of batch, semi-batch; continuously stirred tank reactors and tubular reactors; non-

isothermal and non-homogeneous systems; heterogeneous catalytic reactions and catalyzed bed reactors.

16. **Principle of Transport Processes (ChE 30, 3 units)**
This course discusses the phenomenological development of the equations that describe the transport phenomena (mass, energy, and momentum) and illustrates applications of these equations through examples in chemical engineering. Both molecular and macroscopic transport are covered highlighting unifying principles of transport processes and properties. It serves as the introduction to all mass and/or energy transport-based courses in the ChE program.

17. **Momentum Transfer (ChE 31, 3 units)**
This course deals with the fundamental concepts of the two branches of fluid mechanics (statics and dynamics) which are important in unit operations. The combined mass, energy and momentum balances are applied in compressible or incompressible fluid flow, branching of fluids in transport, steady or unsteady flow, including metering of fluids that are important in the design of fluid flow piping network. The course also covers the design of different types of filtration equipment operated at constant pressure, constant rate or a combined constant pressure preceded by constant rate; and the design of continuous rotary vacuum filter.

18. **Heat and Mass Transfer (ChE 32, 3 units)**
This course discusses the application of heat transfer and mass transfer to the design of equipment employing heat exchange, mass exchange and simultaneous heat and mass exchange. Topics include types and design of heat exchangers, evaporation, crystallization, gas absorption, humidification/dehumidification, drying, and water cooling towers.

19. **Separation Processes (ChE 33, 3 units)**
This course covers the application of principles to equilibrium stage separation operations such as distillation, liquid- liquid extraction, solid- liquid extraction, adsorption, gas absorption and membrane separation.

20. **Chemical Engineering Laboratory 1 (ChE 34, 1 unit lab)**
This course provides hands-on laboratory experience where students perform experiments to apply the theories and principles of unit operations. It is also a laboratory course that investigate various theories encountered in momentum transfer, heat transfer and evaporation. Laboratory exercises include friction losses in pipes pipes and fittings, calibration of flow meters such as pitot tube, orifice meter, venturimeter and weirs, Reynolds number, fluidization and packed bed experiments, double pipe or shell and tube heat exchangers, performance of condensers, radiation, evaporation, performance of a plate and frame filter press, ☐batch or continuous sedimentation, centrifugation.

21. **Chemical Engineering Laboratory 2 (ChE 35, 1 unit lab)**
This courses is a continuation of Chemical Engineering Laboratory 1 that provides hands-on laboratory experience where students perform experiments to apply the theories and principles of unit operations. The course covers mainly laboratory experiments in Mass Transfer Operations such as diffusion, distillation, humidification, drying etc. And experiments in reaction kinetics using a continuous stirred tank reactor (CSTR) and a plug flow tubular reactor.

22. Introduction to Biotechnology (ChE 40, 3 units)

This course discusses the overview of basic microbiology which includes the types of cells and their physical and chemical structure, enzymes for industrial application; the mechanism by which cells grow and work in batch and continuous processes and how environmental factors affect their metabolic activity; and how cells can be altered so that their metabolic capability may be enhanced.

23. Biochemical Engineering (ChE 41, 3 units)

This course deals with the processing of biological materials and processing using biological agents such as cells and enzymes. Topics include enzyme kinetics, stoichiometry of microbial growth and product formation, kinetics of substrate utilization, product formation and biomass production on cell cultures, bioprocess systems, bioreactors, fermentation technology, and mixed microbial population.

24. Chemical Process Industries (ChE 50)

This course is the synthesis and familiarization of undergraduate chemical engineering students to the different chemical process industries, through lectures, reports and plant visits. The course will cover a variety of industrial chemical processes, including both inorganic reactions such as the manufacture of sulfuric acid, ammonia, nitric acid and fertilizers, and the chemistry of metallurgy and air pollution abatement, as well as organic processes, focusing principally on the petrochemical industry and the synthesis pf polymers.

25. Safety in Process Industries (ChE 51, 2 units)

This course covers all the aspects of safety in relation to the industrial field including government regulations and audit and inspection standards that will familiarize the student on the various aspects of safety in the industrial arena. Topics include safety standards, industrial safety practices, safety audit and inspection, current good manufacturing practices, HACCP, emergency preparedness, accident investigation.

26. Industrial Waste Management and Control (ChE 52, 3 units)

This course covers the study of the different environmental management programs applied to industry. These includes: environmental impact assessment, environmental management system, risk assessment, life cycle analysis, pollution prevention and waste treatment (wastewater, air pollutants, solid and hazardous waste).

27. Field Trips and Seminars (ChE 53, 1 unit lab)

This course deals with a series of lectures and seminars on selected topics that are highly relevant to chemical engineering but are not covered in any of the other formal courses. It covers recent advances in chemical engineering. Visits to industrial plants are also conducted during the term.

28. Fundamentals of Materials Science and Engineering (ChE 60, 3 units)

This course introduces the students to a broad study on the structure and composition of materials and their properties and behavior in service environments. Topics include crystalline and non-crystalline materials, metals, metal alloys, ceramics, polymers, composites, electrical, dielectric, magnetic, optical and thermal properties.

29. Process Equipment Design (ChE 61, 1 unit lec, 1 unit lab)

This course is an application of technical and economic selection and design of the principal kinds of chemical process equipment with some integration of number of units

into a process. Topics covered in lectures include process documentation design report, codes, standards and recommended practices, safety and design factors, flow sheeting, materials of construction, cost estimation, and various equipment designs. Design activities cover equipment cost estimation, pumps and piping, pressure vessel, heat exchanger, contactors, and chemical reactor.

30. **Process Design and Project Feasibility (CHE 62, 2 units lec, 1 unit lab):**
This course is intended to develop and test the students' ability to coordinate the knowledge gained in earlier course and apply it to the complete design of a process plant. The course uses experimental research/investigation as a way to obtain primary data needed to develop, verify and test the technical feasibility aspects of the proposed process design. The final major requirement is the Final Year Project Study document which is basically an applied research paper that includes technical and economic analysis of a process design.

31. **Chemical Engineering Plant Design (ChE 63, 3 units lec, 2 units lab)**
The course is a continuation of Process Design and Design and Project Feasibility 1 which cover the major areas in the process design and establishes the fundamental requirements of a chemical plants and integrates the outputs of the course into an over-all design of a chemical plant. Also the course used experimental research/ investigation as a way to obtain primary data needed to develop, verify and test the technical feasibility aspects of the proposed design. The final major requirement of this course is the Final Year Project Study document which is basically an applied research paper that includes technical and economic analysis of a process design.

32. **Laws and Ethics for Chemical Engineering (ChE 64, 2 units)**
The course offers discussion on the relevant national laws on the professional practice in the Philippines, chemical engineering profession, contracting, project implementation, environment and safety, investments and setting of enterprises in the Philippines.

33. **Introduction to Particle Technology (ChE 65, 2 units)**
This course is an introduction to the theories and concepts in particle technology, focusing on characterization, behavior, production, separation, and modeling of particulate systems and surveying engineering processes that involve particulates and powders. Multiphase transport phenomena and fluidization are also discussed.

ELECTIVES:

34. **Food Science and Engineering (ChETE 10)**
This course covers topics on food chemistry (carbohydrates, proteins, lipids, etc.), food microbiology, drying, heating, freezing; milk and dairy products, red meat and poultry, grain products, fruit and vegetable products, beverages; mass and energy balances in food manufacturing process; unit operations for food manufacturing.

35. **Food Safety Systems (ChETE 26)**
This course includes topics on Good Manufacturing Practices (GMP), Hazard Analysis and Critical Control Points (HACCP), and ISO 2200.

36. Food Processing Technologies (ChETE 12)

The course an overview of the different processes involved in food manufacture covering the handling and sourcing of raw materials, process parameters, manning requirements, finished products handling and limitations inherent to each type of food product. It includes meat processing, canned goods, baked products, dairy products and all types of beverages. It also includes topics on food preservation techniques, chemical and heat treatment processes.

37. Oleochemical Processing Technologies (ChETE 13)

This course covers the production of oleochemical products like fatty acids, fatty acid methyl esters, fatty alcohols, fatty amines and glycerols, and the processes and technologies involved. Topics also include the application of oleochemicals in biodiesel production, production of detergents, lubricants, and bio plastics.

38. Wastewater Engineering(CHETE 14)

This course is a specialized course encompassing the protection of the environment commensurate with the public health, economic, social and political concerns. It is also concerned with the basic principles of science and engineering applied to the problems of industrial, municipal and storm water wastewater and water pollution control.

39. Solid Waste Management (ChETE 15)

This course will cover the integrated management of municipal solid waste; waste generation, reduction, storage, collection, transportation, transfer station, recycling and resource recovery, materials recovery facility and management options and engineering principles in the various disposal treatment methods. Design of landfill, composting facility and incineration plant are included in the course. Regulations and policies relevant to solid waste management, technical considerations in the development of engineering design will be addressed.

40. Air Pollution Control (ChETE 16)

The course covers of the chemistry of the earth's atmosphere, its evolution and composition, the meteorology and fate of the pollutants as they diffuse and travel in this medium. The course includes the different types and categories of air pollutants, their sources and effects and the engineering measures to control them. The course will also discuss the relevant laws and policies governing air pollution in the country. Special topics will cover greenhouse gasses, photochemical smog and volatile organic carbons.

41. Hazardous Waste Management (ChETE 17)

This course covers the regulations and guidelines of RA 6969, Toxic and Hazardous Waste Law with emphasis on the requirements, the generation and sources of the waste, their life cycle analysis, minimization, control, and management strategy. The course will also cover life cycle and risk assessment analysis, brownfields and site remediation.

42. Energy Management (ChETE 18)

This course deals with energy management topics of relevance to chemical engineers.

43. Renewable Energy Technologies (ChETE 19)

This course deals with the technologies and impacts of renewable energy sources as alternative sources of power.

44. **Cell and Molecular Biology (ChETE 20)**
This course covers the dynamics of cells; their structures and kinetics, genetic analysis, chemical fundamentals, biotechnology, bioinformatics and its applications in the manufacturing industry and in addressing environmental concerns.

45. **Nanotechnology (ChETE 21)**
This course deals with topics on surveys the core concepts and underlying principles, applications, Social and environmental impacts, workplace concerns and employability outlook of nanotechnology.

46. **Introduction to Polymer Engineering (ChETE 22)**
This course is a survey of fundamental and general knowledge pertaining to structure-property relationships, and the synthesis and manufacture of polymers. In addition, it provides the student an overview of reactor design, including environmental issues to be considered in design and operation of such reactors.

47. **Enzyme Technologies (ChETE 23)**
This course covers study on different enzymes and their functions and uses in the different industries; Latest developments on enzyme technologies and opportunities in the local setting. The course also covers equipment requirements in enzyme production.

48. **Statistical Process Control for Chemical Engineers (ChETE 24)**
This course covers the concepts and principles of control charts and scientific sampling procedures. Topics include quality and defective products, simple bar X and R charts, control chars for fraction rejection, control chart for nonconformities. AQL system, models for quality management.

49. **Entrepreneurships for Chemical Engineers (ChETE 25)**
This is a course that is designed to guide students through the business and legal fundamentals of starting and running a business in the new economy.

D.3. Professional Course Specifications for BS Electronics Engineering

1. **Orientation to Electronics Engineering (ECE 01, 1 unit)**
This course presents an introduction to engineering and engineering study, the different engineering disciplines, careers in engineering especially in Electronics Engineering, skills of an Electronics Engineer, various opportunities of Electronics Engineers, fundamental concepts in problem solving; as well as strategies for pursuing engineering courses.

2. **Vector Analysis (ECE 30, 3 units)**
This course covers topics on vector algebra, vector calculus, vector analysis, and their applications.

3. **Electronic Devices and Circuits (ECE 31, 3 units lec, 1 unit lab)**
This course comprises lecture and laboratory components to cover topics on quantum mechanics state electronics; diode and transistor characteristics and models (BJT and FET); diode circuit analysis and applications; transistor biasing; small signal analysis; large signal analysis; transistor amplifiers; Boolean Logic; transistor switch.

4. **Electronic Circuit Analysis and Design (ECE 32, 3 units lec, 1 unit lab)**
   This is a course with lecture and laboratory exercises dealing with the High frequency transistor models; analysis of transistor circuits; multi-stage amplifier, feedback, differential amplifiers and operational amplifiers; integrated circuit families (RTL, DTL, TTL, ECL, MOS).

5. **Advanced Mathematics for Engineering (ECE 33, 3 units)**
   This course covers selected topics in mathematics and their applications in the field of electronics engineering and other allied sciences. Topics include Complex numbers and complex variables, Laplace and Inverse Laplace Transforms, Power series, Fourier series, Fourier Transforms, z-transforms, power series solution of ordinary differential equations, and partial differential equations.

6. **Electromagnetics (ECE 34, 3 units)**
   Electromagnetics deals with vector algebra, vector analysis, electric and magnetic fields, resistive, dielectric and magnetic materials, coupled circuits, magnetic circuits and fields, time-varying electromagnetic fields, Maxwell's equations and their applications.

7. **Signals, Spectra and Signal Processing (ECE 41 lecture and Laboratory, 3 units lec, 1 unit lab)**
   This course includes lecture and laboratory sessions with topics on Fourier transform; Z transform; convolution; FIR filters; IIR filters; random signal analysis; correlation functions; DFT; FFT; spectral analysis; applications of signal processing.

8. **Logic Circuits and Switching Theory (ECE 42, 3 units lec, 1 unit lab)**
   This course has lecture and laboratory components that cover the review of number systems, coding and Boolean algebra; inputs and outputs; gates and gating networks; combinational circuits; standard form; minimization; sequential circuits; state and machine equivalence; asynchronous sequential circuits; race conditions; algorithmic state machines; design of digital sub-systems.

9. **ECE Safety Engineering (ECE 43, 2 units)**
   This course covers the concepts and principles of safety in engineering practice, with topics on safety programs adopted by high risk industries; hazards in the construction, manufacturing, gas and power plants, and other engineering industries and how to prevent or mitigate them; techniques in hazard identification and analysis in workplaces; off-the-job safety; disaster prevention and mitigation; and incident investigation.

10. **Numerical Methods (ECE 44 Lecture and Laboratory, 3 units lec, 1 unit lab)**
    This course, which consists of lectures and laboratory, discusses topics on direct and interactive numerical methods in engineering, determination of error bounds in calculations, computation of series expansions, roots of algebraic and transcendental equations, numerical differentiation and integration, solution to simultaneous linear and non-linear equations, function approximation and interpolation, differential equations, optimization, and their applications.

11. **Feedback and Control Systems (ECE 45 Lectures and Laboratory, 3 units lec, 1 unit lab)**
    This course deals with the time and frequency response of feedback control systems. The topics include, time response of the first order and second order systems, modeling,

transfer functions, pole-zero map, stability analysis, root locus, bode plots, compensators, PID controllers, and introduction to state-space technique.

12. **Industrial Electronics (ECE 51 Lectures and Laboratory, 3 units lec, 1 unit lab)**
    This is course with lecture and laboratory exercises dealing with the theory and operating characteristics of electronic devices and control circuits for industrial processes; industrial control applications; electronics instrumentation; transducers; data acquisition system, power supply and voltage regulator.

13. **Microprocessor Systems (ECE 52 Lectures and Laboratory, 3 units lec, 1 unit lab)**
    The course covers concepts on microprocessor/ microcontroller systems architecture/ organization including microprocessor/ microcontroller programming, interfacing techniques, memory systems and bus standards. In the laboratory, the students are involved with experiments using microcontrollers and the use of microprocessor/ microcontroller development systems and other tools.

14. **ECE Laws, Contracts, and Ethics (ECE 53, 3 units)**
    This course includes topics on contracts; warranties; liabilities; patents; bids; insurance; and other topics on the legal and ethical positions of the professional engineer.

