

Course Description

Credit: 3 units

AGRICULTURAL ENGINEERING

AENGR 105. FUNDAMENTALS OF AGRICULTURAL ENGINEERING I

Hydrology, irrigation and drainage principles, soil and water conservation engineering, weather elements and climate classification and crop and livestock environment.

Prerequisite: MATH 100, SOILS 100

4.5 hours a week: (2 lec, 2.5 lab)

Credit: 3 units

AENGR 110. AGRICULTURAL ENGINEERING ORIENTATION

Agricultural engineering as a tool for sustainable development in global and local frontiers, agricultural engineering projects; success stories, best practices and approaches, innovations, challenges and opportunities in agricultural engineering.

Prerequisite: 2nd Year Standing

1 hour lecture a week

Credit: 1 unit

AENGR 115. FUNDAMENTALS OF AGRICULTURAL ENGINEERING II

Farm shop, farm structure and farm machinery for crop and animal production and processing.

Prerequisite: PHYS 105

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 130. POST-HARVEST TECHNOLOGY (for BSAB)

Handling, threshing, cleaning, drying, classifying, conditioning, packaging and storing of agricultural products; major groups of microorganisms involved in crop processing.

Prerequisite: none

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 410. HYDROMETEOROLOGY

Hydrologic cycle; climatic elements; precipitation; streamflows and stream-flow hydrographs; evaporation and evapotranspiration; groundwater; hydrograph and runoff analysis; statistical treatment of hydrologic data; study and use of hydrometeorological instruments.

Prerequisite: ENGR 323

4.5 hours a week (2 lec, 2.5 lab)

AENGR 411. AGRICULTURAL POWER AND ENERGY

Sources of farm power and energy; operation, maintenance, and testing of internal combustion engines; renewable energy technologies and their development, economic application and environmental implications.

Prerequisite: MENGR 320

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 412. IRRIGATION ENGINEERING

Plant-soil-water-relationships, sources of water supply, flow measurements, distribution and methods of applying water to crops; irrigation pumping systems, planning and design of irrigation systems.

Prerequisite: ENGR 323

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 413. METHODS OF ENGINEERING RESEARCH

Collection, presentation and interpretation of data, measures of central tendency, measures of dispersion, probability distributions, test of hypothesis; principle of experimental designs, linear regression and correlation, test of specific hypothesis in ANOVA.

Prerequisite : 4th Year Standing

4.5 hours a week (2 lec, 2.5 lab)

Credit : 3 units

AENGR 420. AGRICULTURAL MECHANIZATION AND MACHINERY MANAGEMENT

Development, economic requirements, design and construction features and concept, identification, specification, operation, testing and management of agricultural machines; optimum farm machinery management; principles of agricultural mechanization.

Prerequisite: AENGR 411

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 421. PROCESSING OF GRAINS, CEREALS AND BY-PRODUCT UTILIZATION

Fundamental understanding of durables' anatomy and physiology; harvesting and handling; drying and drying systems; storage and preservation technology;

size reduction; material handling methods; conditioning; milling; mixing; pelleting; feed technology and by-product utilization.

Prerequisite: CHEM 203, ENGR 323, MENG 411

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 422. RURAL ELECTRIFICATION

Application, generation and utilization of electric power; generators and motors; electrical equipment and controls; distribution lines; power load calculation; design, application, installation and utilization of power for farm and communities; social preparation and institutional development in rural electrification; load control and instrumentation.

Prerequisite: EENGR 311

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 423. DRAINAGE ENGINEERING

Drainage theories and design factors of drainage systems for agricultural areas, planning and design of drainage systems, surface and sub-surface drainage.

Prerequisite: AENGR 412

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 424. AGRICULTURAL STRUCTURES ENGINEERING

Theory of stress analysis as applied to statically indeterminate structures subjected to static and dynamic loads; algebraic and graphical analysis of beams, trusses, portals and frames of farm buildings; design of farm roads and bridges.

Prerequisite: ENGR 320, ENGR 321

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 425. AQUACULTURE ENGINEERING

Application of engineering principles in aquaculture, site selection, survey methodology and design and construction of facilities for farming systems of selected species.

Prerequisite: MATH 105, AQUA 100

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

AENGR 430. TRACTOR AND FARM EQUIPMENT OPERATION AND MAINTENANCE

Operation, troubleshooting, repair, and maintenance of agricultural tractors and other farm and post-production equipment.

