The NDU Gazette

A publication covering decisions taken at the BOD and UC meetings

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BOD

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DECISIONS

Issue Number TWO, August 2013

Faculty of Engineering
Electrical & Computer and Communication Engineering Dept.
Changes to the EE program

Approved by BOD on March 27, 2013
Approved by UC on June 18, 2013

The ECCE department is proposing the following changes to the Contract Sheet of the EE students effective Fall 2013:

1. Remove from the Catalog: The year 3 technical elective "*The EEN/CSC course can be substituted by CEN 270, MEN 270 and MEN 370 or a course from the technical elective Labs 1 & 2*".

2. Add to the Catalog: "*The EEN/CSC course can be substituted by EEN 377 and two courses from the technical elective Labs 1 & 2*".

EEN 377 Technical Drawing for Electrical Engineering (0.2); 1 cr. Build and supervise electrical installations drawings. Create and modify electrical controls systems. Create intelligent panel layout drawings. Use the tagging and linking panel components. Generate a bill of material (BOM) report.

Rationale

In this course, AutoCAD Electrical which is a software tool used in the design and drawing of electrical systems will be introduced and utilized extensively. In today's global market, electrical engineering designers are relying mainly on AutoCAD Electrical for getting accurate design and significant cost savings. Based on the feedback received from our graduate students and on the fact that a large number of them are working in the design and installation of electrical systems, offering the course EEN 377 will have a significant positive impact on the performance and skills of our students which will make them much more competent in the market.

Faculty of Engineering
Electrical & Computer and Communication Engineering Dept.
Master of Science - Electrical & Computer Engineering (MSECE)

Approved by the BOD on July 17, 2012
Approved by the UC on Nov. 5, 2012

1- Objectives

The Master of Science Programs in Electrical and Computer Engineering (thesis and non-thesis options) is designed to prepare a select group of students for successful professional careers in the industry with specialized technical expertise as well as for further graduate studies in doctoral degree programs. Its educational objectives are the following.

a) Provides a scientific approach to increase student's understanding and problem solving abilities with a special emphasis on performing independent theoretical and applied research.
b) Provides an adequate level of specialization in the following major areas: Integrated Circuits and Computer Systems, Electromagnetics and RF Systems, Communications and Signal Processing, Power and Control Systems and Renewable Energy.
c) Provides graduates with the required background to synthesize technical issues in the solution of electrical and computer engineering problems.

2- Admission Requirements

In order to be eligible for admission to the Master of Science (MS) Program in Electrical and Computer Engineering (ECE), applicants must have a bachelor's degree (B.S. or B.E. or its equivalent from an accredited institution) in electrical engineering, computer and communication engineering or a closely related field. They are also required to fulfill the following requirements:

a) Applicants should have achieved a minimum cumulative GPA of 3.0/4.0 from an accredited Faculty of Engineering.
b) Applicants must sit for the GRE general test.
c) Applicants must satisfy English Language requirements as specified by the NDU graduate admission.
d) Holders of Bachelor of Science Degree (B. S.), from accredited institutions, may be required to take some additional courses as suggested by the graduate program committee.
e) Transfer students need to have a minimum cumulative GPA of 3.0 to be admitted to the Master's Program.
f) Students planning to pursue a Ph.D. degree are advised to enroll in the thesis option
g) Students applying to the thesis program are normally interviewed by members of the ECE Graduate Committee, and are asked to provide a statement of research describing their experience and research interests.

3- Graduation Requirements

a) ECE Thesis Program Requirements

The program requirements include 30 credit hours: 24 course credit hours and 6 thesis credit hours.

12 Cr.	Four ECE graduate courses selected from four major ECE areas with no more than 3 credits from a given Area.
3 Cr.	Graduate elective course
6 Cr.	ECE graduate elective courses related to the thesis main topic and approved by the graduate advisor.
3 Cr.	Advanced Math course (MAT **6XX**)
0 Cr.	Seminar

6 Cr. Thesis

b) ECE Non-Thesis Program Requirements

The program requirements include 33 credit hours.