15. **ECE Final Year Project Study 1 (ECE 54, 1 unit lec, 1 unit lab)**
    This course covers lectures, laboratory and other activities necessary for the students in carrying out the process of doing scientific activities to complete the required Final Year Project Study. As a pre-requisite for the completion of an Engineering degree in Xavier University, the study, project or research aims to produce new knowledge or to solve a practical problem in the field of Electronics Engineering.

16. **ECE Final Year Project Study 2 (ECE 55, 1 unit lec, 1 unit lab)**
    This course is a continuation of FYPS 1 geared towards the ultimate completion, defense and presentation of the students' study, project or research in the field of Electronics Engineering.

17. **Seminars and Field Trips (ECE 56, 1 unit lab)**
    This course includes seminars and lectures on current topics on electronics engineering development; fieldtrips to different companies and plants dealing or engaged in electronics facilities.

18. **On-the-Job Training (ECE 80, 2 units)**
    As part of the BS Engineering curricula, the 300-hour On-the-Job Training requires the students to be assigned to various companies and government agencies, where they learn practical applications of the Electronics Engineering concepts they learn from the academe and at the same time learn and begin to engulf people skills.

COMMUNICATIONS Courses:

19. **Principles of Communications (COM 01, 3 units lec, 1 unit lab)**
    This is a course with lecture and laboratory exercises that cover the concepts and analysis of communication systems. Topics include Bandwidth; filters, linear modulation; angle

modulation; phase locked loop; pulse modulation; multiplexing; noise analysis; radio transmitters and receivers.

20. **Digital Communications (COM 02 Lecture and laboratory, 3 units lec, 1 unit lab)**
    This course, which comprises of lecture and laboratory, focuses on Random variables, bit error rate; matched filter, Digital modulation techniques; ASK,QAM, PSK/QPSK, CDMA and W-CDMA systems; signal space; generalized encoding; error correcting codes information theory; data compression; coding theory.

21. **Transmission Media & Antenna System (COM 03 lecture and laboratory, 3 units lec, 1 unit lab)**
    This a lecture and laboratory course dealing with topics on Transmission media; radio wave propagation wire and cable transmission systems; fiber-optic transmission system; transmission lines and antenna systems.

22. **Wireless Communications (COM 04, 3 units)**
    This is a lecture and laboratory course that covers topics on cover signal transmission modes; spread spectrum modulation system; terrestrial microwave; satellite systems; satellite multiple access techniques; terrestrial and satellite systems path calculations and link budgets.

23. **Data Communications (COM 05 lecture and Laboratory, 3 units lec, 1 unit lab)**
    This lecture and laboratory course covers theoretical concepts and applications involving Data communication systems; terminals, modems; terminal control units; multiplexers; concentrators; front-end processors; common carrier services; data communication system design; computer network models; TCP/IP; Principles; LAN; WAN; sample case studies.

ELECTIVES:

- **Microelectronics**
- **Instrumentation and Control**
- **Biotech/Biomedical Engineering**
- **Communication Systems Design**
    - This course includes topics on Communication systems analysis and design; operating performance and interface standards for voice and data circuits; telecommunications facility planning; outside plant engineering; surveying; switching and handling systems; mobile systems and standards; cellular radio systems (GSM AND UMTS architecture) ; PSTN

D.4. Professional Course Specifications for BS Electrical Engineering

1. **Orientation to Electrical engineering (EE 01, 1 unit)**
    This course presents an introduction to engineering and engineering study, the different engineering disciplines, careers in engineering especially in Electrical Engineering, skills of an Electrical Engineer, various opportunities of Electrical Engineers, fundamental

concepts in problem solving; as well as strategies for pursuing engineering courses. Topics also include aptitude and academic requirements, professional responsibilities, problem definition and solution, engineering design, and terminology.

2. **Advanced Engineering Mathematics for EE (EE 30, 3 units)**
   The content of this course involves modeling, solving, and interpreting various basic and advanced mathematical tools such as matrices and system of linear and differential equations including eigenvectors, scrutinized topics of Laplace and Fourier transform, and partial differential equations needed for engineering applications, especially in the field of Electrical Engineering.

3. **Electromagnetics (EE 33, 3 units)**
   This course deals with electric and magnetic fields, resistive, dielectric and Magnetic materials, coupled circuits, magnetic circuits and fields, time-varying Electromagnetic fields and Maxwell's equations.

4. **Electrical Circuit 1 (EE 35, 3 units lec, 1 unit lab)**
   This course comprises of lectures and laboratory exercises that introduce the fundamentals of circuit analysis. Topics include electrical circuit theory , voltage, current, energy sources and Ohm's law; analysis and applications of series, parallel and series-parallel resistive circuits; mesh and nodal analysis; network theorems; characteristics of inductors and capacitors; analysis of RL, RC, and RLC circuits with DC excitation ; general and powerful procedures used in analyzing electric circuit. These methods are first applied to resistive circuits and later to circuits with more complex elements such as capacitors, inductors operational amplifiers and other electronic devices.

5. **Electrical Circuit Theory II (EE 36, 3 units lec, 1 unit lab)**
   This course, accompanied with laboratory exercises, deals with the introduction of the characteristics of passive and active elements, its mathematical and practical interpretations, use of phasors or vectors (complex quantities) as alternative solutions for its circuit analysis, and the calculation of power and energy involve in these elements. Topics include steady state frequency domain analysis of RLC circuits driven by sinusoidal voltage/current source(s); impedance bridge circuits; application of mesh/nodal analysis and network theorems in AC circuit analysis; concept of power and power factor correction in AC circuits; resonant and tuned circuits; two port network analysis; analysis of dynamic circuits with AC excitation

6. **Research Methods for EE (EE 40, 1 unit)**
   Research Methods is an undergraduate introductory EE course to the process of inquiry, research and writing of a research, project or design proposal. This course presents the basic techniques of qualitative and quantitative research applicable to Engineering. Topics include the types and application of research, characteristics of a good research, research design, problem formulation, research instrument and data gathering procedures, and data analysis.

7. **Electrical Circuit Theory III (EE 42, 2 units lec, 1 unit lab)**
   This course is an introduction to the field power system. Lectures and Laboratory exercises focus on polyphase systems, especially the most economical three-phase system. It also discusses on symmetrical components which is one of the requirements to fault calculations. Topics include analysis of balanced three-phase systems, with balanced and

unbalanced loading; analysis of circuits with magnetically-coupled coils; symmetrical components; per unit calculations.

8. **DC Machinery (EE 43, 2 units lec, 1 unit lab)**
   This course comprises of lectures and laboratory exercises which cover the basic principles and theories of DC Machinery in preparation for study in AC Machinery. Topics include electromechanical energy conversion, generalized machine model, and the operating characteristics of DC machines and synchronous machines.

9. **AC Machinery (EE 44, 3 units lec, 1 unit lab)**
   The entire course comprises lectures and laboratory exercises that cover the theories and principles of operation, engineering aspects and applications of three phase alternators, three-phase induction motors, synchronous motors and single-phase motors

10. **Control System Analysis (EE 45, 3 units)**
    This course introduces the fundamental theory and practice of control systems. The emphasis is on the analysis and design of a feedback system. Beginning with the study of the basic concepts of system modelling, in both mechanical and electrical system, the course gradually progresses to the study and analysis of the system responses such as the transient response, steady state response and stability. The topics covered include time response of first order and second order systems, modelling, transfer functions, pole-zero map, stability analysis, root locus, bode plots, compensators, PID controllers, and introduction to state-space techniques.

11. **AC Apparatus and Devices (EE 46, 2 units lec, 1 unit lab)**
    The course covers learning the theories and principles of operation and applications of single-phase transformers, parallel operation of transformers, autotransformers, three phase transformers, instrument transformers, circuit breakers, power relays and other selected equipment and devices currently used in the field as basic requirements of an electrical system in a lecture and laboratory environment.

12. **Microprocessor Systems (EE 47, 2 units lec, 1 unit lab)**
    The course covers concepts involving microprocessor/ microcontroller systems architecture/ organization including microprocessor/ microcontroller programming, interfacing techniques, memory systems and bus standards, through various lectures and laboratory exercises .Experiment topics include: assembly language programming topics, interfacing with input and output devices, data transfer between micro controller-based and the PC via serial port and parallel port.

13. **Numerical Methods with Computer Applications (EE 48, 2 units lec, 1 unit lab)**
    The entire course consists of a lecture and laboratory environment for the study of direct and interactive numerical methods in engineering, determination of error bounds in calculations, computation of series expansions, roots of algebraic and transcendental equations, numerical differentiation and integration, solution to simultaneous linear and non-linear equations, function approximation and interpolation, differential equations, optimization, and their applications.

14. **Electrical Engineering Safety (EE 49, 1 unit)**
    The course covers topics on industrial accident prevention and safety organization, accident analysis, selection and application of remedy/corrective actions, industrial health and environmental concerns, first-aid and CPR.

15. **EE Research Project 1(EE 50, 1 unit lec, 1 unit lab)**
    This course covers lectures, laboratory and other activities necessary for the students in carrying out the process of doing scientific activities to complete the required research or project. As a pre-requisite for the completion of an Engineering degree in Xavier University, the study, project or research aims to produce new knowledge or to solve a practical problem in the field of Electrical Engineering.

16. **Electrical Transmission & Distribution System (EE 51, 3 units lec, 1 unit lab)**
    The understanding of the theories and principles of the operation of distribution systems and equipment is covered in lectures and laboratory exercises. This course covers the study and design of primary and secondary distribution networks, load characteristics, voltage regulation, metering techniques and systems, and protection of distribution systems.

17. **Illumination Engineering Design (EE 52, 2 units lec, 1 unit lab)**
    Through lectures and laboratory exercises, this course offers topics on the basic principles and the components of lighting system, its design, maintenance, cost estimation and use of energy efficient lighting systems in the residential, commercial and industrial establishments.

18. **Electrical System Design (EE 53, 2 units lec, 1 unit lab)**
    This course comprises of lectures and laboratory or drafting exercises that cover the basic concepts of electrical designing. Topics include electrical system design, installation, and cost estimation for commercial and Industrial establishments, guided by the provisions of the Philippine Electrical Code (PEC) and other relevant laws and standards.

19. **Instrumentation and Control (EE 54, 2 units lec, 1 unit lab)**
    Topics on the basic concepts and principles of instrumentation and control are learned in a lecture and laboratory environment. Specific topics include Control and Testing; Electromechanical, analogue, and digital measuring and testing instruments; R, L and C measurements: calibration; graphic and waveform analyzing instruments; and detectors for the measurements of process variables; analysis of performance characteristics of control systems, electronics, magnetic, hydraulic and mechanical control.

20. **EE Laws, Contracts and Ethics (EE 55, 2 units)**
    This course, intended for Electrical Engineering students, involves topics on Philippine Electrical Code, Contracts, Patent and Copyright Law, Electrical Engineering Professional Ethics, and EE Scope of Work.

21. **Electrical Equipment Operation Maintenance (EE 56, 3 units)**
    This course covers the basic concepts of difference electrical equipment and devices; and their operation, functions, characteristics and applications of different electrical equipment and devices; the design, installation and troubleshooting, automation and control of different kinds of industrial motors.

22. **Power System Analysis & Design (EE 57, 3 units lec, 1 unit lab)**
    This course has lecture and laboratory components which cover topics on Basic structure of power systems, recent trends and innovations in power systems, complex power, per-unit quantities, transmission line parameters, network modelling and calculations, load flow studies, short circuit calculations, use of computer software for simulation

23. **Power Plant Engineering (EE 58, 2 units lec, 1 unit lab)**
    Through lectures and laboratory and drafting exercises, the various existing types of electrical equipment, apparatus and devices used in power plant substations are covered. Specific topics also covered include Load Graphics, types of power plants, power plant operation and protection, interconnections, economics of electric service and arrangement of equipment for modern plants.

24. **Seminars and Field Trips (EE 59, 1 unit lab)**
    This is a Seminars and lectures on current topics on Electrical engineering development; fieldtrips to different companies and plants dealing or engaged in Electrical facilities.

25. **EE Research Project 2 (EE 60, 1 unit lec, 1 unit lab)**
    This course is a continuation of EE Research Project 1 geared towards the ultimate completion, defence and presentation of the students' study, project or research in the field of Electrical Engineering.

26. **On-the-Job Training (EE 80, 2 units)**
    The 300-hour On-the-Job Training requires the students to be assigned to various companies and government agencies, where they learn practical applications of the Electrical Engineering concepts they learn from the academe and at the same time learn and begin to practice people skills.

27. **Mechanics of Fluids (ACE 40, 2 units)**
    This course covers the basic principles and practical aspects of fluid mechanics, with topics on properties of fluid, pressure intensity, static pressure, relative equilibrium of liquids, kinematics of flow and fluid dynamics, flow through orifices, nozzles, venturimeter, weirs and flow meters.

28. **Information Technology (ACE 41, 2 units lec, 1 unit lab)**
    This course comprises of lectures and laboratory exercises that deal with data and databases, telecommunications. Topics covered include software development, data communications computer networking, databases, internet and web technologies.

D.5. Professional Course Specifications for BS Industrial Engineering

1. **Introduction to Industrial Engineering (IE 01- 3 Units)**
    This is a first year course intended for Industrial Students to achieve a smooth transition from high school to IE academic life while attaining understanding about the field. This course presents an introduction to engineering and engineering study, history of IE, elements of IE, skills of Industrial Engineer, opportunities in IE, and IE at Xavier University, through various activities interactive activities such as lectures, readings, role plays, workshops and testimonies.

2. **Industrial Economics (ECON 216, 3 units)**
   This course covers the concepts, theories and principles of economics and its application.

3. **Industrial Material Processes (IE 21- 3 Units)**
   This course comprises of a lecture and laboratory environment that focus on Industrial Materials and Processes and their effects on production system decisions. Topics include Metals, plastics, glass and ceramics, elastomers, wood, pulp and other common engineering materials, their uses and their production process.

4. **Advanced Statistics (IE 31-3 Units)**
   This course covers topics on the tools and techniques of statistical design and analysis for engineering application. Topics include Regression, correlation, and design of experiments and their applications in Industrial Engineering.

5. **Financial Accounting (IE 32 -3 Units)**
   The course covers the basic Accounting concepts and principles applied to service, merchandizing and manufacturing operations; partnerships and corporations; the analysis, interpretation and use of accounting data for management.

6. **Methods Study (IE 35- 3 Units)**
   This course covers topics and concepts on Productivity and its techniques. Topics include methods study and work measurement, wage payment, indirect and expense labor standards, training practices.

7. **Advanced Engineering Mathematics for IE (IE 35- 3 Units)**
   This is a lecture course which covers topics on Matrices, determinants, systems of linear and nonlinear equations, elements of error analysis, real roots of an equation, polynomial approximation by finite difference and least squares methods, and numerical solution on systems of linear and nonlinear equations.

8. **Management Accounting (IE 36- 3 Units)**
   This course covers the basic concepts and theories of cost accounting process, and its uses of accounting information for managerial planning and control.

9. **Industrial Quality Control (IE 41- 3 Units)**
   This course deals with lectures on Natural and assignable variations, central limit theorem, process control, tools for process control, benefits of control charts, traditional control chart for variables, traditional control charts for attributes, process capability and acceptance sampling.

10. **Operation Research 1 (IE 42- 3 Units)**
    The course deals with the fundamentals concepts of deterministic methods of operation research. It applies the scientific method to management and engineering. This course addresses both model building and optimization by focusing on the deterministic methods of operation research. This course also discusses Linear programming formulation and solution techniques, duality theory, sensitivity analysis; transportation and assignment problems; network models.

11. **Ergonomics (IE 43- 3 Units)**
    This course comprises of lectures and laboratory exercises that cover topics on origins and development of human factors and ergonomics, movement, cognitive and environmental

factors in ergonomic workplace design and evaluation, tools and techniques of ergonomic risk assessment.