Prerequisite: AENGR 420

5 hours laboratory a week

Credit: 2 units

AENGR 431. ADVANCES IN IRRIGATION SCIENCE (Elective Subject)

Advances and innovations in irrigation systems and technologies including best practices and approaches for agricultural application relevant to sustainable countryside development; models and methods of extension teaching and communication.

Prerequisite: AENGR 412

1 hour lecture a week

Credit: 1 unit

AENGR 432. ADVANCES IN AGRICULTURAL MECHANIZATION (Elective Subject)

Advances and innovations in agricultural mechanization including best practices and approaches in agricultural mechanization relevant to sustainable countryside development; models and methods of extension teaching and communication.

Prerequisite: AENGR 420

1 hour lecture a week

Credit: 1 unit

AENGR 433. ADVANCES IN RENEWABLE ENERGY AND ENVIRONMENT (Elective Subject)

Advances and innovations in renewable energy systems and technologies including best practices and approaches for various relevant applications for sustainable countryside development; models and methods of extension teaching and communication.

Prerequisite: AENGR 411, AENGR 422

2.5 hours laboratory a week

Credit: 1 unit

AENGR 500a. FIELD PRACTICE I

Orientation before the field practice, identification of the field practice area related to the field of agricultural engineering, writing and presentation of the proposed program of work for the selected field practice area.

Prerequisite: AENGR 413, ENGL 125

1 hour lecture a week

Credit: 1 unit

AENGR 500b. FIELD PRACTICE II

Field exposure on the chosen field of agricultural engineering, evaluation and sharing of experiences after the field practice, and writing and presentation of report.

Prerequisite: AENGR 500a
11 hours a week (1 lec, 10 lab)
Credit: 5 units

AENGR 501a. UNDERGRADUATE THESIS I

Identification of a special problem related to the field of agricultural engineering, writing, and presentation of thesis proposal.

Prerequisite: AENGR 413, ENGL 125
1 hour lecture a week
Credit: 1 unit

AENGR 501b. UNDERGRADUATE THESIS II

Collection of relevant data and information on the selected and approved problem area, analysis of data, writing, and presentation of the report.

Prerequisite: AENGR 501a
11 hours a week (1 lec, 10 lab)
Credit: 5 units

AENGR 510. PROCESSING OF PERISHABLE FARM PRODUCTS

Fundamental understanding of postharvest physiology; handling systems; storage technology; preservation methods; packaging technology; transport; application of engineering principles in unit process operations; energy and mass balances in processing operations; design of cold storage.

Prerequisite: CHEM 203, ENGR 323, MENG 411
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

AENGR 511. AGRICULTURAL MACHINERY DESIGN

Design, fabrication and test of machine elements and components in agricultural equipment; ergonomics in tractor design; documentation, presentation, and reporting techniques.

Prerequisite: ENGR 220, ENGR 321, AENGR 420
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

AENGR 512. SOIL AND WATER CONSERVATION ENGINEERING

Basic principles of soil and water conservation; water management; design, construction and maintenance of soil and water conservation structures; drainage and erosion control systems.

Prerequisite: AENGR 423

4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

AENGR 513. FOREST PRODUCTS ENGINEERING

Engineering properties of wood; survey of forest products manufacturing processes; handling, transport, processing and utilization of forest products; natural resource assessment inventory approaches and best practices in forestry management; woods and biofuels.

Prerequisite: ENGR 320
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

AENGR 514. COMPUTER APPLICATION IN ENGINEERING

Computer programming; testing and debugging based on engineering applications; application programs essential to the engineering practice.

Prerequisite: COMSCI 100
6 hours a week (1 lec, 5 lab)
Credit: 3 units

AENGR 515. AGRICULTURAL ENGINEERING LAWS, CONTRACTS AND PROFESSIONAL ETHICS

The Philippine Agricultural Engineering Law; project specifications; bids and awards; project documents; professional ethics.

Prerequisite: 5th Year Standing
1 hour lecture a week
Credit: 1 unit

AENGR 520. AGRICULTURAL ENTREPRENEURSHIP AND MANAGEMENT

Principles, theories, models and best practices underlying organizational management, and their application in agricultural business, programs and projects; management of agricultural projects.

Prerequisite : 5th Year Standing
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

AENGR 521. DESIGN AND MANAGEMENT OF AGRICULTURAL STRUCTURES

Engineering principles and design criteria for farm structures; cost estimates and specifications; job planning and construction management; farm structures maintenance and management.

Prerequisite: AENGR 424
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

AENGR 522. AGRICULTURAL WASTE MANAGEMENT

Agricultural waste management system; bio-conversion technologies; analysis, design and construction techniques of agricultural waste management systems.