15 Cr. Five ECE graduate courses selected from the five major ECE areas
3 Cr. Directed research project in electrical and computer engineering
9 Cr. ECE graduate elective courses
3 Cr. Graduate elective course
3 Cr. Advanced Math course (MAT **6xx**)
0 Cr. Seminar

c) Holders of Bachelor of Engineering Degree (B.E.), from accredited institutions, may transfer up to a maximum of twelve credits upon the approval of the graduate program committee. Only courses with at least a B letter grade can be considered for transfer.
d) The minimum passing grade in any course is B. Failed courses with a grade of D or higher may be repeated only once. Failing any course with an F grade results in automatic dismissal from the program.
e) The graduate elective course can be any one of the following courses: BAD 601, BAD 603, BAD 609, BAD 611, PRM 601, PRM 603, and PRM 605.
f) The advanced math course is to be selected from a pool of graduate math courses approved by the ECE graduate committee.
The minimum residency requirements (as specified by the NDU graduate academic rules and regulations) are two regular semesters, one regular semester and two summers, or four summers. All requirements for the master's degree must be completed within a period of four years after admission to graduate study.
g) The candidate must attend at least half of the seminars offered during a semester.
h) The maximum course load is 9 credits per regular semester.
i) During thesis work, the student is expected to perform advanced research on a given topic. Topics for research are to be approved by a thesis supervisor and the work is to be presented in front of the thesis committee and interested audience.

4- Major Electrical and Computer Engineering Areas

Area 1: Integrated Circuits and Computer Systems
EEN 611, EEN 612, EEN 613, EEN 620, EEN 621, EEN 622, EEN 623, EEN 624, EEN 627, EEN 722, EEN 729.

Area 2: Electromagnetics and RF Systems
EEN 630, EEN 631, EEN 632, EEN 634, EEN 635, EEN 636, EEN 637, EEN 638.

Area 3: Communications and Signal Processing
EEN 645, EEN 646, EEN 647, EEN 648, EEN 680, EEN 685, EEN 783

Area 4: Power and Control Systems
EEN 650, EEN 651, EEN 652, EEN 653, EEN 654, EEN 655, EEN 656, EEN 657, EEN 658, EEN 660, EEN 661, EEN 662, EEN 663, EEN 664, EEN 665, EEN 666, EEN 667, EEN 668

Area 5: Renewable Energy
EEN 652, EEN654, EEN 661, EEN 665, EEN 752

5- Suggested Program

Thesis Option:

Year I

Fall Semester			**9 cr.**
MAT	6XX	Advanced Math course	3 cr.
EEN	XXX	Major Area course 1	3 cr.
EEN	XXX	Major Area course 2	3 cr.
Spring Semester			**9 cr.**
EEN	XXX	ECE graduate elective 1	3 cr.
EEN	XXX	Major Area course 3	3 cr.
EEN	XXX	Major Area course 4	3 cr.

Year II

Fall Semester			**9 cr.**
EEN	780	Seminar	0 cr.
EEN	XXX	ECE graduate elective 2	3 cr.
EEN	790	MS Thesis	6 cr.
Spring Semester			**3 cr.**
EEN	XXX	Graduate Elective Course	3 cr.

Non-Thesis Option:

Year I

Fall Semester			**9 cr.**
MAT	6XX	Advanced Math Course	3 cr.
EEN	XXX	Major Area course 1	3 cr.
EEN	XXX	Major Area course 2	3 cr.
Spring Semester			**9 cr.**
EEN	XXX	ECE graduate elective 1	3 cr.
EEN	XXX	Major Area course 3	3 cr.
EEN	XXX	Major Area course 4	3 cr.

Year II

Fall Semester			**9 cr.**
EEN	780	Seminar	0 cr.
EEN	XXX	Major Area course 5	3 cr.
EEN	XXX	ECE graduate elective 2	3 cr.
EEN	XXX	ECE graduate elective 3	3 cr.
Spring Semester			**6 cr.**
EEN	690	Directed Research Project	3 cr.
EEN	XXX	Graduate Elective Course	3 cr.