12. **Undergraduate Research (IE 44-3 Units)**
    This course is intended for IE students who are entitled to study fundamentals of research design; quantitative research methodologies; conduct of actual research; research proposal and report writing.

13. **Operation Research 2 (IE 45- 3 Units)**
    This course is designed to help students quantify and organize stochastic problems through modeling of relationships and decision making variables. This course involves topics on the role of models for understanding the impacts of interdependent elements has become more important. Probability and statistics, risk and uncertainty, stochastic processes, and other techniques of operations research provide a way to organize, model, and understand such relationships.

14. **Production Systems (IE 43- 3 Units)**
    The course deals with the Analysis, design, and management of production systems. Productivity measurement, forecasting techniques, project planning, line balancing, inventory systems, aggregate planning, master scheduling, operations scheduling, and modern approaches to production management such as Just in- Time production.

15. **Engineering Values and Ethics (IE 51- 3 Units)**
    This course covers an overview on values, value system, value formation and value clarification processes; work and responsibilities of an industrial engineer; relations of the industrial engineer with the state, the public, the clients, employer, engineers, and other professionals.

16. **Facilities Planning and Design (IE 52- 3 Units)**
    This is a course that covers topics on Principles and practices of the planning of facility layout and material handling equipment for manufacturing and service systems; Analytical approaches in site location, facility layout, material handling, and storage systems; Systematic procedures and computer-aided techniques.

17. **Project Feasibility (IE 53- 3 Units)**
    This course deals with the application of principles and tools in Industrial Engineering in analyzing problems in the large manufacturing industrial and small and medium enterprises. It is a combination of lecture, consultation and actual immersion in the industry from which project feasibility study will be expected from each or group of students at the end of the semester. Each group or students shall have a faculty adviser. At the end of the semester, the students are expected to present his project and validated solutions to the Industrial Engineering Unit, the management of the company they have conducted of study with and/ or Department of Trade and Industry if study is part of the XUIE-DTI-SME linkage program.

18. **Information Systems (IE 54- 3 Units)**
    This course is a study of Information systems as one of the important resources of business management process. This includes the fundamental technology employed in information systems; the support made by information systems in numerous business operations and the management decision making processes. As a practical operation in this course, the

students are grouped to come up with an application project which they will present and discuss at the end of the semester.

19. **Systems Engineering (IE 55- 3 Units)**
    This course covers topics on total systems analysis and design, integration of subsystems with concentration on optimal total systems implementation.

20. **On the Job Training (IE 56)**
    As part of the BS Engineering curricula, the 800-hour On-the-Job Training requires the students to be assigned to various companies and government agencies, where they learn practical applications of the Industrial Engineering concepts they learn from the academe and at the same time learn and begin to engulf people skills

TECHNICAL ELECTIVES:

- Project management
- Job Evaluation and Wage Administration
- Product Design and Development
- Energy Management

D.6. Professional Course Specifications for BS Mechanical Engineering

1. **Orientation to Mechanical Engineering (ME 01, 1 unit)**
   This course is intended to provide information in the field of Mechanical Engineering. This course presents an introduction to engineering and engineering study, the different engineering disciplines, careers in engineering especially in Mechanical Engineering, skills of a Mechanical Engineer, various opportunities of Mechanical Engineers, fundamental concepts in problem solving; as well as strategies for pursuing engineering courses.

2. **Workshop Theory and Practice (ME 21, 2 units lab)**
   This a laboratory course that covers the basic principles of machine shop practices. It includes workshop safety and organization; simple workshop measuring instruments, hand tools, fitting bench work, bench drill and bench grinder; sheet metal working; principles of welding processes; welding metallurgy; joining processes; testing and inspection of welds; foundry and metal casting.

3. **Thermodynamics 1 (ME 22, 3 units)**
   This course deals with the thermodynamic properties of pure substances, ideal and real gases and the study and application of the laws of thermodynamics in the analysis of processes and cycles. It includes introduction to vapor and gases.

4. **Machine Elements 1 (ME 23, 2units lec, 1 unit lab)**
   The course comprises of lectures and laboratory exercises that covers the study of mechanisms regarding the forces and energies that causes the motion. It emphasizes on the analytical and graphical study of displacement, velocity and acceleration.

5. **Machine Shop Theory (ME 24, 2 units lab)**
   This is a laboratory course that covers the use and operation of machines such as lathes, shapers, planers, drilling and boring machines, milling machine, cutters, grinding machines, machine tools and accessories. It also covers technological advances in metal working and new innovations in machine shop.

6. **Thermodynamics 2 (ME 25, 3 units)**
   This course is aimed to further enhance the student's knowledge regarding the principles of thermodynamics by using these principles in practical application specifically in the field of power generation. This includes study of real gases, properties of gas and vapor mixtures and introduction to reactive systems.

7. **Machine Elements 2 (ME 26, 2 units lec, 1 unit lab)**
   This course covers learning the elements of mechanism such as gears, gear trains, rolling bodies, belt and pulleys, ropes, hoisting, chairs, sprockets, cams and follower through lectures and laboratory exercises.

8. **Fluid Mechanics (ME 27, 3 units lec, 1 unit lab)**
   This is a course with lectures and laboratory exercises concerning topics on nature and physical properties of fluids as well as the identification and measurement of fluid properties. It emphasizes the application of conservation laws on mass, energy and momentum to fluid systems either incompressible or compressible flow and in viscid or viscous flow as well as head loss calculation on pipes and fittings.

9. **Engineering Economy for ME (ME 28, 3 units)**
   This course is intended for Mechanical Engineering students to study the concepts of the time value of money and equivalence; basic economy study methods; decisions under certainty; decisions recognizing risk; and decisions admitting uncertainty.

10. **ME Laboratory 1 (ME 29, 2 units lab)**
    The course involves the study and use of devices and instruments used to measure pressure, temperature level, flow, Speed, weight, area, volume, viscosity, steam quality, and products of combustion. It also includes the study and analysis of fuels and lubricants.

11. **Machine Design 1 (ME 30, 3 units lec, 1 unit lab)**
    This lecture with laboratory course covers topics on the various mechanical properties of engineering materials in lieu of the determination of design stresses. It includes of simple, variable and combined stresses applied to different mechanical elements such as shafts and mechanical springs.

12. **Materials Engineering (ME 31, 3 units lec, 1 unit lab)**
    The course comprises of lectures and laboratory exercises that deal with the properties of engineering materials including mechanical acoustical, electrical, magnetic, chemical, optical and thermal properties; laboratory experiments using equipment include; tension, compression, bending shear, torsion and impact tests.

13. **Heat Transfer (ME 32, 3 units)**
    The course covers topics on the different modes of heat and mass transfer; laws governing conduction, convection and radiation and its application to the design of common heat exchangers such as condenser; Cooling coils and evaporators; and the environmental impact of their operation.

14. **Combustion Engineering (ME 33, 3 units)**
    The course deals with principles involved in combustion, carburetion and fuel injection; fundamentals and basic of the most commonly used fluid machineries such as pumps, fans, blowers, compressors and turbines.

15. **ME Laboratory 2 (ME 34, 2 units lab)**
    The course involves the study and test of mechanical engineering equipment and machineries such as steam generator, steam turbine, heat exchangers, internal and external combustion engines, pumps, fans, blowers and compressors

16. **Machine Design 2 (ME 35, 3 units lec, 1 unit lab)**
    The course covers the design of various mechanical elements such as brakes and clutches, bearings, flexible transmitting elements, gears, flywheels. It also includes the study of welding design.

17. **Refrigeration Systems (ME 36, 3 units)**
    This course covers the concepts and foundation of the thermodynamic principles and components of mechanical refrigeration systems; cycles and associated equipment, and the effect of their operation on the environment.

18. **Methods of Research for Mechanical Engineering (ME 37, 3 units)**
    This course covers the study of the methodologies used in conducting an engineering research. It includes the types and application of research, characteristics of a good research, problem formulation research design, research instrument and data gathering procedures, data analysis. It also deals with the study of writing a research proposal and various formats.

19. **Fluid Machinery (ME 38, 3 units)**
    The course is a comprehensive study of the principles and theories in the proper operation, selection and application of the most commonly used fluid machineries such as pumps, fans, blowers, compressors and turbines.

20. **Safety Engineering for ME (ME 39, 2 units)**
    This is a course related to the study of industrial safety and health. It includes risk mitigation process and components from hazards and risk identification, evaluation and control.

21. **Advanced Engineering Mathematics for ME (ME 41, 3 units)**
    This course includes topics in mathematics and their applications in mechanical engineering and other allied sciences. It covers the study of complex numbers, Laplace and inverse Laplace transforms, power series, Fourier series, matrices and determinants, vector analysis and numerical methods.

22. **ME Laboratory 3 (ME 42, 2 units lab)**
    The course covers the practical study of performance analysis and evaluation of refrigeration, air-conditioning and ventilation systems and power plants.

23. **Instrumentation & Control Engineering (ME 43, 2 units lec, 1 unit lab)**
The course includes lectures and laboratory exercises that introduce the basic concepts of instrumentation and process controls as well as important applications of feedback control systems with emphasis on analysis as well as design techniques.

24. **Air-conditioning & Ventilation System (ME 44, 2 units lec, 1 unit lab)**
This is a course that deals with Psychometric properties of air; affecting human comfort; air distribution and basic duct design drying, heating and ventilation; cooling load calculations; complete design of an air-conditioning system and its component and different types of refrigerants , their uses and effects as used air-conditioning system.

25. **Industrial Processes (ME 45, 2 units)**
This course studies the methods of transformation of raw materials to finished products by utilizing power, machineries, equipment, technology and operation.

26. **Seminars and Plant Inspections (ME 46, 1 unit lab)**
This course exposes students to attendance and participation in Seminars and lectures on current topics on Electrical engineering development; and fieldtrips to different companies and plants dealing or engaged in Mechanical Engineering facilities.

27. **Final Year Project 1 (ME 47, 1 unit lec, 1 unit lab)**
This course covers lectures, laboratory and other activities necessary for the students in carrying out the process of doing scientific activities to complete the required research or project. As a pre-requisite for the completion of an Engineering degree in Xavier University, the study, project or research aims to produce new knowledge or to solve a practical problem in the field of Mechanical Engineering.

28. **Power Plant Engineering (ME 48, 4 units lec, 2 unit lab)**
This course covers the fundamental concepts in the design and installation of typical power plants such as steam power plant, diesel electric plant, geothermal power plant as well as other generating plants using non-conventional sources of energy.

29. **Industrial Plant Engineering (ME 49, 3 units lec, 1 unit lab)**
This course is related to mechanical engineering theories, equipment and systems that are needed in the operation of an industrial/manufacturing plant.

30. **ME Laws, Ethics, Codes & Standards (ME 51, 3 units)**
The course deals with the study of the Mechanical Engineering law, code of ethics, ethical theories, and ethical issues in the practice of engineering. Familiarization with the technical codes and standards are included.

31. **Engineering Management for ME (ME 52, 3 units)**
The course involves the study of Decision-making; the functions, roles and skills in engineering management. It covers the planning, organizing, leading, controlling and staffing of engineering organization.

32. **ME Final Year Project Study 2 (ME 53, 1 unit lec, 1 unit lab)**
This course is a continuation of ME Final Year Project Study 1 geared towards the ultimate completion, defense and presentation of the students' study, project or research in the field of Mechanical Engineering.

33. Vibration Engineering (ME 54, 2 units)

This course is an introduction to the fundamental concepts of vibration as it affects operation and performance of machine components. It covers topics on modeling of mechanical systems, derivation of the differential equations for such systems and its varying solutions (responses) based on different excitations; analysis, design, measurement, damping and computational aspects. The computer as a computational tool will also be utilized.

34. On the Job Training (ME 80, 2 units)

As part of the BS Engineering curricula, the 300-hour On-the-Job Training requires the students to be assigned to various companies and government agencies, where they learn practical applications of the Mechanical Engineering concepts they learn from the academe and at the same time learn and begin to engulf people skills.

35. DC/AC Machinery (ACE 10, 3 units); DC/AC Machinery Laboratory (ACE 10L, 1 unit, 3 units lec, 1 unit lab)

The course covers the concepts and practical application of performance characteristics and operation including losses and efficiencies of DC and AC machines such as alternators, induction/synchronous motors, synchronous converters and transformers. It includes demonstrations and laboratory experiments.

Master of Engineering Program

Master of Engineering Program

Master of Engineering (MOE) Program upgrades the quality of engineering education and the technical expertise of engineering graduates and practitioners in Visayas and Mindanao. It is a practice-oriented program that bridges the gap between the typical baccalaureate engineering degrees and the Master of Science programs.

Master of Engineering Program in Xavier University is geared in developing expertise towards environmental and energy engineering, as well as industrial systems management. The program requires completion of course requirements and practicum/special problems.

TRACK A CURRICULUM (MAJOR IN SYSTEMS ENGINEERING)

Course No	*Course Description*		*(Lec/Lab/Total) Credit Units*
FIRST YEAR/ FIRST SEMESTER			
MOE 111	Advanced Engineering Mathematics	Foundation	3/0/3
MOE 112	Advanced Statistics	Core	3/0/3
MOE 113	Computer Programming	Foundation	2/1/3
MOE 115	Engineering Management	Core	3/0/3
FIRST YEAR/SECOND SEMESTER			
MOE 121	Research Methods	Core	3/0/3
MOE 122	Numerical Methods	Core	3/0/3
MOE 124	Environmental Management	Foundation	3/0/3
MOE 125	Advanced Computer-Aided Design	Core	2/1/3
SECOND YEAR/FIRST SEMESTER			
MOE 211	Special Problem	SP	3/0/3
MOE 213	Operations Research	Cognate	3/0/3
MOE 215	Information Systems Management	Cognate	2/1/3
MOE 216	Production, Operations and Maintenance Management	Cognate	3/0/3
SECOND YEAR/SECOND SEMESTER			
MOE 221	Systems Engineering	Cognate	3/0/3
MOE 225	Software Engineering	Cognate	2/1/3

SUMMARY OF UNITS

Foundation Courses	*9 units*
Core Courses	*15 units*
Cognates	*15 units*
Special Problem	*3 units*
Total	*42 units*

TRACK B CURRICULUM (MAJOR IN ENVIRONMENTAL ENGINEERING)

Course No.	*Course Description*	*(Lec/Lab/Total) Credit Units*
FOUNDATION COURSES (9 units)		
MOE 111	Advanced Engineering Mathematics	3/0/3
MOE 121	Research Methods	3/0/3
MOE 122	Numerical Methods	3/0/3
CORE COURSES (21 units)		
MOE 112	Advanced Statistics	3/0/3
MOE 115	Engineering Management	3/0/3
MOE 231	Solid Waste Management	3/0/3
MOE 232	Wastewater Management	3/0/3
MOE 236	Air Quality and Management	3/0/3
MOE 237	Introduction to Environmental Management	3/0/3
MOE 238	Introduction to Geoinformatics	2/1/3
COGNATE OR DISCIPLINE-RELATED COURSES (12 units)		
MOE 125	Advanced Computer-Aided Design	2/1/3
MOE 233	Energy Resources and Utilization	3/0/3
MOE 234	Energy Conservation	3/0/3
MOE 239	Environmental Health Engineering	3/0/3
MOE 240	Environmental Impact Assessment	3/0/3
MOE 241	Environmental Risk Assessment	3/0/3
MOE 242	Disaster Mitigation and Management	3/0/3
PRACTICUM (6 units)		
MOE 210	Practicum 1	3/0/3
MOE 220	Practicum 2 (Practicum Paper)	3/0/3

SUMMARY OF UNITS

Foundation Courses	*9 units*
Core Courses	*21 units*
Cognates	*12 units*
Practicum	*6 units*
Total	*48*