Prerequisite: 5th Year Standing
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

AENGR 523. UNDERGRADUATE SEMINAR

Seminar on advances and innovations in agricultural engineering relevant to the advancement of agriculture in the country.

Prerequisite: 5th Year Standing
1 hour lecture a week
Credit: 1 unit

CIVIL ENGINEERING

CENGR 220. ELEMENTARY SURVEYING

Principles, theories and uses of all major surveying instruments for horizontal, vertical and angular measurements particularly in the planning and construction of civil engineering projects.

Prerequisite: MATH 105
7 hours a week (2 lec, 5 lab)
Credit: 4 units

CENGR 221. SURVEYING

Use and adjustment of surveying instruments; methods of running traverses and leveling; topographical surveys.

Prerequisite : MATH 105
4.5 hours a week (2 lec, 2.5 lab)
Credit : 3 units

CENGR 310. HIGHER SURVEYING

Use and application of surveying instruments including mapping, celestial observation, photogrammetry, measuring velocity and discharge of streams and hydrographic surveying.

Prerequisite: CENGR 220
7 hours a week (2 lec, 5 lab)
Credit: 4 units

CENGR 320. ROAD CURVES AND EARTHWORKS

Theories and principles about horizontal and vertical curves, lines and grades, and earthworks; theory of location and application to roadways and highways; mass diagram, haul estimates and costing, and restructuring of curves.

Prerequisite: CENGR 310
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

CENGR 321. ENGINEERING GEOLOGY

Earth's crust as the surface and underground materials; structures built on or beneath the surface of the earth, river, subsurface waters, and other bodies of water; erosion and deposition, landslide; different land forms and others pertaining to geology; prevention of earth materials from natural calamities.

Prerequisite: CHEM 200
3 hours lecture a week
Credit: 3 units

CENGR 410. HYDRAULICS ENGINEERING I

Fluid statics; basic fluid flow equations; energy equation and its application to the study of the flow of fluids through orifice, tubes, pipes, pipe networks, reservoir and open channels.

Prerequisite: ENGR 321
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

CENGR 411. SOIL MECHANICS

Identification and classification of soils and rocks; soil volume and density relationships; flow of water in soil; effective stress concept; consolidation and settlement; shear strength of soil; lateral earth pressure; stability of slopes; bearing capacity of foundation; improvement of site soil and selection of foundation types; laboratory and in-site soil testing; sampling; soil properties behavior; characteristics; soil constants; construction tests.

Prerequisite: ENGR 321
5.5 hours a week (3 lec, 2.5 lab)
Credit: 4 units

CENGR 412. STRUCTURAL THEORY I

Theory of stress analysis as applied to statically determinate structure subjected to static and dynamic loads; algebraic and graphical analysis of beams, trusses, portals and building frames.

Prerequisite: ENGR 321
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

CENGR 413. FUNDAMENTALS OF COMPUTER-AIDED DESIGN AND DRAFTING

Principles and application of computer-aided design and drafting (Auto CAD) in manipulating building and infrastructure plans; specifications and introduction to other similar software essential to civil engineering practice.

Prerequisite: COMSCI 100, ENGR 220
6 hours a week (1 lec, 5 lab)
Credit: 3 units

CENGR 414. FUNDAMENTALS OF TIMBER, STEEL AND REINFORCED-CONCRETESTRUCTURES

Deals with the basic principles of timber, steel, and reinforced concrete structural elements including their properties, design criteria, and simple detailing.

Prerequisite: ENGR 321
3 hours lecture a week
Credit: 3 units

CENGR 420. CONSTRUCTION MATERIALS AND TESTING

Properties and characteristics of common construction materials such as metal, wood, concrete and asphalt; examination of these properties and characteristics with respect to design, uses and procedures in construction and installation; and introduction to reinforced concrete.

Prerequisite: ENGR 311
4.5 hours a week (2 lec., 2.5 lab)
Credit : 3 units

CENGR 421. PLANNING AND ESTIMATING

Project design, detail and cost estimate; preparation of plans, specifications, and bill of materials; schedule of manpower and preparation of program of work.

Prerequisite: CENGR 413
3 hours lecture a week
Credit : 3 units

CENGR 422. ENVIRONMENTAL SCIENCE

Sources of water pollution; treatment of water for control of pathogens and toxic contaminants; treatment of sewage; BOD testing and treatment of industrial effluents; analytical methods in pollution testing and control; particular control in atmospheric discharge; testing and control of toxic gases; smoke stacks.