6- Course Descriptions

EEN 611 Integrated Circuit Fabrication Processes (3.0) 3 Cr.: Fundamental principles of integrated circuit fabrication processes; physical and chemical models for crystal growth, oxidation; ion implantation, etching, deposition, lithography, and back-end processing. *Prerequisites*: EEN 331 and PHS 213.
**This course is not open to students that have taken EEN 411*

EEN 612 Low Power Analog and Mixed-Signal Integrated Circuits (3.0) 3 Cr.
Devices and noise. Current mirrors. Operational amplifiers. Comparators. Sample and hold circuits. Voltage references. Continuous-time filters. Switched-capacitor circuits. Data converter fundamentals. Nyquist digital-to-analog converters. Nyquist analog-to-digital converters. Oversampling converters. Phase-locked loops. ***Prerequisites: EEN 311***

EEN 613 Electronic System Packaging and PCB Design (3.0) 3 Cr.:
Introduction to System-on-Package (SOP) technology. Introduction to System-on-Chip (SOC). Stacked ICs and Packages (SIP). Mixed-Signal (SOP) design. Radio Frequency System-on-Package (RF SOP). Printed circuit technology drivers. PCB materials. PCB engineering and design. Prerequisite: EEN 311 and EEN 331.

EEN 620 Advanced Microprocessor System Design (3.0) 3 Cr.: Architectures of 32/64-bit RISC processors. Performance and architectural limitations of RISC and CISC microprocessors (Intel, Motorola, ARM…). Address/instruction pipelines, burst cycles, memory caching and cache coherency issues, register renaming, and microprocessor interfaces. *Prerequisite*: EEN 324

EEN 621 VLSI Design (3.0) 3 Cr.: Static and dynamic CMOS gates, CMOS circuit fabrication, design rules, resistance and capacitance extraction, power and delay estimation, scaling, MOS combinational and sequential logic design, registers and clocking schemes, memory and data-path; elements of computer-aided circuit analysis, synthesis, and layout techniques. *Prerequisite*: EEN 322.
**This course is not open to students that have taken EEN 421*

EEN 622 Testing and Fault Tolerance of Digital Systems (3.0) 3 Cr.: Testing of computer systems and designing for testability. Failure and fault models. Fault coverage, test vectors and test generation. Ad-hoc testing, built-in self test, IDDQ testing. Basic considerations in the design of reliable computing systems. Redundancy and evaluation methods. *Prerequisite*: EEN 322.
**This course is not open to students that have taken EEN 422*
EEN 623 Advanced Computer Architecture (3.0) 3 Cr.: Performance evaluation; Instruction set design; including data speculation, performance synchronization methods, advanced instruction level parallelism, pipelining, branch prediction; memory hierarchy, cache memory, virtual memory, and virtual memory; I/O interface devices, specification, and modeling pipelining, caches, virtual memory, and multiprocessors. *Prerequisites: EEN 324*

EEN 624 Embedded Systems Design (3.0) 3 Cr. Embedded hardware and software design; Design specification, hardware/software co-design, co-verification, testing; embedded computing platforms, systems-on-a-chip, intellectual property (IP) core design, embedded networks; software design tools and technologies using CAD tools, compilers, and assemblers; hardware design tools, hardware-description languages, high-level synthesis tools, ASIC and FPGA design flows; and real-time operating systems. *Prerequisite: EEN 324*

EEN 627 Optoelectronic Devices (3.0) 3 Cr.: Principles of light-emitting diodes (LEDs), lasers, and photodetectors; population inversion at a junction; generation of coherent radiation; heterojunctions, quantum-well LEDs and lasers, and vertical cavity surface-emitting lasers (VCSELs); PIN and avalanche photodiodes; photonic fabrication and packaging. *Prerequisite*: EEN 416.
**This course is not open to students that have taken EEN 527*

EEN 630 Antenna Design for Wireless Communications (3.0) 3 Cr.: Fundamentals of radiation from antennas; wire antennas such as monopole, dipole and loop antennas; aperture antennas such horn and reflector antennas; wideband antennas; antenna arrays; application to cellular systems. *Prerequisite*: EEN 331.
**This course is not open to students that have taken EEN 430*

EEN 631 Microwave Circuit Design (3.0) 3 Cr.: Passive and active microwave devices including transformers, couplers, resonators, circulators, oscillators and amplifiers; computer-aided design of microwave circuits. *Prerequisites*: EEN 311 and EEN 331.
**This course is not open to students that have taken EEN 431*

EEN 632 Numerical Methods for Wireless Propagation (3.0) 3 Cr.: Basic coverage of the main numerical techniques in electromagnetics: Finite Difference Time Domain (FDTD) and Finite Element (FE) methods; simulation of radiation and propagation of waves in a wireless communication environment. *Prerequisite*: EEN 331.
**This course is not open to students that have taken EEN 432*