PRC Licensure Examination Topnotchers

PRC LICENSURE EXAMINATION TOPNOTCHERS
As of APRIL 2015

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

NAME	DATE OF EXAM	RANK
1. Heraldo L. Canarejo	Nov 1990	1st
2. Maryshayne F. Tagaro	Nov 2005	2nd
3. Arniel L. Belarmino	Dec 2013	2nd
4. Alex D. Jimenez	Nov 1985	4th
5. Sugar R. Estrada	Dec 2013	4th
6. Marbert D. Pinque	Dec 2014	4th
7. Alex D. Jimenez	Nov 1985	4th
8. Hazel A. Decina	May 1998	5th
9. Rodel T. Fronda	Nov 2004	6th
10. Ma. Theresa P. Isla	Oct 1988	7th
11. Wilmer R. Mostrales	Oct 1993	7th
12. Teasanie S. Nieles	Nov 2006	8th
13. Hercules R. Cascon	Oct 1993	9th
14. Ruel S. Demata	Oct 1996	9th
15. Jason E. Abuso	Nov 1997	9th
16. Jack L. Demata	Oct 1996	10th
17. Alona Z. Pimentel	Nov 1986	13th
18. Allan G. Cagaanan	Nov 1986	19th

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

NAME	DATE OF EXAM	RANK
1. Eric U. Lim	Nov 1986	6th
2. Lynne A. Duero	Nov 1989	6th
3. Paquito M. Malingin Jr.	Nov 2001	7th
4. Muriel C. Vivares	May 1992	11th
5. Victor Eugene C. Mamawag	Nov 1996	13th
6. Nilo M. Hondanero	Dec 1991	13th
7. Jed Dax G. Estillore	Nov 2000	15th
8. Ma. Theresa Barbara P. Gomez	Nov 1989	16th
9. Dante Ponciano R. Ocaya	May 1987	19th
10. Romeo B. Mejia	Nov 1997	19th
11. Efren N. Lim Jr.	May 1998	19th
12. Egbert Miranda	Nov 1999	20th

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

NAME	DATE OF EXAM	RANK
1. Zandro Chad G. Ramos	Oct 1995	3rd
2. Raoul B. Atun	Nov 1993	3rd
3. Rene G. Magallanes	Nov 1989	5th
4. Gratz Dale Noel G. Redoble	Sep 2014	5th
5. Virbuen V. Ladaga	Oct 1995	6th
6. Augusto Manuel V. Perdices Jr.	Oct 1998	7th

7. Stephen J. Tian	Nov 1986	10th
8. Camilo O. Crispin D. Uy	Oct 1990	18th

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

NAME	DATE OF EXAM	RANK
1. Mark Anthony P. Pana	Apr 1993	1st
2. Roselle Victor C. Lague	Sep 2010	2nd
3. Ruel Jeznar A. Caneda	Apr 1994	3rd
4. Chris Kenneth P. Tan Nery	Oct 1997	3rd
5. Romland M. Zurita	Oct 1991	4th
6. Jerome C. Maandig	Oct 1991	5th
7. Camilo Jose S. Salvana III	Apr 1992	6th
8. Andrew G. Domo	Oct 2002	7th
9. Bobby Guido A. Israel	May 1986	9th
10. Nolan J. Yap	Oct 1998	9th
11. Clyde S. Igot	Oct 2001	10th
12. Juan Felimon M. Derayunan	May 1999	10th
13. Jacinto C. Ritardo	May 1986	12th
14. Roberto K. Tan	Oct 1990	12th
15. Rene Nelson J. Abujan	Nov 1986	14th
16. Jedwin Z. Duapa	Jun 1990	15th
17. Ariel F. Lustre	Oct 1987	16th
18. Jaime A. Basilan	Nov 1986	18th
19. Erwin Emmanuel U. Nagac	Oct 1987	18th
20. Cyril G. Fabrea	Nov 1986	20th

BACHELOR OF SCIENCE IN ELECTRONICS ENGINEERING

NAME	DATE OF EXAM	RANK
1. Louijie O. Compo	April 2011	2nd
2. Vyll Roxanne D. Tinampay	Nov 2006	3rd
3. Julius Paulo R. Servigon	Nov 2007	4th
4. Adeline D. Yeban	Nov 1999	5th
5. Gian Carlo J. Estorba	Mar 2009	7th
6. Antonio B. Paguirigan Jr.	Apr 2000	7th
7. Von Bryann D. Naca	Apr 2011	7th
8. Monirih Ramirez Abejuela	Oct 2012	7th
9. Stephen C. Sabanal	Nov 2002	8th
10. Brix A. Aragon	Nov 2004	11th
11. Jack Edmund E. Wong	Apr 2004	12th
12. Jan Amcil L. Chaves	Nov 2000	12th
13. Richard P. Domingo	Nov 1998	16th
14. Jener B. Bahian	Nov 2004	20th

Xavier University Engineering Resource Center (XUERC)


USAID


Rapid Damage Assessment
Post-Earthquake Safety Evaluation of Build


Xavier University
ENGINEERING RESOURCE CENTER
Climate and Weather Training
27-28 May 2014 | Xavier University - Ateneo de Cagayan


Xavier University
CLIMATE and WEATHER Training
Climate and Weather T
27-28 May 2014 | Xavier University - Atene


2015 Final Year Projects
Display and Presentation

Xavier University Engineering Resource Center (XUERC)

The Xavier University Engineering Resource Center spearheads the College of Engineering's mission in research, consultancy, and human resource development by providing a pool of experts and facilities. It pursues top-notch and significant researches and innovation opportunities in next-generation technologies. Also, XUERC actively collaborates with institutions for technological advancements, and provides appropriate solutions to the pressing engineering needs of communities. Moreover, it facilitates individual and institutional capacity-building among faculty and students. And It serves as a venue for dialogue on the application, the socio-economic and ethical impacts of technology.

Mission

Developing engineering solutions with the community

Vision

A leader in engineering research and outreach programs in Northern Mindanao by 2016

Goals

1. To develop and enhance the research capabilities of the College of Engineering Faculty and Students through relevant researches, trainings and service learning programs
2. To strengthen and advance linkages with other university units, academic institutions, industries, the government and organizations in the local, national and international arena
3. To expand the financial resources and physical capabilities of the college through internal and external grants and self-generated funds
4. To develop competent, conscientious and committed personnel and a highly functional management system

History

Founded in 1933 by Jesuit missionary Fr. James T.G. Hayes SJ, who later became the first archbishop of Cagayan De Oro, Ateneo de Cagayan has steadily dedicated to the integral development for the needs of Mindanao and the country.

In March 1958 the Ateneo de Cagayan received university status and its present name, Xavier University-Ateneo de Cagayan, in honor of St. Francis Xavier, Jesuit missionary to the Indies and companion of St. Ignatius of Loyola, founder of the society of Jesus. It became the first university in Mindanao, and the First Jesuit University in the Philippines.

In 1979 the college of Engineering was instituted by then Fr. President Ernesto O. Javier SJ and headed by the founding Dean, Engr. Ernesto B. San Juan. Thirty years later, on Xavier University Diamond Jubilee, coincident with College first Silver Jubillarian celebration, as a response to the dynamic challenges of times, Fr. President Ramon T. Villarin SJ, with the leadership of Dean, Engr. Alma P. Eufinado, created the XU Engineering Resource Center (XUERC) with Engr. Dexter S. Lo, who a year later was appointed as Founding director.

ERC Services

1. Disaster Risk Management (DRM Program)

This program advocates disaster risk reduction and management using science-based information and methodologies; with focus on prevention, mitigation, and preparedness strategies particularly at the local and micro-scale levels (cities, municipalities, barangays, and sitios). It also includes studies of possible impacts of the changing climate, and maintaining a weather station based in the university.

It uses technical researches and evidence-based strategies in addressing the pre- and post-disaster needs of communities by conducting the following:

- Disaster Risk Assessment and Mapping
- Hazard Monitoring (HazaMo)
- Rapid Damage Assessment (RapiDA)

Currently, XUERC is the lead unit of the university-wide XU DRRM Program.

2. Computer-Aided Services (CAS Program)

This program aims to enhance the digital competency and skills of the Faculty Members and Students of the College of Engineering, and the XU community. It also caters customized training modules and workshops to partner industries and communities.

It also intends to promote the effective use of technologies and digital platforms to aid in policy formulation, reviews, and implementation.

XUERC offers capacity building training modules and workshops on the following technical tools (but not limited to):

- Geographic Information System (GIS)
- Computer-Aided Design (CAD)
- Specialized Software (e.g., Sketch-Up, GRASP, SAP, Vensim, Free Mind)
- Basic and Advanced Computer Skills (e.g., Microsoft Office, Photoshop)

Xavier University
ATENEO DE CAGAYAN

DISASTER RISK REDUCTION AND MANAGEMENT (DRRM) PROGRAM

EVERY YEAR, AN AVERAGE OF 20 TYPHOONS HIT THE PHILIPPINES. IT ALSO LIES BETWEEN TWO MAJOR TECTONIC PLATES WHICH MAKES THE COUNTRY EXPOSED TO EARTHQUAKES. AT LEAST 20 OF THE COUNTRY'S MORE THAN 200 VOLCANOES ARE CONSIDERED ACTIVE. COUPLED WITH ECONOMIC CHALLENGES, THE PHILIPPINES RANKS AMONG THE TOP COUNTRIES AT RISK OF NATURAL DISASTERS.

THE FORMATION OF THE XU DISASTER RISK REDUCTION AND MANAGEMENT (DRRM) TEAM

As an academic institution geared to respond to the needs of the community, Xavier University has consistently given its assistance in times of calamities mainly through relief operations.

However, in the past decade, the university's disaster-related activities evolved to more proactive approaches. In 2002, the XU Civil Engineering Department did a study on fire hazard mapping of the Poblacion area in Cagayan de Oro. In 2008, the XU Engineering Resource Center (XUERC) partnered with Barangay Carmen in developing methodologies for disaster risk assessment and mapping of various hazards at the local level.

In January 2009, intermittent rains submerged a large part of Cagayan de Oro, affirming the need for a disaster risk reduction paradigm. Right after the onslaught of TS Sendong in December 2011, the Xavier University Disaster Risk Reduction and Management (XU DRRM) Program was conceptualized. Tropical Storm Washi, locally known as Sendong, left more than 1,000 persons dead, hundreds missing, and more than hundreds of thousands displaced. Xavier University was quick in providing immediate relief goods for the survivors while also planning for longer-term assistance designed for the rebuilding of resilient communities.

The university together with partner institutions, built the Xavier Ecoville. This resettlement site did not only provide shelter for survivors but also provided on-site formation programs that are the core of the university's mission as a Jesuit institution.

To sustain these engagements, in 2013, the XU DRRM Program was formally institutionalized to facilitate the convergence of the expertise of the different XU units; thus the formation of the XU DRRM Team. The program is envisioned not only to respond to calamities but also to capacitate various actors and communities in mainstreaming disaster risk reduction and management in local and sub-national development plans and projects.

XU is a member of the regional, provincial and city DRRM councils.

THE FIVE COMPONENTS OF THE XU DRRM PROGRAM

RESEARCH

The XU DRRM Team conducts data gathering and analyses necessary for implementing interventions for the prevention and mitigation of disasters. These include participatory disaster risk assessment, community-based hazard characterization and mapping, as well as other environmental and health studies related to disasters and changes in the local climate.

The XU Engineering Resource Center (XUERC) is presently the lead unit for research. XUERC also serves as the over-all coordinator of the XU DRRM Program.

CAPACITY BUILDING

Given the complex geophysical and meteorological situation of the country worsened by the reality of climate change, there is a clear need to not only reduce disaster risk but also to adapt to these current realities through the concerted efforts of key actors and community stakeholders. With the XU Governance and Leadership Institute (XUGLI) as the lead unit, this component extends trainings to stakeholders as well as assists them in formulating their community-based DRRM plans which include disaster preparedness and disaster drills.

The University, a small community in itself, also aims at the knowledge improvement of its members-- involving not only its faculty but also its students through the integration of DRRM in the curriculum and regular activities of their respective departments.

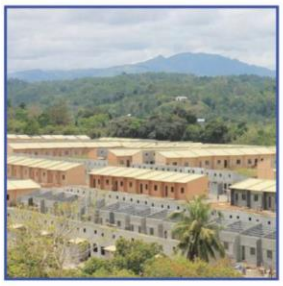
ADVOCACY

Part of the program is the dissemination of information and research outputs to the general public. Knowledge products are disseminated through information campaign and popular communication channels.

The advocacy component is also engaged in policy review and formulation. This component is being led by the XU Press.

RESPONSE

Since 1991, Xavier University has been involved in various disaster-response activities-- organizing networks of donors and delivering relief goods to disaster stricken communities. This has been exemplified recently in the series of tireless relief operations led by the Kristohanong Katilingban sa Pagpakabana- Social Involvement Office (KKP-SIO): Tabang-Zamboanga, Tabang Bohol and Tabang Visayas. Through the years, XU has proven the trust and confidence of generous donors from many parts of the world.



REHABILITATION

In response to Sendong, XU pioneered a university-led resetlement community, the Xavier Ecoville. XU partnered with the city government and various local and international donors in providing new homes for more than 500 families who survived the flood. The mission of Xavier Ecoville is clear: “We are not just building houses. We are building Communities.”

3. Research and Publication (RePublic Program)

This program facilitates and manages the various researches of the College of Engineering, ensuring it meets quality standards set by accrediting bodies (CHED, NHERA, DOST, etc). It also serves as an oversight to prioritize research activities that address contemporary issues and that they are parallel with the research agenda and priority thematic engagements of the university.

XUERC also serves as the "clearing house" of the Kinaadman Research Center and the XU Press, the central research and publication arms of the university, respectively.

Every year, XUERC publishes the FYP Journal, a compendium of researches done by senior engineering students.

Lecture Series are also regularly conducted for research and project outputs dissemination and to entice young researchers for further projects.

4. Capacity Building, Internship, and Networking (CaBIN Program)

This program gears towards the advancement of the technical expertise and specializations of faculty members and students of the College of Engineering, by facilitating various training and workshop opportunities, industry immersion, service learning, expert exchange, and on-the-job training programs.

It also caters foreign and local interns and volunteers who wish to learn and experience the various technology-based and community-oriented projects. It also offers opportunities for deeper self-reflection and processing sessions of the role of engineers and scientists amidst the fast evolving developments.

It also aims to establish strong and sustainable linkages with industries and partner communities for collaborative projects and activities.

5. Consultancy and Special Projects (ConSpec Program)

This program manages and promotes the role of engineers in providing technical expertise to various clients and customers.

In particular, XUERC offers the following technical services:

- Structural and Geotechnical Analysis and Design
- Construction Management
- Transportation Systems Analysis and Design
- Power Engineering Design
- Energy Audit and Appropriate Technologies

- Electronics and Acoustic Design
- Environmental Impact Assessment
- Waste Management Strategies (solid waste, wastewater, emissions)
- Mechanical and Machine Design (including HVAC)
- Systems Analysis and Engineering
- Database and Information Management
- Laboratory Testing (Construction Materials, Chemical Analysis)

Linkages

XUERC Personnel

Dexter S. Lo, MSCE
Director

Engr. Jefferson R. Vallente, Jr.
Computer Aided Services

Kasandra Macababayao
Administrative Assistant

Dr. Rogelio C. Golez
Capacity Building, Internship and Networking

Engr. Megan M. Montuno
Disaster Risk Management

Carla V. Gonzales
XU DRRM Program

Laboratories & Facilities

Laboratories & Facilities

I. Classrooms –Classes are held only at the following floors.
   a. Second Floor: E205 to E209
   b. Third Floor: E305 to E309
   c. Fourth Floor: E405 to E409
   d. Sixth Floor: E605 to E609

II. Laboratories

Laboratories in the College of Engineering are spaces within and resources of the College of Engineering facilities in which chemicals, apparatuses and equipment, and other such materials are stored and used for research and education activities.

a. First Floor Engineering Building

Electronics Laboratory (@E105) is intended for experiments and exercises for the subjects in Electrical Circuits, and Basic Electronics. The laboratory includes equipment such as oscilloscope, power supply, function generator, multimeter, and various training modules.