Prerequisite: CENGR 410
3 hours lecture a week
Credit: 3 units

CENGR 423. HYDRAULICS ENGINEERING II

Flow in pipes and networks; uniform flow in open channels; energy methods; introduction to varied flow phenomena; forces on submerged bodies, pumps, turbines and hydropower systems; introduction to irrigation engineering; introduction to scour and erosion; use of hydraulic models.

Prerequisite: CENGR 410
5.5 hours a week (3 lec, 2.5 lab)
Credit: 4 units

CENGR 424. STRUCTURAL THEORY II

Maximum criteria for moving loads; effect of moving loads in the stress analysis of highways and railways, bridges, statically indeterminate beams, rigid frames and trusses; application of slope-deflection and moment distribution methods to the analysis of statically indeterminate structures.

Prerequisite: CENGR 412
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

CENGR 425. HIGHWAY ENGINEERING

Highway engineering practice and design including geometrics, soils, drainage, structures, surveys and plans, earthwork, flexible and rigid pavement design and maintenance.

Prerequisite: CENGR 320, ENGR 322
3 hours lecture a week
Credit: 3 units

CENGR 426. URBAN PLANNING AND LAND DEVELOPMENT (Elective Subject)

Nature of urban and evolution of urban-forms; conceptual modeling of urban growth and decay; rationale for planning, steps in the planning process, and basic studies of plan formulation; estimating requirements for commercial, industrial and residential land uses; measures of plan implementation; application of the planning process to typical problems of community growth and development.

Prerequisite: 4th Year Standing and CENGR 320
3 hours lecture a week
Credit: 3 units

CENGR 427. TRANSPORTATION ENGINEERING (Elective Subject)

Transportation as a central societal function with emphasis on multi-modal system approach;

planning methodology; technical characteristics; design concepts; evaluation criteria.

Prerequisite: CENGR 320

3 hours lecture a week

Credit: 3 units

CENGR 428. GEOGRAPHIC INFORMATION SYSTEMS (GIS) (Elective Subject)

Introduction to the procedures and techniques of GIS in civil engineering; analysis on the impact of development and consumption on the natural resources; assembling, storing, manipulating and displaying geographically referenced information on earth, i.e. civil engineering data identified according to their locations.

Prerequisite: CENGR 310, CENGR 411

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

CENGR 429. SOIL MECHANICS AND FOUNDATION ENGINEERING

Identification and classification of soils and rocks; soil volume and density relationships, and flow of water in soil; effective stress concept; consolidation and settlement; shear strength of soil; lateral earth pressure; stability of slopes; bearing capacity of foundation; improvement of site soil and selection of foundation types; laboratory and on-site soil testing, sampling, soil properties behavior, characteristics, soil constants, construction tests.

Prerequisite: 4th Year Standing

2 hours lecture a week

Credit: 2 units

CENGR 430. CIVIL ENGINEERING APPRENTICESHIP

Field, hands-on, on-site exposure and training on the various fields in civil engineering; evaluation and sharing of experiences after the activities; writing and presentation of report.

Prerequisite: Completed 1st to 4th Yr subjects

Requirements: Certified checklist from the University Registrar (1st Yr. to 4th Yr. 1st semester) and Form 6 (4th Yr. 2nd semester) Minimum 100hrs. of on the job training

Credit: 3 units

CENGR 511. HYDROLOGY

Precipitation, snowmelt, infiltration run-off, and streamflow measurements; statistical treatment of hydrological data; hydrograph analysis and synthesis evaporation; sedimentation; groundwater structure design; floods; reservoir; storage and flood routing; urban runoff and drainage.

Prerequisite: CENGR 423

3 hours lecture a week

Credit: 3 units

CENGR 512. REINFORCED CONCRETE DESIGN

Fundamental principles underlying the theory and design of reinforced concrete slabs, beams, columns, footings using working stress and ultimate strength (stress) design methods, especially on the theory of pre-stressed concrete and flat slabs.

Prerequisite: CENGR 421, CENGR 424

8 hours a week (3 lec, 5 lab)

Credit: 5 units

CENGR 513. TIMBER DESIGN

Design of timber structures with careful attention to details of joints and splices, roof and bridge trusses.

Prerequisite: CENGR 421, CENGR 424

5.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

CENGR 514. WATER RESOURCES PLANNING

Concepts in water resources planning; water inventories, use and control; water conservation measures and legislation; single-purpose and multi-purpose planning; economic and financial analysis.