EEN 634 Radar Systems and Remote Sensing (3.0) 3 Cr.: Operation of a radar system including antennas, circuitry and wave propagation; remote sensing and mapping of the earth; ground penetrating radar, intelligent vehicle highway system; aircraft navigation. *Prerequisite*: EEN 344 and EEN 430.
**This course is not open to students that have taken EEN 534*

EEN 635 Electromagnetic Compatibility (3.0) 3 Cr.: Fundamentals of Electromagnetic Compatibility (EMC): regulations, grounding, shielding and cross talk; modeling and reduction techniques of noise and interference phenomena in electrical circuits; effect of radiation on the human body; design of electronic devices to minimize undesired radiation and susceptibility to electromagnetic emissions. *Prerequisite*: EEN 331.
**This course is not open to students that have taken EEN 435*

EEN 636 - Electromagnetic Field Theory (3.0) 3 Cr.:
Separable guided wave and scattering boundary value problems; one-dimensional Green's functions with applications; multi-conductor transmission lines. Multi-dimensional potential Green's functions. Integral equation formulation. Use of asymptotic methods to obtain high-frequency solutions; geometrical optics and the propagation through inhomogeneous media; geometrical theory of diffraction and its application to antenna and scattering problems. *Prerequisite:* EEN 430

EEN 637 Antenna Theory and Design (3.0) 3 Cr.:
Aperture antennas; ground plane effects; horn and reflector antennas; pattern synthesis; Smart antennas; antenna measurements in anechoic chamber. *Prerequisite:* EEN 430.

EEN 638 RF Transceiver Design (3.0) 3 Cr.:
Basic concepts in RF design. Modulation and detection. Multiple access techniques and wireless standards. Transceiver architectures. Low-noise amplifiers and mixers. Oscillators. Frequency synthesizers. Power amplifiers. Filters. Communication system design and propagation. Radio frequency simulation. Application to the latest wireless standards. Prerequisites: EEN 311, EEN 331, EEN 443

EEN 645 Optical Communication (3.0) 3 Cr.: Fundamentals of fiber optic communication systems; principles of light propagation in slab and cylindrical waveguides; signal multiplexing techniques used in optical transmission; signal degradation in optical fibers; noise and detection; optical sources, detectors, and amplifiers; optical link design. *Prerequisites*: EEN 331 and EEN 443.
**This course is not open to students that have taken EEN 545*
EEN 646 Algebraic Coding and Information Theory (3.0) 3 Cr.: Information theory and its relation to statistics; Kolomogrov complexity, entropy and inference; Shannon theory of communication; source coding for noisy channels; capacity theorems for multiple user channels. *Prerequisite*: EEN 443.
**This course is not open to students that have taken EEN 546*

EEN 647 Statistical Communication Theory (3.0) 3 Cr.: Concepts of probability and random process theory necessary for advanced study of communications; stochastic control; detection and estimation problems. *Prerequisite*: EEN 443.
**This course is not open to students that have taken EEN 547*

EEN 648 Wireless Communications (3.0) 3 Cr.: Wireless systems and cellular principles, modulation techniques for mobile radio, speech and channel coding, multiple access techniques; applications to wireless systems. *Prerequisites*: EEN 331 and EEN 443.
**This course is not open to students that have taken EEN 548*

EEN 650 Power System Stability and Control (3.0) 3 Cr.: Static and dynamic power system stability problems; transient stability; small-signal stability, eigenvalue analysis, power system stabilizer, wide area measurements; relaying and system protection; computational techniques for power system stability and control system operation. *Prerequisite*: EEN 452 and EEN 360.

EEN 651 Power System Security (3.0) 3 Cr.: Power system modeling and analysis, conditions for secure operation; mathematical programming techniques for system operation, state estimation, unit commitment, optimal power flow, economic load dispatch, security dispatch; heuristic methods. *Prerequisite*: EEN 452.

EEN 652 Sustainable Power Generation (3.0) 3 Cr.: Solar, wind, hydro, tidal, bio-mass, geo-thermal, and wave power generation; storage technologies and energy conversion, characteristics and limitations; distributed generation, technical challenges and opportunities, connection in distribution grids; environmental aspects of electricity generation. *Prerequisites*: EEN 452 and EEN 455.