Electrical Laboratory (@E103) provides the resources for the conduct of experiments and exercises in Digital Electronics, and communication subjects. Typical equipment found are oscilloscope, multitester, RF generator, function generator, microcontrollers, antenna trainer, microwave trainer, data communication equipment, and various training modules.

Hydraulics Laboratory (@E107) provides the resources for the conduct of exercises and experiments of all Engineering Students regarding the transfer of energy in fluids flow. Installed facilities include pipe assembly, weirs, venturimeter, pumps, valves, manometer, water hammer set-up, pitot tube, orfice.

Materials Testing Laboratory (@E103) is where students and other researchers conduct experiments and activities as an introduction to the physical and behavioral characteristics of engineering materials. Available equipment include a UTM, oven, and sieve shaker. Universal Testing Machine (UTM) Laboratory caters for the measurement of tensile strength of materials such as steel.

Surveying laboratory is where students will learn how to conduct basics of surveying land area. Available equipment include transits, total stations, GPS, engineers' level.

b. Annexes

Mechanical Engineering Laboratories are housed in the ME Annex and contains the Instrumental and Control Laboratory, Refrigeration and A/C Laboratory, ME Laboratory 1 and ME Laboratory 3, and the facilities for Shop Practice and Theory course (which includes equipment for fabrication and welding of simple machines). The activities that are to be performed here are on the use and operation of power tools and machines as lathes, shapers, planers, drilling and boring machines, milling machine, cutters, grinding machines, machine tools and accessories. It covers technological advances in metal working and new innovations in machine shop.

Power Laboratory (near Haggerty Hall) caters to the conduct of experiments and exercises on power generation using steam. Available equipment include a steam generator (i.e., boiler), steam turbines, direct-contact dryer, electrical generator.

b. Third Floor Engineering Building

The Industrial Engineering Laboratory features equipment for Ergonomics and Methods Engineering class where the students can do hands on applications deemed as necessary and important component to learning. Aside from computers that have licensed simulation software readily installed for Vernier physiological packages and dynamometers are available for students with usage that extends beyond laboratory activities, as it can also be utilized for research undertakings and industry servicing.

The Higher Computing Laboratories of College of Engineering (E303 and E304) are provided with laptops instead of the usual bulky and high energy consuming desktop computer units. These laptops have the basic and higher application software needed for engineering studies and research. These rooms could also function as manual drafting rooms if the laptop units are placed in built-in storage compartment of the tables.

c. Fifth Floor Engineering Building

CHE Analytical Laboratory (@E504) is intended for selected physical, chemical analyses on selected constituents of samples, materials and products performed support of college and university wide research and extension activities.

CHE Research Laboratory (@E506) provides the needed resources to strengthen the research activities of the Chemical Engineering Program. Through this Laboratory, the Department of Chemical Engineering strives to provide opportunity, equipment, and technical support to the diverse research interests of faculty and students. These researches include, but are not limited to, the development of new technologies, solutions to technical problems of the industry partners, building prototypes for field demonstrations or commercial exhibition, or commercial exhibition, and to evaluate and validate new products and processes.

XU CHE Unit Operation-UO Laboratory (@E508-E509) provide the setting for students to gain hands-on experience while studying both the fundamental principles and practical applications of chemical engineering. The laboratory includes a process-control module, distillation columns, heat exchangers, ion exchange units, gas absorption columns, drying units, plate-and-frame filter press, among others. This laboratory is specially designed to simulate real industrial processes where the students can apply methods and theories of chemical engineering in semi-pilot scale experiments.

The Physics Laboratories (E502 and E503) provide the venue and facilities for all physics laboratory classes offered in the university.

Final Year Project and Display and Presentation


FINAL YEAR PROJECT DISPLAY
PRESENTATION 2015
"Developing Engineering"
Xavier University
ATENEO DE CAGAYAN


Xavier University
ATENEO DE CAGAYAN


Xavier University
ATENEO DE CAGAYAN


Xavier University
ATENEO DE CAGAYAN
2015 Final Year Projects
Display and Presentation


Catalytic Reactor
Xavier University
ATENEO DE CAGAYAN

FYP Display and Presentation: Past, Present and Future

In the summer of 1990, fresh from their trainings at Portsmouth Polytechnic (now University of Portsmouth) in the United Kingdom, Engr. Jocelyn A. Mabaylan and Dr. Edilberto L. Tadulan, then faculty members of the College of Engineering, introduced the concept of exhibiting Final Year Projects to the public. The purpose of this activity is to inspire engineers and scientists to perfect existing technologies, as well as to engage partnership with industries on research and development.

On February 14, 1994, with the efforts of two other trainees from Portsmouth, Engrs. Mary Jean O. Apor and Eliseo B. Linog, Jr. organized a display that showcased various projects and laboratory equipment of the Electrical, Electronics and Communications and Mechanical Engineering units in celebration of the Power Engineering Day. Years later, as other units of the College advanced in research capabilities, then Dean Engr. Antonio C. Sevillano, Jr. institutionalized the showcasing of student projects as an annual activity of the College of Engineering. Consequently, with the spearheading endeavors of Engrs. Maria Theresa I. Cabaraban, Maria Isabel R. Dumlao, Shierlyn S. Paclijan and Dexter S. Lo, faculty members of the then combined Chemical-Civil-Industrial Engineering Department, the course Final Year Project Study (FYPS) was integrated to the curriculum of all engineering programs.

Today, the FYP Display and Presentation is a way of a peer review of the completed Final Year Project Studies of the graduating seniors of the College of Engineering. It primarily showcases, promotes and exposes the atmosphere of healthy competition among the students and of constructive interaction between students and professionals from other institutions and industries. Several others are upshots of collaborative ventures between and among the local industries, the faculty and the students. The objectives of the researches at the College of Engineering are: to create new knowledge in the engineering disciplines, to foster an active learning environment for students to acquire tools for lifelong learning and to make science and technology matter to the pressing needs of society.

To date, many of the College's FYPS have garnered recognition outside the walls of the University. Many are continuously presented in various professional technical conferences and conventions in the local, national and international arenas. To be sustained, the College has steadily collaborated with self-same industries, institutions and agencies that stand firm with the academe in its pursuit toward the training and development of the Christian Engineer.

Engineering Student Organizations

Junior Philippine Institute of Chemical Engineering (JPIChE)

Junior Philippine Institute of Chemical Engineers (JPIChE) is an organization that seeks to help augment the current academic standing of chemical engineering students through seminars, forums, and plant tours. This organization also aims to incorporate the Ignatian values in the chemical engineering students through participating not just n school activities, but also in social outreach activities.

Philippine Institute of Civil Engineers – Xavier University Chapter (PICE-XUSC)

Philippine Institute of Civil Engineers (PICE) is a fun- loving organization established to create a fun environment for C.E. students. It is where camaraderie is being taught and Ignatian values are being imprinted to the future engineers. This is where builders for the future are being built!

The Institute of Integrated Electrical Engineers of the Philippines, Inc. – Council of Student Chapter, Xavier University Chapter (IIEE - CSC - XU)

Institute of Integrated Electrical Engineers of the Philippines, Inc. (IIEE) is a student organization of all Electrical Engineering student of Xavier University. The organization's vision is to develop the initiative of EE students to be aware of the greater responsibilities that await us not only in excelling in the academic field, technical skills and competence but also in providing ourselves with the humanistic foundation that will train and develop in us a social conscience. It aims to:

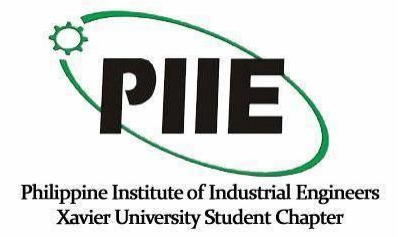
1. Plan and initiate activities that will supplement the advancement of academic and technical knowledge in the field of electrical engineering.
2. Facilitate good working relationship with the administration and other technical organizations of the College of Engineering.
3. Assist its members regarding academic problems.
4. Foster camaraderie and unity among its members.

Junior Philippine Society of Mechanical Engineers (JPSME)

Junior Philippine Society of Mechanical Engineers (JPSME) is a co-curricular organization of Xavier University for students taking up Mechanical Engineering. This organization aims to mold and equip ME students through its programs and activities to a holistic formation to be a man and woman for others integrating also the skills, knowledge and values learned as ME students.

Junior Institute of Electronics Engineers of the Philippines (JIECEP)

Junior Institute of Electronics Engineers of the Philippines (JIECEP) is a global paradigm organization of competent, agile, virtuous and committed Electronics Engineering students. It is a specialized organization created for the academic development of the art of electronics and communications. It operates with the belief that students of the said field should be academically inclined and practically involved in activities related to electronics & communications engineering. The goals of JIECEP involve promoting unity among Electronics Engineering students of Xavier University, helping the ECE students realize the importance and capabilities of Electronics Engineers, and initiating and organizing different activities that will enable the officers, members, and other Electronics and Communications Engineering students to develop more their skills, to become a better individual, and to widen their horizons about their understanding in the course.



Philippine Institute of Industrial Engineers – Xavier University Student Chapter

Philippine Institute of Industrial Engineers (PIIE) is a co-curricular organization of Xavier University for students taking up Industrial Engineering. This organization aims to mold and equip IE students through its programs and activities to a holistic formation to be a man and woman for others. PIIE-XUSC serves as a training ground for students that will expose them to the different specialization of Industrial Engineering.

College policies, Procedures and Guidelines

COLLEGE POLICIES

- LABORATORY PROCEDURES, POLICIES, AND GUIDELINES FOR STUDENTS, RESEARCHERS, AND OTHER LABORATORY WORKERS
- ADMINISTRATIVE GUIDELINES AND PROCEDURES FOR THE LABORATORIES
- COLLEGE POLICIES AND PROCEDURES FOR STUDENTS CLASSIFIED UNDER THE ON-PROBATION AND ON-CONDITIONAL STATUS
- ON-THE-JOB TRAINING PROGRAM POLICIES AND PROCEDURES
- FINAL YEAR PROJECT STUDY POLICIES, PROCEDURES AND GUIDELINES

LABORATORY PROCEDURES, POLICIES, AND GUIDELINES FOR STUDENTS, RESEARCHERS, AND OTHER LABORATORY WORKERS

1. Background

The Xavier University College of Engineering (CoE) provides laboratory facilities for different departments such as the Chemical Engineering Department, Civil Engineering Department, Electrical Engineering Department, Electronics Engineering Department, Industrial Engineering Department, and Mechanical Engineering Department. These laboratories are equipped with equipments, tools or instruments, and materials that need proper handling by laboratory workers. All laboratory workers shall follow the procedures, policies, and guidelines outlined in this document.

1.1. Definition and general principles

Laboratory: Any room or building of the CoE equipped for teaching, research, or scientific experiments. This facility houses equipments, apparatuses, chemicals, and other such materials used for any of the above purposes.

Department chair: A person appointed by the University President to oversee the development of the program in the areas of faculty, instruction and laboratories pursuant to the requirements of the Commission on Higher Education and the mission, vision and goals of the University.

CoE Laboratory manager: A person designated by the Dean, who is responsible for the management and development of all the facilities under the CoE.

Laboratory worker: Any person working in a laboratory, regardless of the person's employment status. This includes, but is not limited to, faculty members, laboratory technicians, property custodians, undergraduate and graduate students, visiting scholars and associates, or anyone who participates in any research or teaching in the laboratory.

Faculty member. Member of the Coe faculty who handles a laboratory course, who acts as advisor of an undergraduate or graduate research, or who him/herself actively performs work functions with equipment or materials in a laboratory.

Property custodian: A person who has been designated as being responsible in ensuring the availability of consumable materials, and in preparing documents pertinent to the requisition of these materials for a specific laboratory facility. The property custodian also ensures that the laboratory facilities under his responsibility are operational and functional, and requests for the repair of any facility when necessary. Other responsibilities assigned to the property custodian include, but are

not limited to, cleaning and maintaining of the laboratory space, materials and equipment.

Laboratory technician: A person, under the supervision of the CoE LM, who has been designated as being responsible for the release of materials and apparatuses at the beginning of any laboratory activity, and the subsequent collection of said apparatuses at the end of said activity. The laboratory technician assists the laboratory worker in the operation of instruments and/or equipment that may need special handling. The laboratory technician also functions as the property custodian.

1.2. **Keeping the work area clean, safe, and in proper order shall be the responsibility of all laboratory workers.**

1.3. It shall be the responsibility of all laboratory workers to conduct themselves in a manner that does not diminish the confidence in the CoE's competence, judgment or operational integrity.

2. Policies on the conduct of regular laboratory activities for instructional purposes

2.1. No laboratory exercise shall be conducted in the facility without the presence of the laboratory course instructor.

2.2. Likewise, no laboratory exercise shall be conducted in the facility without the presence of the designated laboratory technician.

2.3. Personal protective equipment (PPE)

It shall be the responsibility of all laboratory workers to always wear appropriate clothing (e.g. full length pants, shirts, closed toe and heel shoes) and personal protective equipment (e.g. safety glasses, laboratory coats or aprons, gloves) in the laboratory. Personal protection may vary according to the activities set forth by the laboratory course instructors. The following should be observed inside the laboratory:

(a) The worker's personal clothing should be fully covering. Open sandals as well as high heeled shoes are prohibited; shorts, including golf shorts, are considered inappropriate.

(b) Unrestrained long hair and loose clothing, such as neckties and baggy pants, are inappropriate in a laboratory and are therefore prohibited. Such items can catch fire, be dipped in chemicals and get caught in equipment. Similarly, rings, bracelets, watches or other jewelry that could be damaged, trap chemicals close to the skin, come in contact with electrical sources, or get caught in machinery should not be worn in situations where chemicals could be absorbed in the leather and held close to the skin.

2.4. Borrowing equipment and/or apparatuses

When performing a regular laboratory exercise, the student, or group of students, should accomplish the following:

(a) Complete **two copies** of the **user's form** for **equipment and/or apparatuses (COE LU Form 1)**. The user's form can be downloaded from the CoE webpage at www.xu.edu.ph/academic-cluster/school-of-engineering.

The group leader should fill up the following information:

Laboratory/Room – This refers to the laboratory where the equipment/or apparatuses are housed, and/or where the student(s) is/are to performing the exercise.

Experiment Title – This refers to the name of experiment and/or exercise that is to be conducted in the laboratory.

Subject, Instructor, Schedule, and Date of Actual Use – These refer to, respectively, the subject for which the laboratory exercise is to be conducted, the faculty handling the subject (i.e. the laboratory course instructor), the *regular* laboratory schedule (i.e. days of the week and time period), and the *actual* date that the laboratory exercise is to be conducted.

Quantity, Description, Purpose, and Remarks – When meticulously accomplished, these details facilitate logistics associated with the equipment and/or apparatuses. The laboratory technician should fill in the portion for *Purpose* and *Remarks* with details as to the purpose for which the items are borrowed, or general condition of the apparatuses and/or equipment. Especially noted are slightly scratched or dented apparatuses and/or equipment so that the group members are not made accountable for said damage.

Name(s) and Signature(s) – Group members who are actually present, and are to perform the laboratory exercise, should write their names and affix respective signatures on the spaces provided for.

(b) The group leader should then have the form signed by the laboratory course instructor.

(c) The group leader submits the completed form together with his/her University ID before the instruments are released to the group, or before the group is allowed to use the equipment for the day's laboratory exercise.

(d) Upon completion of the activity or end of the laboratory class period, the group members return all borrowed equipment and/or apparatuses to the laboratory technician, who then affixes his signature and/or additional remarks on both copies of the user's form, indicating that the borrowed items are returned in the condition indicated, and hands back the borrower's University ID.