Prerequisite: CENGR 423

3 hours lecture a week

Credit: 3 units

CENGR 515. COMPUTER APPLICATIONS FOR CIVIL ENGINEERS

Solution of civil engineering problems and application in the use of popular and innovative computer software for computer-aided design and drafting (Auto CAD) and construction planning and scheduling (MS Project) and other similar software.

Prerequisite: CENGR 413

6 hours a week (1 lec, 5 lab)

Credit: 3 units

CENGR 516. CIVIL ENGINEERING LAWS, CONTRACTS, SPECIFICATIONS AND ETHICS

Elements of contracts, obligations, fraud, proposal, bonds, specification, performance and termination;

preparation of complete specification and contract documents for an engineering structure.

Prerequisite: CENGR 421

3 hours lecture a week

Credit: 3 units

CENGR 517. SAFETY ENGINEERING

Concepts of accident prevention and reduction techniques; safe work practices; identification of hazards and safety awareness; elimination or correction of unsafe acts and conditions for safe construction environment.

Prerequisite: CENGR 430

2 hours lecture a week

Credit: 2 units

CENGR 520. STEEL DESIGN

Design of structural elements in steel including details of joints and splices; design of riveted and welded trusses, plate girders as applied to buildings, bridges and other engineering structures.

Prerequisite: CENGR 421, CENGR 424

7 hours a week (2 lec, 5 lab)

Credit: 4 units

CENGR 521. CONSTRUCTION PROJECT MANAGEMENT

Management of the construction processes; control of project item and cost; resource allocation and management; administration of a construction contract; safety engineering.

Prerequisite: CENGR 421, CENGR 515

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

CENGR 522. SPECIAL PROBLEM

Identification of special problem integrated in the various fields of civil engineering works; writing and presentation of the proposal for a selected problem area including planning, design, construction and solution of problems of civil engineering structures.

Prerequisite: CENGR 512, CENGR 513

6 hours a week (1 lec, 5 lab)

Credit: 3 units

CENGR 523. PRE-STRESSED CONCRETE

Principles, method analysis and design sections for bending; ultimate strength of section; loss of pre-stress; shear design; application to bridges, buildings, and tanks; special properties of materials needed for effective pre-stressing.

Prerequisite: CENGR 512

3 hours lecture a week

Credit: 3 units

CENGR 524. GEOTECHNICAL ENGINEERING

Selection of type of foundation; structural design of shallow and deep foundation; pile and pier foundation; retaining walls and bulkheads.

Prerequisite: CENGR 411, CENGR 512

3 hours lecture a week

Credit: 3 units

CENGR 525. WATER ENGINEERING (Elective Subject)

Non-uniform and curvilinear flow in channels and rivers; unsteady flow in pipes and channels; water hammer and surge; mobile boundary hydraulics; waves, tides, and estuaries; introduction to hydraulics; introduction to physical and mathematical modeling for harbors, estuaries, etc.

Prerequisite: CENGR 423

3 hours lecture a week

Credit: 3 units

CENGR 526. HYDRAULIC SYSTEM DESIGN (Elective Subject)

Principles of project planning; methods of analysis and hydraulic design of storage systems; diversion structures; conveyance and regulation systems; structures for irrigation, power and flood control projects; pipeline networks.

Prerequisite: CENGR 511, CENGR 514

3 hours lecture a week

Credit: 3 units

ENGINEERING SCIENCES

AGMECH 110. PRINCIPLES OF AGRICULTURAL MECHANICS I

Agricultural internal combustion engines used in the farms; sources of farm power; tractor operation, hitches, belt and rope work; batteries and battery charging.

Prerequisite: none

9 hours a week (3 lec, 6 lab)

Credit: 5 units

AGMECH 111. MANAGEMENT AND MAINTENANCE OF AGRICULTURAL MACHINERY I

Maintenance and management of tractors and other machinery; servicing and lubrication; adapting the farm to tractor use, checking adjustments, making

minor repairs and taking preventive measures as may be necessary.

Prerequisite: none

4 hours a week (1 lec, 3 lab)

Credit: 2 units

AGMECH 112. AGRICULTURAL SHOPMECHANICS I

Use of hand and machine tools; forge and cold metal work; soldering and repair of farm machinery; sheet metal work; oxy-acetylene and arc welding.

Prerequisite: none

4 hours a week (1 lec, 3 lab)

Credit: 2 units

AGMECH 120. PRINCIPLES OF AGRICULTURAL MECHANICS II

Continuation of Agricultural Mechanics 110 with emphasis on specifications, construction, operation, adjustments, power requirement, test and use of tillage, fertilizing, seeding, harvesting and food processing machinery; pumps and pumping equipment and other equipment of farm machinery; transmission systems; soil conservation equipment and rural sanitation.