EEN 653 Power System Analysis (3.0); 3 cr. Optimal dispatch of generation. Synchronous machine transient analysis. Balanced and unbalanced short-circuits, balanced three-phase fault and systematic fault analysis. Symmetrical components and unbalanced faults. Transient stability and numerical solution of the swing equation. Power system control. *Prerequisite:* EEN 452
**This course is not open to students that have taken EEN 553*

EEN 654 Electric Drives (3.0) 3 Cr.: Elements of drive systems, characterization of mechanical loads, requirements of electric drive systems, dc drives with various power electronics based conversion sources, dynamic equations and closed loop control of dc drives, induction motor drives, ac controller, slip-energy recovery, volts/Hz control, synchronous motor drives, permanent magnet motors, reluctance motors. *Prerequisite*: EEN 455.

EEN 655 Energy Markets (3.0) 3 Cr.: Operation of electricity markets, economic procedures, and emissions trading; restructuring and deregulation in generation, transmission and distribution; pool, bilateral, and imbalance market mechanisms; transmission congestion and demand side management; models for analyzing the impact of risk and uncertainty, risk management techniques. *Prerequisite*: EEN 452.

EEN 656 Power System Planning and Reliability (3.0) 3 Cr.: Planning and reliability of power systems, load forecasting, load duration curves, loss of load expectation; Generation, transmission and distribution system reliability; factors affecting power system planning and expansion; system adequacy, security, and ancillary services; reliability in electricity markets. *Prerequisite*: EEN 452.

EEN 657 Selected Topics in Power and Control (3.0) 3 Cr.: Current issues in areas relevant to state of arts in renewable energy and related fields. Department determines topics to be covered and prerequisites when it is offered.

EEN 658 Flexible AC Transmission Systems (3.0) 3 Cr.: Operating principles of controllers of flexible AC transmission systems (FACTS); active and passive harmonics compensation methods; integration of modern

power electronics in shunt and series advanced static VAR controllers, phase shifters, and unified power flow controllers (UPFC). *Prerequisites*: EEN 452 and EEN 455.

EEN 660 Linear System Theory and Control (3.0) 3 Cr.: State-space models for analysis and design of linear control systems; canonical realization of transfer functions; state observability and controllability; pole placement; state feedback and asymptotic observers; reduced order observer; direct transfer function design. *Prerequisite*: EEN 360.

EEN 661 Digital Control (3.0) 3 Cr.: Sampling and data reconstruction in computer control systems; Z-transforms and state equations to describe discrete and mixed data systems; analysis of digital feedback systems using frequency domain techniques and state space techniques; non-linear digital feedback systems. *Prerequisite*: EEN 360.
**This course is not open to students that have taken EEN 461*

EEN 662 Advanced Feedback Control Systems (3.0) 3 Cr.: Principles of analyzing and designing linear feedback control systems; system representations; controller design methods and criteria; robust design; LQG; servo compensators; H-infinity design techniques. *Prerequisite*: EEN 360.

EEN 663 Introduction to Estimation Theory (3.0) 3 Cr.: Linear dynamic systems with random inputs; least squares estimation, mean-squared estimation, Kalman filtering and applications. *Prerequisite*: EEN 360, MAT 326.

EEN 664 Optimal Control Theory (3.0) 3 Cr.: Optimal control by dynamic programming; Pontryagin's maximum principle and variational methods; minimum time, energy, and fuel problems for linear continuous and discrete systems. *Prerequisite*: EEN 661.

EEN 665 Nonlinear Control Systems (3.0) 3 Cr.: Dynamic formulation of non-linear systems; Lyaponov stability; phase plane techniques; describing functions; input-output and input-to-state analysis and control; discontinuous and sliding mode control; model reference adaptive control. *Prerequisite*: EEN 360.

EEN 666 Optimization (3.0) 3 Cr.: Finite dimensional optimization theory and basic optimization algorithms; unconstrained optimization; Newton methods; steepest descent; conjugate gradient; constrained optimization; active set methods; penalty methods; quadratic programming; global optimization; integer programming. *Prerequisite*: Graduate standing.

EEN 667 Neural Networks and Fuzzy Logic in Control (3.0) 3 Cr.: Fundamental methods and techniques of artificial neural networks and fuzzy logic; architecture, circuit implementations, and system identification. *Prerequisite*: EEN 360.