(e) One copy of the form is given to the group leader, and the other copy retained by the laboratory technician as file for laboratory documentation.

2.5. Chemicals, materials, and other consumable supplies

When the laboratory exercise makes use of materials and other consumable supplies, the student, or group of students, should accomplish the following:

(a) Two copies of the **request form** for **materials and supplies (COE LU Form 2)** should be accomplished by the group leader, at least two weeks before the scheduled date of the exercise. The user's form can be downloaded from the CoE webpage at www.xu.edu.ph/academic-cluster/school-of-engineering.

(b) Group members who are actually present, and are to perform the laboratory exercise, should write their names and affix respective signatures on the spaces provided for. The group leader should then have the form signed by the laboratory course instructor.

(c) The group leader submits the completed form to the laboratory technician, who indicates his remarks (i.e., hazard or toxicity, special handling requirement, etc.) and promptly distributes the materials and/or supplies requested for the scheduled laboratory exercise.

(d) Upon issuance of the requested materials and/or supplies, the laboratory technician affixes his signature on the request form, gives one copy to the group leader, and retains the other copy as file for laboratory documentation.

(e) Laboratory workers shall exercise frugality in utilizing laboratory supplies. All unused materials that remain unadulterated at the end of the laboratory exercise shall be returned to the laboratory technician.

2.6. Borrowing equipment and/or apparatuses for out-of-campus laboratory activities

No equipment and/or apparatus shall be checked out of the facility premises for the conduct of course-related laboratory exercises without the explicit approval of the CoE laboratory manager.

(a) For laboratory exercises that require the instrument(s) to be brought outside of the University campus, the student (or the group leader) should accomplish one copy of the **user's form** for **equipment and/or apparatuses to be brought out of the laboratory room, including out-of-campus use (COE LU Form 4)**.

The user's form can be downloaded from the CoE webpage at www.xu.edu.ph/academic-cluster/school-of-engineering.

The student (or group leader) should fill up the following information:

Name, ID, and contact information – The student borrower, or the group leader on behalf of the group, should write his/her name and XU ID number; the borrower should also write down his/her telephone or mobile number.

Borrowing period – This refer to the actual date and time the equipment and/or apparatus is/are to be checked out of the laboratory, and the actual date and time the same is/are to be returned.

Item(s) to borrow and purpose of borrowing – This lists the item(s) that will be checked out, and the purpose for which the same is/are to be checked out.

(b) The borrower affixes his/her signature and the date the request is made. The laboratory course instructor and laboratory custodian endorse the request by affixing their signatures and signature dates. The borrower then submits the form to the laboratory, and obtains the approval of the same.

(c) The duly signed form should be submitted to the laboratory technician at least one day in advance of actual date of item check out; this allows time for the laboratory technician, when necessary, to orient the borrower how to operate the item(s) to be borrowed.

(d) Item(s) should be checked out and checked in personally by the borrower, according to the agreed schedule.

2.7. Extension of laboratory use

An extension may be requested for exercises in progress and whose subsequent continuation and completion require more than 30 minutes. The extension period being requested may or may not be on the same day as the regular schedule of the laboratory course. A laboratory exercise that extends beyond the allotted period for not more than 30 minutes **does not need** the extension request. In either case, at the culmination of their activity, the group members must return all borrowed instruments and/or apparatuses to the laboratory technician, or the laboratory course instructor or the designated substitute as the case may be. If the laboratory technician, laboratory course instructor, or designated substitute faculty was otherwise be engaged elsewhere by the time the group completed their exercise, the group members must wait for the laboratory technician, laboratory course instructor, or designated substitute faculty to be available to receive from them borrowed equipment and/or instruments.

For request for extension, the student (or the group leader), should accomplish the following:

(a) **Two copies** of the **request form** for **extension of use of laboratory** (COE LU Form 3). The request form can be downloaded from the CoE webpage at www.xu.edu.ph/academic-cluster/school-of-engineering.

(b) The student should clearly indicate the *Date of Actual Use*. The laboratory technician should sign the form to confirm that he/she (*i*) finds the request for extension in order; and/or (*ii*) is available to accommodate the additional needs of the students.

(c) It shall be the responsibility of the laboratory course instructor to advise his/her students on the necessity of accomplishing COE LU Form 3. Both the laboratory course instructor and the department chair should endorse the request.

(d) If the laboratory technician was not available to assist the students during the extension period requested, he/she should clearly indicate this information on the form. In his absence, it is understood that the laboratory course instructor also assumes in full responsibility of the laboratory technician.

(e) **No such extension is allowed without the approval of the CoE laboratory manager. Concurrently, no extension of activity is allowed without the supervision of the laboratory course instructor or his/her designated substitute.**

Requests for extension may be granted subject to the following conditions:

i. Availability of a laboratory technician who shall attend to the needs of the requesting party; or

ii. Availability of the laboratory course instructor who shall supervise the extension of the laboratory activity.

(f) A student or a group of students with an approved request for extension but who arrives more than 30 minutes later than the specified time forfeits the entitlement and **shall not be allowed access to the laboratory as scheduled.** Another request for extension shall therefore be filed, following the proper channel.

(g) Upon completion of the exercise, the group members return all borrowed equipment and/or apparatuses to the laboratory technician, or the laboratory course instructor or the designated substitute faculty as the case may be, who then writes his/her remarks and/or affixes his/her signature on both copies of COE LU Form 1, indicating that the borrowed items are returned in the condition indicated, and hands back the borrower's University ID.

(h) One copy each of COE LU Form 1 and COE LU Form 3 is given to the group leader and the other copy retained by the laboratory technician as file for laboratory documentation.

2.8. Breakage, damage, or loss of instrument

(a) In cases of breakage, damage, or loss of the instrument and/or apparatuses, the group members whose signatures appear in COE LU Form 1 shall be held liable for the replacement of the item(s) broken, damaged, or lost.

(b) In cases when the whole class concurrently uses an equipment and/or apparatus, the *entire class* shall be accountable for the equipment and/or apparatuses.

(c) It shall be the responsibility of each group member to ensure that all borrowed equipment and/or apparatuses are accounted for before they leave the laboratory. In the same way, the laboratory technician shall make sure that all borrowed equipment and/or apparatuses are accounted for before the students leave the laboratory.

(d) It shall be the responsibility of the laboratory technician to report to the CoE laboratory manager any damage, loss and/or misuse of equipments and/or apparatuses by the students or other users. For this purpose, the laboratory technician shall submit to the CoE LM a list of students with liabilities in the form stated above at least one week before the final examinations week (i.e., the period allotted for the signing of clearance). It shall be the responsibility of the CoE LM to furnish the department chair and the CoE administrative assistant copies of such list. **No student shall be cleared by the Office of the Dean unless cleared from any such liability by the CoE LM.**

2.9. A seminar shall be scheduled within the first month of the first semester of every school year where these policies are discussed, and the laboratory workers are instructed on basic laboratory safety and emergency procedures. **This seminar shall be required of all those who work in research, teaching, or other scientific capacity in the CoE laboratories.**

3. Policies on laboratory use for Final Year Project Study (FYPS)

3.1. FYPS courses shall have assigned laboratory schedules. To support the conduct of the annual inventory of chemicals, equipment and apparatuses, and to ensure the availability of such chemicals and the maintenance of such equipment and apparatuses, policies on borrowing of equipment and/or instruments, and request for materials and supplies shall also apply, as in the case of regular laboratory use for instructional purposes described in detail in Section 2 of this document.

3.2. The FYPS adviser (or the FYPS course instructor, if the adviser is not a member of the University faculty) shall submit to the department chair two copies of the **description**

of the anticipated activities at least one month before the start of the first laboratory activity of each of the projects. This list shall include the following:

- equipment and apparatuses, chemicals, and/or other such materials to be used
- projected amounts and/or number of such resources needed
- tentative schedule of each of the laboratory activities

A copy of this list shall be furnished to the CoE laboratory manager by the FYPS adviser or course instructor.

3.3. The costs of consumables under FYPS should be borne by the students except those of materials and/or chemicals customarily used by the department in running equipment and instruments, as well as in conducting laboratory analyses.

3.4. It shall be the responsibility of the CoE laboratory manager to ensure that all FYPS laboratory exercises are given time slots with a corresponding laboratory technician to assist the students in the laboratory.

3.5. Requests for Extension

Should demands of the study call for additional laboratory experiments to be done outside of the assigned laboratory schedule, the group leader shall file COE LU Form 3 *before* they are allowed access to the laboratory. Endorsement of the request should come from the FYPS adviser (or the FYPS course instructor, if the adviser is not a member of the University faculty), noted by the department chair and approved by the CoE laboratory manager. Procedures on requests for extension as in the case of the regular laboratory exercises (Section 2.7) shall be observed.

3.6. For FYPS exercises that require the instrument/s to be brought outside of the University campus, the group leader submits to the CoE laboratory manager duly accomplished CoE LU Form 4 for his/her signature and approval. The procedure described in detail in Section 2.6 shall apply. **No equipment and/or apparatus shall be checked out of the facility premises for the conduct of conduct of FYPS without the explicit approval of the CoE laboratory manager.**

3.7. A seminar shall be scheduled within the first month of the first semester of every school year where these policies are discussed, and the laboratory workers are instructed on basic laboratory safety and emergency procedures. **This seminar shall be required of all those who work in research, teaching, or other scientific capacity in the CoE laboratories.**

4. Policies on use of laboratory facilities by external organizations

The term “external organizations” here refers to organizations external to the CoE. By this definition, external organizations may also refer the different departments and units in the University but are not under the CoE, as well as persons or organizations not affiliated with the University.

4.1. External organizations that intend to use any facility shall submit to the CoE dean a request letter that bears the endorsements of the CoE laboratory manager indicating:
- the name and location of the equipment and/or instruments,
- the description and quantity of the equipment and/or instruments to be used, and
- the actual date and time period of use of the facility.

4.2. Upon Approval by the CoE dean, policies on use of equipment and/or instruments (Section 2.4), and request for materials and supplies (2.5) shall apply, if the intention was to use the equipment and/or instruments in situ.

4.3. **No equipment and/or apparatus shall be checked out of the facility premises by external organizations without the explicit approval of the CoE dean.** If instruments are to be checked out of the facility premises, the actual date and time of subsequent return of the instruments should also be indicated in the request letter to the CoE Dean. Upon approval by the CoE Dean, the procedure described in detail in Section 2.6 shall apply.

Policy and Guidelines for On-Probation and On-Conditional Students (College Retention Policy)

1.0 Policy Statement

This policy is on the management and control of students in the College of Engineering who:

- after being assessed of not reaching the minimum QPI for promotion to next year level, are put under the On-Probation (OP) status
- have entrance examination percentage below 60% but not less than 32% that were given chance to enroll in an engineering program due to their high interest in the discipline and are classified under the On-Conditional (OC) status.

The guiding framework of this policy is The College Student Handbook specifically its stipulations on student promotion and residency (Pages 32-33 of the Student Handbook 2014 edition).

2.0 Rationale

2.1 The College of Engineering recognizes the need to assist students who are academically-challenged in order to have these students complete their BS degrees in the College.

2.2 There is also the need to design guiding policy that will serve as safeguard for maintaining the minimum academic standards of the College.

3. 0 Scope

This policy applies to all engineering programs with bonafide students that are classified as under the OP/OC status according to (1) the Student Handbook stipulations on promotions and (2) the freshmen entrance examination scores attained and presented during enrollment period.

4.0 Definitions

4.1 A freshman engineering student is considered under the **OC** status if he/she is accepted for enrollment to any of the engineering programs even though his/her entrance examination score is below 60% but is also not lower than 32%.

4.2 An engineering student is considered under the **OP** status if the QPI he/she obtained during the previous semester is below the minimum cut-off required for unconditional promotion to the next year level.

5.0 Procedures

5.1 Any freshman engineering student classified under the OC status during enrollment is automatically allowed the maximum load reflected in his/her program curriculum. The student is given one school year (2 semesters, 1 summer) to prove his/her qualification to the engineering program by obtaining grades that at a minimum will allow him/her to be unconditionally promoted to the 2nd year level.

5.2 Upon confirmation of his/her OC status, the student shall accomplish and submit an OC Promissory Note (Appendix 1), which is also to be signed by his/her parents or guardian. In addition, he/she will accomplish OC Student Card (Appendix 3). Only first year engineering students can be classified as OC.

5.3 Through the department evaluators, **all freshmen engineering students after one school year will have their QPI computed using all of their grades from 1st, 2nd semester and summer**. **For upperclassmen, department evaluators will use their grades from the previous term (1st semester or 2nd semester plus summer) or the entire year (for promotion to next year level) for their QPI.** Based on the QPI, all will be classified in terms of academic status, according to Table 1:

Table 1. QPI requirements for determination of student academic status.

Year level of fapromotion	QPI ranges		
	Non-admittance (ineligible)	On-Probation	Unconditional promotion
1st yr to 2nd yr	< 1.20	1.20 to 1.49	Not less than 1.50
2nd yr to 3rd yr	< 1.50	1.50 to 1.79	Not less than 1.80
3rd yr to 4th yr	< 1.70	1.70 to 1.99	Not less than 2.00
4th yr to 5th yr	< 1.70	1.70 to 1.99	Not less than 2.00
5th yr to 6th yr*	< 1.70	1.70 to 1.99	Not less than 2.00

*Source: Undergraduate Student Handbook 2014; * for students of extended residency*

The list of OC and OP students will be generated by the department or by the Administrative Assistant and reported to the Dean and Assistant Dean.

5.4 Students incurring QPI within the non-admittance range can be possibly reclassified to the On-Probation status subject to student petition, department deliberation, Chair recommendation and final approval by the Dean.

5.5 Upon confirmation of his/her OP status, the student shall accomplish and submit an OP Promissory Note (Appendix 2), which is also signed by his/her parents or guardian. In addition, he/she will accomplish OP Student Card (Appendix 3). A special letter addressed to the parents/guardian may also be given if the student is on his/her second OP status.

5.6 Students on OP status can only have a maximum load of 18 units but not less than 15 units during the semester to uplift his/her status. No students are classified as OP during summer term and all can take full summer load (9 total units max, 1 lab subject max).

5.7 Guidance and monitoring of OP or OC students through the compulsory requirements stipulated in the **OC/OP Student Card:**

5.7.1 Orientation - OP and OC students shall attend a semestral orientation session (coordinated by ACES and the co-curricular student organizations of the departments)to:

- review the students about academic policies;
- inform the students on the conditions for lifting of OP/OC status;
- educate the students about tutorial programs;
- guide the students to participate in counseling programs, and
- to obtain feedback from and enforce stronger guidance on repeat OP students.

5.7.2 Counseling – OC or OP students are required to undergo counseling at the Guidance and Counseling Office least once in a semester (within 1 month after midterms). Students may also have counseling with the Department Chairperson or assigned faculty.

5.7.3 Tutorial/mentoring – The OC or OP students are required to avail of the ongoing tutorial program of the College (see Colege Tutorial Program Policy). A minimum of 5 tutorial sessions should be attended by each student.

5.7.4 The OP/OC Student card is used by the OP or OC student to record and log their participation and completion of the requirements (with appropriate signatures of the faculty/facilitators as proof) for lifting of the OP status. The OP card is checked during the signing of clearance.

5.7.5 The OP or OC students will surrender their OP/OC cards to the Administrative Assistant (or representative) after obtaining clearance for final exam.

5.8 Lifting of OC/OP status - OC students are given one complete school year to accumulate a QPI that is not less than the minimum requirement for unconditional promotion to the 2nd year level, otherwise they would be OP or advised to shift to non-engineering programs. Lifting of OP status will be on per semester basis, following the QPI requirements presented in Table 2.

Table 2. Semester QPI requirement for lifting of OP status.