Prerequisite: AGMECH 110

9 hours a week (3 lec, 6 lab)

Credit: 5 units

AGMECH 121. MANAGEMENT AND MAINTENANCE OF AGRICULTURAL MACHINERY II

Continuation of AGMECH 111 with emphasis on preventive maintenance.

Prerequisite: AGMECH 111

4 hours a week (1 lec, 3 lab)

AGMECH 122. AGRICULTURAL SHOP MECHANICS II

Selection, care, and use of hand and power carpentry tools; Selection of building materials; electrical wiring; construction of farm building and farm tools.

Prerequisite: AGMECH 112

4 hours a week (1 lec, 3 lab)

Credit: 2 units

EENGR 310. ELECTRICAL CIRCUITS AND WIRING DESIGN

Basic AC and electrical circuits; application and design of electrical wiring in various infrastructure projects.

Prerequisite: PHYS 110

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

EENGR 311. PRINCIPLES OF ELECTRICITY AND ELECTRONICS

Electric circuits; electronic devices and circuitry; electro-magnetic devices; single and poly-phase circuits.

Prerequisite: PHYS 110

4.5 hours a week (2 lec, 2.5 lab)

Credit: 3 units

ENGR 210. FUNDAMENTALS OF ENGINEERING DRAWING

Freehand lettering, pencil, and ink rendering and sketching; use and care of drafting equipment; instrumental and mechanical drawing; descriptive and engineering geometry; orthographic drawing; pictorial and working drawing.

Prerequisite : none

5 hours laboratory a week

Credit: 2 units

ENGR 220. APPLIED ENGINEERING DRAWING

Presentation drawing, sections and conventions; details, assembly and working drawing of machine parts and structures; maps and topographic drawing; elements of applied graphics to engineering problems; and pencil and ink tracing and reproduction.

Prerequisite: ENGR 210

5 hours laboratory a week

Credit: 2 units

ENGR 310. MECHANICS OF RIGID BODIES

Statics and dynamics; fundamental principles of equilibrium of rigid bodies; first and second moment of mass, volume, area and length; static equilibrium of rigid bodies in rectilinear, curvilinear and planar motion; force, mass and acceleration; impulse and momentum; kinematics of particles and rigid bodies; mechanical vibrations.

Prerequisite: PHYS 105, MATH 221

5 hours lecture a week

Credit: 5 units

ENGR 311. CARPENTRY, PLUMBING AND MASONRY WORKS

Selection, use and care of hand and power carpentry tools; installation and repair of plumbing fixtures; design and control of concrete mixes; concrete works; plastic forming and ceramics; project making and cost estimates.

Prerequisite: 3rd Year Standing

2.5 hours laboratory a week

Credit: 1 unit

ENGR 312. ENGINEERING MECHANICS

Forces, its distribution and the corresponding motion and other effects accompanying the application of force on rigid bodies; resultant and equilibrium of force systems in space; analysis of structure, friction, centroid and moment of inertia. Newton's law of motion, work and energy, impulse, momentum and mechanical vibrations.

Prerequisite: PHYS 106 & MATH 220
5 hours lecture a week
Credit: 5 units

ENGR 320. ENGINEERING MATERIALS

Properties of engineering materials including mechanical, acoustical, electrical, magnetic, chemical, optical and thermal properties; evaluation and selection of materials; standard materials specification. Prerequisite: CHEM 200

3 hours lecture a week
Credit: 3 units

ENGR 321. STRENGTH OF MATERIALS

Axial shear force and bending moments; stress-strain relationships; torsion, bending and shear stresses; combined stresses; beam deflection; continuous and restrained beam buckling; and plastic behavior of structures.

Prerequisite: ENGR 310
3 hours lecture a week
Credit: 3 units

ENGR 322. ENGINEERING ECONOMICS

Time value of money, economic decision problems, financial and economic feasibility indicators, feasibility studies.

Prerequisite: 3rd Year Standing
3 hours lecture a week
Credit: 3 units

ENGR 323. FLUID MECHANICS

Principles of fluid properties; fluid statics; basic fluid flow equations; energy equation and its application to the flow of fluids through weirs and metering devices; aerodynamics; open channel flow; similitude and dimensional analysis.