EEN 668 Automation and Robotics (3.0) 3 Cr.: Fundamental principles of automation and robotics; robotic manipulator kinematics; dynamics and control; components of a robot system; types of robotic manipulators; electronic system components; analog-to-digital conversion, and applications. *Prerequisite*: EEN 360.

EEN 680 Discrete-Time Signal Processing (3.0) 3 Cr.: Fundamental concepts of discrete-time signals and systems; digital signal processing of discrete signals; sampling theory and reconstruction; discrete Fourier transforms and analysis of digital filters in the frequency domain; Z-transforms, causality and stability; state-space equations; design and analysis of FIR and IIR digital filters; windowing; bilinear transformation; filter structures. *Prerequisite*: EEN 340.
**This course is not open to students that have taken EEN 480*
EEN 685 Biomedical Signal Processing (3.0) 3 Cr.: Analysis of biological signals; random signals; windowing with Fourier transform; z-transform, and wavelet transform; signal processing techniques applied to vital signs signals such as ECG, EEG, and EMG; high resolution CG and signal averaging. *Prerequisite*: EEN 480.
**This course is not open to students that have taken EEN 585*

EEN 722 Advanced VLSI Design (3.0) 3 Cr.: Advanced topics in VLSI design. Layout synthesis and optimization, design-rule checking, and design circuit for testability. VLSI Algorithms, VLSI for communications and signal processing. Interconnect, packaging, sources of noise. VLSI technologies (silicon and GaAs). *Prerequisite:* EEN 621

EEN 729 Selected Topics in Integrated Circuits (3.0) 3 Cr.: A course on **current** issues in areas relevant to state-of-the-art integrated-circuit technologies. Department determines topics to be covered and prerequisite when offered.

EEN 743 Advanced Wireless Communications (3.0) 3 Cr.: Detection in fading channels, diversity, interference management, capacity of wireless channels, opportunistic communication, spatial multiplexing, space-time coding, overview of wireless systems (IEEE 802.11n, IEEE 802.16e / WIMAX, 3GPP Long Term Evolution)
Prerequisites: EEN 548.

EEN 752 Power Electronics for Renewable Energy Systems (3.0) 3 Cr.: Converter structures for photovoltaic and wind energy systems connected to the grid, issues related to the control of the converters, power quality, reactive power compensation, active power filters, and the use of simulation tools for design and analysis. *Prerequisite*: EEN 455.

EEN 783 Advanced Digital Signal Processing (3.0) 3 Cr.: Advanced techniques in signal processing; multirate signal processing, upsampling and downsampling in the Z-domain; non-stationary signals; frequency-domain adaptive filtering; the correlation matrix; least-squares adaptive algorithms; linear prediction; the wavelet transform. *Prerequisite*: EEN 480 or EEN 644.
**This course is not open to students that have taken EEN 583*

EEN 690 Directed Research Project in Electrical and Computer Engineering (3.0) 3 Cr.: Individual study of selected advanced topics in electrical engineering. This course includes experimental work or simulation. To be graded on satisfactory/unsatisfactory basis ONLY.

EEN 780 Seminar (0 Cr.): A series of seminars covering state-of-the art topics in electrical engineering. Prerequisite: advisor approval.

EEN 790 Master Thesis 6 Cr.

Faculty of Engineering
Civil and Environmental Engineering Dept.
Master of Science in Civil Engineering

Approved by the BOD on July 17, 2012
Approved by the UC on Nov. 5, 2012

1- Objectives

A Master of Science Program in **Civil Engineering** will be an added value to the department, faculty members and students. It will contribute toward preparing students to have a hand on research and solve some of the civil and environmental problems facing our community. This program will be of a great value for the following reasons:

- It interacts with the WEERC research projects
- It will address civil and environmental problems in Lebanon
- Contributes in solving problems of:
    - Hydrology and Water pollution,
    - Solid waste,
    - Network systems,
    - Transportation,
    - Material,
    - Soil,
    - Structures,
    - Energy in buildings,
    - Environmental impact on the area.

The aim is to graduate civil and environmental engineers with a strong knowledge in one of the fields of Transportation, Project Management and Urban Planning, Geo-environmental, or Structure and Material. Candidates will then move into the workplace with a strong theoretical background, as well as design experience in the field of their expertise.
On the other hand, the MS program in Civil Engineering will pave the way toward continuing education in local, European and American Ph.D. programs.