Year level	QPI to be obtained during the semester student was declared OP
2nd yr	1.8 or more
3rd yr	2.0 or more
4th yr	2.0 or more
5th yr	2.0 or more

*Source: Undergraduate Student Handbook 2014; * for students of extended residency*

5.9 Students shall not be placed under the OP status more than two (2) times, whether contiguous or not, per academic program (engineering or otherwise). This also applies for students who choose to temporarily stop their schooling and then later return to the same program. If the student fails to meet the conditions required to lift his/her OP status after being put on OP for two semesters already (contiguous or not), he/she will be required to shift into a non-engineering program.

5.10 A student who has been dropped from two academic programs shall be warned to improve his/her academic performance and move out of OP status or he/she shall be no longer be admitted by the University. Any student who has been dropped from 3 academic programs shall no longer be eligible for readmission or admission to any other unit in the University.

5.11 Those released from the OP/OC program (lifting and/or promotion) or advised to shift/drop will be officially informed through a letter signed by the chairperson, Assistant Dean and Dean (addressed to the student and parents/guardian).

6.0 Responsibilities

6.1 The Dean approves the final list of OC/OP students and may implement discretionary decisions after proper consultation with appropriate bodies.

6.2 The Assistant Dean is responsible for overall management of the OP/OC program of the College.

6.3 The Administrative Assistant will:

- collate the department-submitted list of OP/OC students, verifies and submit the final list to the Assistant Dean and Dean
- collect the OP/OC cards surrendered during final exam clearance time for safekeeping, recording and transmittal of the record to Assistant Dean
- prior to semestral enrollment, furnish to the departments the Assistant Dean's status report on OP/OC students recommending promotion, lifting of status or advisement to shift/drop.

6.3 The program evaluators/faculty members are responsible for:

- preparing the list of OP/OC students in the department and to have this reviewed by the Chairperson
- advising and guiding students in accomplishing the requirements stipulated in the OP/OC card
- initiating the communication process for lifting, promotion or advisement to shift/drop.

7.0 Related policies

XU Undergraduate Student Handbook 2012

XU-CoE Tutorial Program Policy

Appendix 1

COLLEGE OF ENGINEERING
XAVIER UNIVERSITY
OFFICE OF THE DEAN

PROMISORY NOTE
(On-Conditional)

I, _____, (Course & Year)_____on my own volition declare that;

1. I have been admitted to the College of Engineering of Xavier University, Ateneo de Cagayan, starting the _____ semester of the School Year _____ on **CONDITIONAL STATUS.**

2. that during the above stated period, I have to fulfil the following:
   a. to carry not more than the number of academic units approved by the Dean;
   b. not to drop or withdraw from any subject enrolled in;
   c. not to incur any overcut;
   d. not to incur any failing final mark;
   e. to obtain the required or higher QPI set for my year level;
   f. not to play in the intramurals; and
   g. not to represent the College in any official activity inside and outside the university.
   h. to attend tutorials and other remedial classes which are of use to me, if there are any; and
   i. to undergo counselling and furnish the College evidence of compliance of these conditions.

3. that the above – mentioned conditions for **CONDITIONAL STATUS** have been explained to me;

4. that failing to comply with any of the **conditions aforementioned will debar** me from seeking further admission to the College of Engineering, Xavier University.

Noted by: Approved by:

_____ _____ _____

Signature Over Printed Name (Student On-Condition)
Parent's Signature Over Printed Name
Engr. XXXX XXX
Dean, College of Engineering

Appendix 2

COLLEGE OF ENGINEERING
XAVIER UNIVERSITY
OFFICE OF THE DEAN
PROMISORY NOTE
(On Probation)

I, _____, Course & Year _____, on my own volition declare that;

1. I incurred a QPI of _____ for the _____ semester, SY _____.
2. That this QPI is below the required QPI of my year level which puts me **ON-PROBATION STATUS** for this coming semester of the said academic year as stipulated in the College Student Handbook;
3. That I am aware of and understand the applicable set of stipulations in the College Student Handbook for probation and separation from the University;
4. That during the above stated period, I have to fulfill the following:
   a. to carry not more than the number of academic units, which is _____ units, approved by the Dean or his/her designated representative;
   b. not to drop or withdraw from any subject I enrolled in;
   c. not to incur any overcut;
   d. not to fail in any of the subjects I have enrolled in;
   e. not to play in the University intramurals, unless allowed by the Department chair;
   f. not to represent the college in any official activity inside and outside the University nor join any extra-curricular organization, unless allowed by the Department Chair;
   g. to obtain the required QPI set for my year level;
   h. to attend tutorials and other remedial classes which are of use to me, if there are any; and
   i. to undergo counselling and furnish the College evidence of compliance of these conditions.
5. That the above – mentioned conditions for ON PROBATION STATUS have been explained to me;
6. That failing to comply with any of the **conditions aforementioned and upon recommendation of the Department Chair will debar** me from seeking further admission to the College of Engineering of Xavier University.

Noted by: Approved by:

_____ _____ _____

Signature Over Printed Name (Student On-Condition)

Parent's Signature Over Printed Name

Engr. XXXX XXX
Dean, College of Engineering

Appendix 3

OP/OC Student Card

	Xavier University – Ateneo de Cagayan College of Engineering	On-Probation and On-Conditional Student Card	
For evaluator only :	☐ On-Conditional	☐ On-Probation ☐ 1st time ☐ 2nd time	
Please provide the required information: NAME:_____ COURSE/YR:_____ ☐ 1st Sem. ☐ 2nd Sem. School Year 20__ __- 20__ ___			

ACTIVITIES	Date	Name	Signature
1. Orientation Session			
2. Counseling (Guidance & Counseling Office)			
3. Dept. Evaluation (Chair or faculty evaluator)			

4. Tutorials Log (a minimum of 5 sessions is required)					
Date	Time	# hrs	Subject	Tutor name	Signature

To student: Please present this card when processing for Midterm and Final Exams clearance.
To Admin. Assistant/representative: Collect this card after giving the student final exam clearance.

POLICIES AND PROCEDURES FOR THE ON-THE-JOB TRAINING AND INTERNSHIP PROGRAM

An Overview

The On-the-Job Training and Internship Program is part of the BS Engineering curricula; without undergoing and passing the training the student cannot graduate from his/her course. Under the program the students are assigned to various companies and government agencies where they learn practical applications of the concepts they learn from the academe and at the same time learn and begin to engulf people skills. The industry benefits also from the training in that the academe is able to supply the former's demand for a developed human resource.

The Program has the following **objectives**:

1. To expose all senior engineering students to actual work conditions;

2. To provide opportunities for the students to use their initiative to translate the theories and principles learned from classroom instruction;

3. To instill in the students the right kind of work attitude, ethics, and values;

4. To provide opportunities for the students to experience professional interaction with the practicing professionals and with other people in the organization; and

5. To allow the students to observe their future role in the industry.

In line with the objectives of the Program, the College has drawn the following policies:

1. The OJT and Internship Program is a course requirement hence; all students who take it must officially enroll the course before undertaking training. OJT is offered every summer session of every school year and the Internship Program is offered only in the second semester of the academic year. OJT can be enrolled simultaneously with any other coursework with the discretion of the Department Chair as long as student-trainee will present a Program of Works to cater the OJT plus coursework no more than one (1) subject.

   Students may apply for the Output-based On-the-Job Training (OB-OJT) Program, where its own guidelines and implementing rules are applicable (see OB-OJT Program Policies and Guidelines).

2. Being a course requirement the student-trainee will be graded according to the marking system of the University. The mark of the student is computed at the end of the term and is based on the course requirements weighted as follows:

Midterm Grade:	(%)
Prelim Equivalent (Technical Report)	20
Midterm Equivalent (Department Coordinator's Evaluation)	30
Class Standing Equivalent (Weekly Reports)	50
After Midterms:	
Semi Final Equivalent (Technical Report)	20
Class Standing Equivalent (Weekly Reports)	80
Final Grade:	
Final (Summary Report)	30
Midterm Grade	35
Supervisor's Evaluation	35
TOTAL	100

3. The Grade Scale shall be as follows:

Numerical Grade	Letter Grade Equivalent
92 – 100	A
85 – 91	A-
76 – 84	B
68 – 75	B-
60-67	C
BELOW 60	C
Lacking major requirement	INC

4. The participants of the program are the senior engineering students. Student-trainees who will graduate in May and October of the current school year and those who will be graduating in March of the following year are first priority student-trainees.

5. The minimum requirement in the 2005 Curriculum for the duration of the actual training is at least 240 hours, 300 hours in the 2008 Curriculum (with an equivalent 2 units of Laboratory), 120 hours for ChE students enrolled in ChE 70 (an equivalent 1 unit of Laboratory), and 600 hours for the internship program (with an equivalent of 2 units of Laboratory). In cases when the company requests that the trainee extends his/her training it is left to the discretion of the trainee to decide on this matter.

6. All student-trainees are required to attend the OJT and Internship Program orientation. A student-trainee who misses the orientation will not be allowed to enroll in the OJT and Internship Program.

7. The student-trainee must secure the required documents and the explicit approval of the College before undergoing training; otherwise his/her training will not be credited for his/her

course curriculum.

8. A student-trainee can be endorsed in only one company except in such case when the company to which he/she is endorsed declines to accept him/her for some reasons.

9. Training in a company that is owned by the trainee's family is not allowed.

10. A student-trainee who transfers to another company without the knowledge and permission of the College gets an F mark for OJT and the Internship Program.

11. For cases involving students who need special medical attention, a medical certificate from his/her physician is required stating that the student is capable to undergo training.

12. As there are working students in the College, these students may be allowed to undergo training in the same company where they are currently working provided that their work is in line with their field of specialization. Prior approval of the College and compliance to the requirements of the OJT must be secured before enrolling in the OJT.

Training Requirements:

The following are required of the student-trainee for his/her training to be considered official:

1. Before training:

   - ☐ Student's Intent (Form 2, see Appendix B)
   - ☐ Certification from the Department (Form 5, see Appendix E)
   - ☐ Trainee Information Sheet (Form 3, see Appendix C)
   - ☐ Training Agreement & Liability Waiver (Form 4, see Appendix D)
   - ☐ Training Recommendation (Form 6, see Appendix F)
   - ☐ 2 pcs. 1 ½ x 1 ½ ID pictures
   - ☐ Orientation Clearance (Form 1, see Appendix A)
   - ☐ Proof of Official Enrolment/Registration
   - ☐ Insurance Policy (Personal Accident Insurance)

2. During Training

   - ☐ Accomplished Weekly Log Sheets (Form 7, see Appendix G)
   - ☐ Authenticated Daily Time Record (DTR)

3. After Training

   - ☐ Accomplished Training Performance Evaluation Form (Form 9, see Appendix I)
   - ☐ Executive Summary Report (Form 8, see Appendix H)
   - ☐ OJT Training and Apprenticeship Program Evaluation Form (Form 10, see Appendix J))

☐ Photocopy of Certificate of Completion

In addition to the above requirements, the students may be required by the companies to submit the following before the start of training:

☐ ID Pictures
☐ Endorsement Letter from the School
☐ Barangay Clearance
☐ Police Clearance
☐ NBI Clearance
☐ Certificate of Good Moral character
☐ Medical Certificate

Appointment, Duties and Responsibilities of the Coordinators

A. PROGRAM COORDINATOR

1. The Dean shall appoint an OJT and Internship Program Coordinator and serve as the Overall Program Coordinator under XU Engineering Resource Center.

2. The Program Coordinator oversees the operation of the entire program and reports to the Director of XUERC all matters pertaining to the OJT and Internship Program.

3. The Program Coordinator, with the assistance of the Department Coordinators prepares and sends letters of request, recommendation and endorsement to the companies.

4. The Program Coordinator is the liaison between the College and the industry.

5. The Program Coordinator reproduces all forms to be duly accomplished by the trainees and gives them out through the Department Coordinators before the orientation.

6. All problems that may arise during the training should be resolved through the Program Coordinator.

B. DEPARTMENT COORDINATOR

1. Every department shall be assigned a Coordinator for OJT. Appointment shall come from the Dean of the College through the Department Chair.

2. The Department Coordinator coordinates with the Department Chair to conduct academic evaluation of all incoming fourth-year ChE students or fifth-year engineering students in order to qualify them to the training program.

3. The Department Coordinator identify venues for training such as industrial plants,

manufacturing companies, construction firms, power companies, telecommunications and computer firms, government agencies, etc.

4. The Department Coordinator assists the Program Coordinator to request for training slots, recommend qualified student-trainees appropriately and reasonably. All recommendations shall pass through the Office of the Program Coordinator for endorsement purposes.

5. The Department Coordinator assists the Program Coordinator to make follow-ups on the recommendations made earlier to confirm accommodation/acceptance or make another recommendation for those denied requests.

6. The Department Coordinator closely coordinates all arrangements or placements made, either directly or indirectly done, through the Office of the Program Coordinator.

7. If necessary, the Department Coordinator extends assistance to company personnel for preliminary screening purposes, i.e. scheduling, testing and interview.

8. At the start of the term, the Department Coordinator shall submit to the Program Coordinator the final list of student trainees and their corresponding contact details and the company, with its contact details, where they are assigned.

9. The Department Coordinator visits the workplace of the trainee for the following purposes:

   - ☐ To determine if there is a training program designed by the company. In case when there is none, the Coordinators must submit a recommended training program to the company for the trainee;
   - ☐ To monitor the progress of the training; and
   - ☐ To help evaluate the company as a training ground.

10. The Department Coordinator makes a timetable of monitoring schedule indicating proposed budget for fare, gasoline, snacks and/or meals and to submit a copy of the **Proposed Monitoring Schedule** to the Department and the Office of the Program Coordinator before the monitoring period starts, particularly on the first week of the term. This proposal should be made as an attachment to the faculty teaching load report for the term.

11. The Department Coordinator liquidates all expenses incurred before, during, and after the training immediately. Copy of the Liquidation Report must also be submitted to the office of the Department Chair for record/reference purposes.

12. At the end of the term, the Department Coordinators submit to the office of the Program Coordinator the final list of students who have completed and passed their training, and photocopies of the trainees' Certificates of Completion and original copies of the OJT and Internship Program Executive Summary, in bound form.

13. The Department Coordinator accomplishes and submits to the Registrar's Office the **Official**

Grading Sheets for the On-The-Job Training and Internship Program on schedule. Appropriate marks must appear in the Final Mark column accordingly.

14. The Department Coordinator meets with the Program Coordinator to evaluate the companies based on the executive summary reports of the trainees and on the monitoring that they have conducted. The Chairs should be given a copy of the evaluation.

Monitoring, Feedback and Evaluation

To ensure that the student-trainees gain from the OJT and Internship Program, monitoring is conducted by the Department Coordinators by visiting the workplace of the trainee, observing the environment and soliciting feedback from the trainee and the trainee's supervisor. When the coordinator observes some problems concerning the kind of work given to the trainee, he/she informs the supervisor about the problem and tackles what could be remedies to these problems.