Prerequisite: ENGR 310
5.5 hours a week (3 lec, 2.5 lab)
Credit: 4 units

ENGR 324. TINSMITHING, WELDING AND METAL WORKS

Different welding processes and their basic principles; techniques of arc and oxy-acetylene welding;

weldability of various metals by pressure and non-pressurized methods; tinsmithing and metal works; project making and cost estimates; fabrication of hand tools and light equipment

Prerequisite: 3rd Year Standing
2.5 hours laboratory a week
Credit: 1 unit

ENGR 410. ADVANCED ENGINEERING MATHEMATICS

Matrices and determinants; power series solutions; Fourier analysis; Laplace transforms; complex variables.

Prerequisite: MATH 230
3 hours lecture a week
Credit: 3 units

ENGR 411. ENGINEERING MANAGEMENT

Basic management skills; decision making; planning; marketing; production; case studies including operations research.

Prerequisite: ENGR 322
3 hours lecture a week
Credit: 3 units

ENGR 510. INTRODUCTION TO OPERATIONS RESEARCH

Introduction to operations research; resource allocation and scheduling models as applied to engineering problems; quantitative methods to decision making.

Prerequisite: 5th Year Standing
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

FIELD WORK I AND FIELD WORK II

Practical work involving all mechanized farm operations and other related chores to be distributed on rotation basis in the different sections of the General Services Division and Engineering Section as follows:

1. Farm Machinery Section
2. Water Supply and Plumbing Section
3. Automotive Section
4. Carpentry Section
5. Rural Electrification Section
6. Engineering Section (Agricultural Mechanics)

MENGR 320. THERMODYNAMICS

Laws of thermodynamics; energy and property relationships; ideal gas law and the concept of

thermodynamic processes; cycles as applied to ideal gases.

Prerequisite: PHYS 110, MATH 226
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

MENGR 410. HEAT TRANSFER

Introduction to conduction, convection and radiation heat transfer; heat exchangers; mass transfer analogies; heat transfer during condensation and boiling; mass transfer at low rates; evaporation; thermal properties and engineering applications.

Prerequisite: MATH 230, MENGR 320
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

MENGR 411. REFRIGERATION ENGINEERING

Air conditioning refrigeration cycle analysis; analysis of vapor compression refrigeration systems; refrigerants and their properties; application of psychometrics in air conditioning and cold storage; cooling load calculations; design of refrigeration systems.

Prerequisite: MENGR 320
4.5 hours a week (2 lec, 2.5 lab)
Credit: 3 units

INFORMATION TECHNOLOGY

COMSCI 100. COMPUTER FUNDAMENTALS

Principles of computer science; design and analysis of computer system; operations and EDP fundamentals; word processing using MS Word; spreadsheet; presentation; computer ethics and use of internet.

Prerequisite: MATH 100
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

COMSCI 210. COMPUTER PROGRAMMING I

Introduction to programming skills and techniques including program logic formulation; problem solving methods and procedure for program execution through exercises and short programming assignments; introduction of new details and concept in bottom-up approach; basic tools of the programmer; basic writing in intermediate programs.

Prerequisite: COMSCI 100, MATH 105
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

COMSCI 211. LOGIC DESIGN

Introduction to Digital Logic Design; review of the number systems, Boolean Algebra and Logic Gates; Boolean Functions; standard and canonical forms, minimization, Karnaugh mapping, and tabulation method; combinational logic circuits; Boolean function implementation using combinational logic, decoders and multiplexers; introduction to synchronous sequential logic - flip-flops, counters and registers.

Prerequisite: COMSCI 100
3 hours lecture a week
Credits: 3 Units

COMSCI 220. COMPUTER PROGRAMMING II

Continuation of COMSCI 211; advanced skills in C-language; concept of programming; solid foundation in the study of complex data structures.

Prerequisite: COMSCI 210, INTECH 211
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 units

COMSCI 221. DATA STRUCTURES AND ALGORITHMS

Concepts behind data structures such as stacks, queues and trees, and associated operations; standard algorithms such as sorting and searching; data structures and encapsulating them into abstract data types.

Prerequisite: COMSCI 210, INTECH 211
3 hours lecture a week
Credits: 3 units

COMSCI 222. COMPUTER ORGANIZATION

Introduction to computer organization; short history on the evolution of computers; basic structure of the computer; CPU organization; binary arithmetic and the ALU; input-output organization; memory organization; microcomputer design and implementation; assembly language programming.

Prerequisite: COMSCI 210, COMSCI 211
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

COMSCI 310. COMPUTER PROGRAMMING III

Introduction to object-oriented programming; object-oriented tools for systems analysis, design, and development; basic concept, logic and syntax of the Java programming language.