2- Admission Requirements

Eligibility for admission to the MS program in Civil Engineering is based on the following requirements:

a- Students must be holders of a Bachelor of Engineering or equivalent (5 years program) from a recognized institution of Higher Education.

b- Up to 12 credits can be transferred upon the Department Graduate Admission Committee's approval, given that required courses taken in the undergraduate program cannot be transferred.

c- Bachelor of Science holders are eligible to apply. Candidates with a BS will be assigned additional remedial courses in the field of study upon the recommendation of the Department Graduate Admission Committee

d- A minimum GPA of 3.0/4.0 or equivalent is required in the undergraduate program.

e- GRE with a minimum combined verbal and quantitative score of 1000 on the general portion.

f- English competency follows the graduate admission requirements of NDU.

3- Length of study

The minimum residency requirement for the master's degree is at least two semesters, one semester and two summers, or four summers.
The duration of studies is estimated at 4 semesters for full time students, but not more than 4 years for part-time students, including the accomplishment of a Master Thesis, and excluding remedial courses. Students who wish to extend their length of studies should petition with a valid excuse. An extension for one year may be granted upon the decision of the department curriculum committee.

4- Graduation Requirements

Students are eligible to earn a Master of Science in Civil Engineering once they have accomplished the following requirements:

a. 30 credit hours with a minimum cumulative GPA of 3.0/4.0. The 30 credits are composed of:
   i. 12 credits (4 courses) of required courses in the Major Field.
   ii. 9 credits of Technical Electives (3 courses) from the other **Three** fields, listed below, or from other departments upon the decision of the department curriculum committee.
   iii. 3 credits (1 course) of Graduate Electives approved by the department curriculum committee (DCC).
   iv. 6 credits of Research dedicated to writing a Master Thesis and defense. The topic selected should be related to the Major Field. A student selects a topic of research with the assistance of his/her advisor. A thesis defense is to be performed in front of a committee.

b. The minimum passing grade for each course is according to the Academic Rules and Regulation of NDU graduate programs.

5- Suggested Program

Year I		
Fall Semester I		**9 cr.**
CEN	Required Course	3 cr.
CEN	Required Course	3 cr.
CEN	Required Course	3 cr.
Spring Semester II		**9 cr.**
CEN	Required Course	3 cr.
CEN	Elective Course	3 cr.
--------	Graduate Elective (approved by DCC)	3 cr.
Year II		
Fall Semester III		**9 cr.**
CEN	Elective Course	3 cr.
CEN 790	Master Thesis	6 cr.
Spring Semester IV		**3 cr.**
CEN	Elective Course	3 cr.

6- Course Description and Major Fields

A- Transportation and Urban Planning

CEN 643 Transportation Engineering III (3.0); 3 cr. One, two, or three topics in Transportation Engineering shall be offered. The course shall be concerned with the process of analyses and design of the topic concerned. Topics like airports; ports and harbors; railways and railway stations; traffic; supply-demand modeling; others. Projects. *Prerequisites:* CEN 443 or equivalent.

CEN 644 Designs of Highway Bridges and Interchanges (3.0); 3 cr. Geometric design of highway interchanges and analyses and design of simple highway bridges. Capacity analysis, and site selection. Environmental and socio-economic impacts of transportation structures. Software's Application; Project. *Prerequisites:* CEN 311, CEN 443 or equivalent.

CEN 645 Pavement Design and Management (3.0); 3cr. Highway and airport pavement design; flexible and rigid pavements; ESAL calculations, pavement materials, stresses and deflections in pavements;

pavement drainage; design of overlays; pavement management, priority programming and rehabilitation. Project. *Prerequisites:* CEN 431, CEN 443 or equivalent.

CEN 646 Traffic Engineering (3.0); 3cr. Fundamentals of traffic engineering, queuing theory, AASHTO and HCM criteria; capacity analysis and level of service concepts, traffic demand at at-grade intersections and highway segments; intersections design and control; weaving, interchanges. Software application. Project. *Prerequisites:* CEN 343 or equivalent.

CEN 647 Urban Transportation Planning (3.0); 3cr. Urban travel demand pattern time evolution in metropolitan areas; travel demand surveys; demand and supply; land-use models, macro-level urban transportation models (traditional four-step and activity-based), and micro-level operational models. Software application. Project. *Prerequisites:* CEN 343 or equivalent.