Before the end of the training the supervisor evaluates the trainee according to the following criteria:

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

(Form 1) *Appendix A*

College of Engineering
XAVIER UNIVERSITY (Ateneo de Cagayan)
Cagayan de Oro City

ON-THE-JOB TRAINING AND INTERNSHIP ORIENTATION GUIDE
Term_____ SY 20____ - 20__

A. Training Details

Period of Training : _____
Inclusive Dates : from _____ to _____
Minimum Hours requirement : _____Training Hours
Orientation Schedule : _____, 20__
Issuance of Orientation Clearance : After due Consultation with Department Coordinator

OJT Requirements:

1. Before Training :
   a) Accomplished OJT Forms (Forms 2,3,4,5 and 6)
   b) 2 pcs 1 ½ x 1 ½ ID pictures
   c) Orientation Clearance (Form 1)
   d) Proof of Official Enrolment
   e) Insurance Policy
   f) Other Documents required by Company

2. During Training :
   a) Accomplished Weekly Logsheets (Form 7)
   b) Authenticated Daily Time Record (DTR) from the Company

3. After Training :
   a) Accomplished Training Evaluation Form (Form 9)
   b) Training Executive Summary Report (Form 8)
   c) Photocopy of Certificate of Completion
   d) OJT Training and Apprenticeship Program Evaluation Form (Form 10)

Submission of Requirements : Up to _____, 20___ (First Day of Registration for Upperclassmen)
Issuance of Orientation Clearance : After undergoing orientation

B. Forms

Forms to be Accomplished	Distribution Copies	Company's Copy	Program Coordinator's Copy	Department Coordinator's Copy	Student's Copy
Form 1 (Orientation Guide and Clearance)	**2**			**1**	**1**
Form 2 (Student's Intent)	**2**		**1**		**1**
Form 3 (Trainee Information Sheet)	**2**	**1**		**1**	
Form 4 (Waiver)	**3**	**1**		**1**	**1**
Form 5 (Certification)	**2**	**1**		**1**	
Form 6 (Recommendation)	**2**	**1**	**1**		
Form 7 (Weekly Progress Report)	**5**			**5**	
*Form 8 (Executive Summary Report)	**2**		**1**	**1**	
Form 9 (Trainee Evaluation Form)	**1**			**1**	
Form 10 (Program Evaluation Form)	**1**			**1**	

*For clearance purposes, the Program Manager receives only the original and computerized copy of the **Executive Summary Report** together with the **photocopy** of the **Certificate of Completion**. The original Copy of the Certificate of Completion must be kept by the student for future reference.

(Form 1) *Appendix A*

C. Grading System

Students who have been able to accomplish the minimum requirement set for the On-The-Job Training Program, i.e., **300 training hours**, shall marked **its equivalent letter grade** in the Official Grading Sheets; otherwise, **"F"** for Failed or **"INC"** for Incomplete. INC mark shall be given only to students who have in any extraordinary circumstances not been able to comply with all the training requirements. **But,** this shall strictly follow the University policy on "Incomplete Marks" (Ref.: p.31, College Student Manual, 2008 Edition) which reads: *"If the requirement is not completed within one month from the end of the semester/school term, the grade will automatically be changed to* ***F (Failure)".*** The University procedure for the completion of requirement and the changing of mark applies.

I, , a -year BS in *Engineering* student, have

understood fully well all the above pertinent details and conditions set for my On-The-Job Training (OJT) and Apprenticeship Program during the Term SY 20 - 20 and that I shall accomplish and submit

on time all the training requirements that are demanded of me as a trainee.

_____
Student-Trainee's Signature

_____
Date

Attested:

_____
Signature Over Printed Name of Department Coordinator

COLLEGE OF ENGINEERING
XAVIER UNIVERSITY (Ateneo de Cagayan)
Cagayan de Oro City 9000

No. _____

OJT ORIENTATION CLEARANCE
_____, _____, 20_____

Name: _____
Date: _____ Time: _____
Venue: _____

Issued by:

_____
Signature Over Printed Name
Overall OJT Coordinator

(Form 2) *Appendix B*

College of Engineering
XAVIER UNIVERSITY (Ateneo de Cagayan)
Cagayan de Oro City

_____
Date

_____
Dean, College of Engineering

Thru: _____
Program Coordinator
On-the-Job Training and Internship Program

Dear Sir:

This is to signify my willingness and readiness to attend and participate in the Xavier University – College of Engineering On-the-Job Training and Internship Program this Summer 20___, one of the requirements of which, is my participation in the OJT Orientation, and to abide by the terms and conditions holding a minimum of ____ hours from _____ to _____ at
_____
(Suggested Company/Agency/Bureau)

free from any liability for negligence or willful acts on my part. Furthermore, I shall observe all company rules and regulations and shall complete the minimum number of training hours prescribed for my assigned tasks during the training conscientiously, diligently, and to the best of my abilities.

I understand fully well that this undertaking is an integral part of the course-curriculum and a pre-requisite for graduation in the College of Engineering of Xavier University.

Very truly yours,

_____
Signature over printed Name of Participant

Course & Year _____

(Form 3) *Appendix C*

College of Engineering
XAVIER UNIVERSITY (Ateneo de Cagayan)
Cagayan de Oro City

TRAINEE INFORMATION SHEET

PHOTO
1 ½ X 1 ½

PERSONAL DATA:
NAME _____ SEX _____ AGE_____

DATE OF BIRTH _____ PLACE OF BIRTH _____

CIVIL STATUS _____ NAME OF SPOUSE, if married _____

CITIZENSHIP _____ RELIGION _____

CITY ADDRESS _____

FATHER _____ MOTHER _____

HOME/MAILING ADDRESS _____

TELEPHONE/FAX NUMBER (S) _____ EMAIL _____

EDUCATIONAL ATTAINMENT:

LEVEL	NAME & ADDRESS OF SCHOOL	INCLUSIVE DATES	DIPLOMA/DEGREE EARNED/YEAR LEVEL
ELEMENTARY			
SECONDARY			
COLLEGE			

SPECIAL STUDIES/SKILLS/TRAINING: _____
_____

SCHOLASTIC ACHIEVEMENT: _____
_____

MEMBERSHIP IN ORGANIZATIONS: _____
_____

IN CASE OF EMERGENCY, PLEASE NOTIFY:
NAME_____ RELATION _____
ADDRESS _____
TELEPHONE/FAX NUMBERS/EMAIL _____
OJT APPLICANT'S SIGNATURE _____DATE APPLIED _____

(Form 3) *Appendix C*

Attachment (XU-Engineering Office Use Only)

NAME OF OJT PARTICIPANT _____

COURSE & YEAR _____

NAME OF COMPANY _____

Please answer the following questions truthfully. Your answers will be treated with utmost confidentiality.

1. Are you pregnant? ☐ Yes ☐ No ☐ n/a
   If yes, please indicate the number of months. _____

2. Do you suffer from any illness such as epilepsy, tuberculosis, hypertension or heart condition? ☐ Yes ☐ No
   Others, please specify. _____

3. Are presently taking prescription medicines?
   ☐ Yes ☐ No
   If Yes, please specify the kind of medicine and indicate for what treatment.
   _____
   _____

4. Is there any special medical attention that the College should be aware of?
   ☐ Yes ☐ No
   If Yes, please specify. _____
   _____

This is to certify that the undersigned has provided only the true and correct information as deemed necessary.

_____
Signature Over Printed Name

(Form 4) *Appendix D*

ON-THE-JOB TRAINING AND INTERNSHIP PROGRAM

W A I V E R

The College of Engineering of Xavier University, Cagayan de Oro City, has requested this waiver in connection with its On-The-Job Training (OJT) and Internship Program offered this Term SY 20____- 20___-and which is accepted and confirmed. The student-trainee,

_____ _____

Name *Course and Year*

together with his parents or judicially appointed guardian acknowledge that the permission granted to his is made subject to the condition, which he hereby accepts and agrees to, that the company will not assume any responsibility whatsoever for any injury or accident which may happen to him within or outside the premises of the company during the period of said program. It is understood that there is no employer-employee relationship between the company and the student-participant.

This waiver will be in effect for the duration of the **_____-Hour Training** as minimum requirement scheduled from
_____ to _____, 20_____.

Done this _____ day of _____ 20_____, in the City of Cagayan de Oro.

_____ _____

Signature of OJT Participant *Signature over Printed Name of Parent or Judicially Appointed Guardian*

Witnessed:

_____ _____

Department Chair **Company/Agency/Bureau Representative**

_____

Name of Company/Agency/Bureau

(Form 5) *Appendix E*

C E R T I F I C A T I O N

TO WHOM THIS MAY CONCERN:

This is to certify that _____is _____-year BS _____ Engineering student of the College of Engineering of Xavier University. The trainee is qualified to undergo a ___**-Hour Training** in your company for the Term SY 20___- 20___.__

This certification is issued to enable the above-mentioned student to undertake the said minimum number of training hours as course requirement and pre-requisite for graduation.

Issued this _____ day of _____ 20___, at the College of Engineering, Xavier University, Cagayan de Oro City.

_____
Department Chair

XAVIER UNIVERSITY – ATENEO DE CAGAYAN
In consortium with ATENEO DE DAVAO UNIVERSITY and ATENEO DE ZAMBOANGA UNIVERSITY
COLLEGE OF ENGINEERING
Ground Floor Engineering Building, Xavier University, Corrales Avenue 9000 Cagayan de Oro City Philippines
jojo@xu.edu.ph (088) 858 3116 Loc 1207 / 1209 (FAX)

(Form 6) *Appendix F*

_____
Date

_____
_____
_____
_____

Dear _____:

The College of Engineering of Xavier University would like to recommend _____ _____ , a _____-year BS in _____ Engineering student, to undergo a _____-Hour training in your company. This student has been evaluated and found qualified to undergo the said training this Term SY 20____- 20___.

At the completion of the training, we would like to request your end to evaluate the trainee and to issue a Certificate of Completion to the same. The evaluation forms will be made available towards the end of the training.

Please do not hesitate to contact me either thru email at mcollado@xu.edu.ph or at telephone no. (088) 858-3116 Local 1218 and 1207 for some concern regarding our **On-the-Job Training (OJT) and Internship Program**.

Thank you very much for your continued support and kind assistance.

Very truly yours,

ENGR. MAJIAH S. COLLADO
OJT and Internship Program Coordinator

XAVIER UNIVERSITY – ATENEO DE CAGAYAN
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jojo@xu.edu.ph (088) 858 3116 Loc 1207 / 1209 (FAX)

(Form 7) *Appendix G*

COLLEGE OF ENGINEERING
XAVIER UNIVERSITY (Ateneo de Cagayan)
9000 Cagayan de Oro City

ON-THE-JOB TRAINING LOG SHEET

WEEKLY PROGRESS REPORT
Term _____ SY 20____- 20___

Name _____ Course & Year _____
Company _____
Week _____, _____ to _____, _____, 2012

Objective #1 for the week:
1._____

ACTIVITIES:	REFLECTIONS:

Objective#
2._____

ACTIVITIES:	REFLECTIONS:

Signed :

_____ _____
Student-Trainee **Signature over Printed Name of Company Dept. Head/Supervisor**

_____ _____
Department Coordinator **Date Signed**

(Form 9) *Appendix I*

COLLEGE OF ENGINEERING
XAVIER UNIVERSITY (Ateneo de Cagayan)
9000 Cagayan de Oro City

ON-THE-JOB TRAINING EXECUTIVE SUMMARY REPORT
Term _____ SY 20____- 20___

Name _____ Course & Year _____
Company _____

What I did in the training:

What I learned from the training:

Signed:

_____ _____
Student-Trainee **OJT Overall Coordinator**

_____ _____
Department Coordinator **Date Signed**

XAVIER UNIVERSITY – ATENEO DE CAGAYAN
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Philippines jojo@xu.edu.ph (088) 858 3116 Loc 1207 / 1209 (FAX)

(Form 9) *Appendix I*

COLLEGE OF ENGINEERING
XAVIER UNIVERSITY (ATENEO DE CAGAYAN)
9000 Cagayan de Oro City

ON-THE-JOB TRAINING EVALUATION FORM

To the Evaluator: Thank you for taking time out of your hectic schedule. Your honest opinion of our student's training performance will greatly aid us in our evaluation. Please check which corresponds to the answer that best describes the performance of the trainee.

Name of Student-Trainee : _____
Engineering Discipline : _____
Inclusive Dates of Training : _____
Name of Company : _____

Competency	Rating of the Student (pls check)				
	1	2	3	4	5
1. ability to apply knowledge of mathematics and science to solve engineering problems					
2. ability to design and conduct experiments, as well as to analyze and interpret data					
3. ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, in accordance with standards					
4. ability to function on multidisciplinary teams					
5. ability to identify, formulate, and solve engineering problems					
6. understanding of professional and ethical responsibility					
7. ability to communicate effectively					
8. broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context					
9. recognition of the need for, and an ability to engage in life-long learning					
10. knowledge of contemporary issues					
11. ability to use techniques, skills, and modern engineering tools necessary for engineering practice					
12. knowledge and understanding of engineering and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments					

COMMENTS/REMARKS: _____
_____

_____

_____ _____
Evaluator's Signature over Printed Name Date Signed

_____ _____
Position/Designation Section/Department

(Form 10) *Appendix J*

Xavier University-Ateneo de Cagayan
College of Engineering

On the Job Training and Internship Program Evaluation Form

Kindly fill up the following:

Name: _____ Signature :_____
Course:_____ Unit coordinator:_____
Company where you had your OJT:_____
Supervisor in the Company:_____

Purpose

The following evaluation instrument is designed to assess the effectiveness of the On-Job-Training Program of the College as well as the training program provided by the host companies. Please check (√) the appropriate box corresponding to your answer for each of the question asked and provide the comments as needed. Return completed questionnaire to your Unit Coordinator together with the documents required for your clearance. The results of this evaluation shall serve as basis for improving the design and management of the OJT in the College to maximize the benefits of the said Program. Thank you for you cooperation.

Program Evaluation:

*NA = not applicable

No.	Question	Yes	No	NA	Comments
1.	Has the College conducted an orientation about the OJT program, the requirements and preparations needed?				
2.	Has the College provided the necessary assistance such as referrals or recommendations in finding the company for your OJT?				
3.	Has the department showed coordination with the company in the design and supervision of your OJT?				
4.	Have the academic preparations ie., prerequisite courses, adequately equipped you to undertake company assignment and its challenges?				
5.	Has the Unit Coordinator provided monitoring of your OJT progress in the company?				
6.	Has the supervision of the Unit Coordinator been effective in achieving your OJT objectives and providing feedback, when necessary?				
7.	Has the College conducted assessment of your OJT program upon completion?				
8.	Has the College provided you with the results of the company assessment of your OJT?				
9.	Was the company appropriate for your type of training required and/or desired?				

No.	Question	Yes	No	NA	Comments
10.	Did the training program designed by the company meet your objectives and expectations?				
11.	Has the company showed coordination with the College in the design and supervision of your training program?				
12.	Has the company and its staff welcomed you and treated you with respect?				
13.	Has the company facilitated the training, including the provision of the necessary resources, such as, facilities and equipment and a safe workplace conducive for training, needed to achieve your OJT objectives?				
14.	Has the company assigned a supervisor to oversee your work?				
15.	Has the supervisor been effective in his/her supervision through regular meetings, consultation or advising?				
16.	Has the training provided you with the necessary technical and administrative exposure of "real world" engineering problems and practice?				
17.	Has the training program allowed you to develop self-confidence, self-motivation and positive attitude towards work?				
18.	Has the experience improved your personal skills and human relations?				

Additional comments and suggestions.

CONTACT INFORMATION

College Administration Office is located at 1st floor, Engineering Building

College Dean	858-3116 local 1209	hcascon@xu.edu.ph
Asst. Dean	858-3116 local 5326	mtcabaraban@xu.edu.ph
College Secretary	858-3116 local 1207	ppacquiao@xu.edu.ph
Admin. Assistant	858-3116 local 5656	rdevilla@xu.edu.ph

Faculty Room for the engineering program departments is located at 2nd floor, Engineering Building

ME Department	858-3116 local 1016	cfabrea@xu.edu.ph
CHE Department	858-3116 local 1206	eortiz@xu.edu.ph
CE Department	858-3116 local 1203	gapor@xu.edu.ph
EE Department	858-3116 local 1217	gcabaraban@xu.edu.ph
ECE Department	858-3116 local 1218	ipabillaran@xu.edu.ph
IE Department	858-3116local 1216	gpaclijan@xu.edu.ph

Faculty room for Physics department is located at 5th floor, Engineering Building. Contact information: 858-3116 loc 1204; Email: mfrancisco@xu.edu.ph

The Engineering Resource Center is located at 3rd floor, Engineering Building. Contact information: 858-3116 loc 1208; Email: dlo@xu.edu.ph

College of Engineering Bulletin of Information

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http://www.xu.edu.ph/academic-cluster/school-of-engineering