Prerequisite: COMSCI 220
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

COMSCI 311. FILE ORGANIZATION

Introductory course in basic file organization and database systems; characteristics and uses of peripheral memory devices; sequential, indexed, and direct access file processing; techniques like sorting, searching and hashing; use of tree-structured files and list-structured files; relation of the file management to database management.

Prerequisite: COMSCI 220, COMSCI 221
3 hours lecture a week
Credits: 3 Units

COMSCI 312. OPERATING SYSTEMS

Introduction to operating system concepts that includes processor scheduling, virtual memory management, disk scheduling, deadlocks, multiprogramming environment, and concurrent processes; aspects of basic operating system design; emphasis on process and memory management than to secondary storage and I/O management

Prerequisite: COMSCI 221, COMSCI 222
3 hours lecture a week
Credits: 3 Units

COMSCI 320. DATABASE MANAGEMENT SYSTEMS

Fundamental concepts behind database management systems with emphasis on the relational and object-oriented models; theory and use of the most popular database paradigms; data definition and manipulation; ER data model; relational databases; relational algebra; queries and SQL; normalization; transaction processing.

Prerequisite: COMSCI 311
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

COMSCI 321. SYSTEMS ANALYSIS AND DESIGN

Fundamental principles of information systems analysis and design; initial phases of the business system life cycle; improving productivity of organizations using computer applications; tools and techniques commonly used by systems analysts to build and document information systems.

Prerequisite: COMSCI 311
3 hours lecture a week
Credits: 3 Units

COMSCI 322. SYSTEMS DEVELOPMENT WITH OBJECTS (Elective Subject)

Extension of the fundamentals of object-oriented design moving into the realm of developing object-oriented applications with current development system.

Prerequisite: COMSCI 310
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

COMSCI 410. ADVANCED DATABASE MANAGEMENT SYSTEMS

Database security; database optimization; integrity; transaction; different data models; concurrency control; backup and recovery; distributed databases; client-server technology.

Prerequisite: COMSCI 320
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

INTECH 210. ORIENTATION IN INFORMATION TECHNOLOGY

Overview of disciplines that use information technology; IT literature database and tools which expand the student's knowledge and skills in scripting languages.

Prerequisite: COMSCI 100
3 hours lecture a week
Credits: 3 Units

INTECH 211. DISCRETE MATHEMATICS

Introduction to discrete mathematics emphasizing topics useful in information technology; mathematical basis for many other topics in information technology; mathematics in upper-level undergraduate and graduate courses; topics include sets, relations, functions, graphs, trees, matching, the binomial theorem, combinations and permutations, probability, recurrence relations, iteration, and finite state machines.

Prerequisite: COMSCI 100, MATH 105
3 hours a week lecture
Credits: 3 Units

INTECH 320. DATA COMMUNICATIONS

Principles of data communications; history of data communication; physical transmission characteristics through the end-user applications; fundamentals of communication used in the IT industry.

Prerequisite: COMSCI 222
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

INTECH 322. NETWORK ADMINISTRATION I (Elective Subject)

Detailed discussion of networking concepts which include the seven layers of the OSI model; design and documentation of networks; network addressing and

routing; routing protocols and structured cabling; structured cabling project.

Prerequisite: COMSCI 312
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

INTECH 410. MANAGEMENT INFORMATION SYSTEMS

Information needs of managers; organization on management information systems, decision support systems, and their support of business functions; data management, information and decision support system, system development, systems acquisition, controls and security measures.

Prerequisite: COMSCI 321
3 hours lecture a week
Credits: 3 Units

INTECH 411. NETWORK ADMINISTRATION II

Continuation of Network Administration I; applied study of the problems inherent in the maintenance and management of the heterogeneous networking environments prevalent in the modern business enterprise; acquiring and integrating the practical management/technical skills that define the effective networking specialist.

Prerequisite: INTECH 322
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

INTECH 412. WEB APPLICATIONS DEVELOPMENT

Design, programming, and implementation of web-enabled/web based applications; interfacing the application to files or a database via creation, accessing and integrating of middle tier components.

Prerequisite: COMSCI 322
4.5 hours a week (2 lec, 2.5 lab)
Credits: 3 Units

ITPRAC 421. ON-THE-JOB TRAINING

A university-approved and coordinated IT experience-based internship of at least 300 hours of work (on or off campus) with written report by the student; employer's evaluation of the student's work presentation and defense of reports as requirements to be fulfilled.

Prerequisite: Finished All Academic Courses
300 hours
Credits: 9 Units