CEN 648 Transportation and Land Development (3.0); 3cr. Land subdivision theory and practice; socio-demographic forecasts, landuse planning and zoning, impact on metropolitan road network; urban development, site planning and traffic impact studies (TIS); site access and parking facilities, and local streets design; interdependence of transportation with urban land-use patterns. Project. *Prerequisites:* CEN 443, CEN 392 or equivalent.

CEN 649 Transportation System Analysis (3.0); 3cr. Systems analysis and decision making using concepts from economics, engineering, public policy analysis, operations research, and management science; application to transportation systems; air pollution, mitigation techniques, traffic congestion and road safety issues. Project. *Prerequisites:* CEN 443, CEN 392, CEN 462 or equivalent.

CEN 650 Advanced Surveying and GPS (3.0); 3cr. Land subdivision theory and practice; total station field usage and data digitization; highway and land surveys and location; remote sensing and global positioning system (GPS). Project. *Prerequisites:* CEN 250, CEN 271 or equivalent.

CEN 651 Infrastructure Planning and GIS (3.0); 3cr. Theory and a comprehensive practical application of the geographic information systems (GIS) and remote sensing technologies for analysis and solution of different transportation and infrastructure issues (GIS-T), impact related issues and mitigation techniques. Project. *Prerequisites:* CEN 250, CEN 271 or equivalent.

CEN 652 Rail Roads, Ports and Harbors (3.0); 3cr. Planning and design of railway tracks and stations, overview of port planning, management and operations with reference to terminal processes and engineering aspects of port development, port management models, port pricing and financing, Project. *Prerequisites:* CEN 360, CEN 443 or equivalent.

CEN 653 Airports; Planning and Design (3.0); 3cr. Airport planning and design parameters, site selection. Airports layouts and capacity, runways and taxiways; land side and airside terminal building layout and design. Demand forecasting, access and air traffic operation and management. Project. *Prerequisites:* CEN 443 or equivalent.

CEN 654 Building laws, Site Selection and Parking (3.0); 3 cr. A comprehensive review of Lebanese building and construction laws with respect to design criteria, site parking and impact criteria, design principles and of on- and off-street design, mechanical parking systems, preliminary project sizing. Civil engineering practice and ethical issues. Project. *Prerequisites:* CEN 271 or equivalent.

CEN 656 Planning using GIS (3.0); 3cr. Theory and a comprehensive practical introduction to the use of geographic information systems (GIS) and remote sensing technologies for the analysis and solution of different water and environmental problems (for example urban planning, pipe-network systems analysis, river

basin management, groundwater analysis and water pollution assessment). *Prerequisites:* CEN 250, CEN 271 or equivalent.

CEN 657 Intelligent Transportation Systems (3.0); 3cr. Advanced technology in transportation. Intelligent Transport Systems (ITS) Architecture and Modules. The field of ITS component technologies and its applications and products. Contemporary issues in the application of advanced technology in transport, societal impacts and the roles of the pubic and private sectors. *Prerequisites:* ENG 202, EEN 205, CEN 443 or equivalent.

CEN 658 Transportation Economics (3.0); 3cr. The concepts, theory and methods of economic theory in transport demand analysis, transport pricing, congestion pricing tools, welfare considerations, and transport policy evaluation. Transportation projects funding and its new trends such as public-private partnership and procurement strategies. *Prerequisites:* CEN 392, CEN 343 or equivalent.

CEN 659 Transportation Asset Management (3.0); 3cr. The concepts, theory and methods of infrastructure management, asset management principles, concepts and identification of asset performance requirements, community and stakeholder benefits and consultation, system performance and measures, level of service and Infrastructure Management Information Systems (IMIS). *Prerequisites:* CEN 392 or equivalent.

B. Water Management and Geoenvironmental Engineering

CEN 620 Advanced Soil Mechanics (3.0); 3 cr. Soils characterization, mineralogy, stresses in soils, basic porous media flow principles, effective stress principle, compaction, consolidation theory and application drained and undrained stress-strain-strength concepts. *Prerequisite:* CEN 220 or equivalent.

CEN 621 Deep Foundations (3.0); 3 cr. Subsurface exploration and sampling, design of sheeting and bracing systems for deep foundations. Pile and corrosion analysis. *Prerequisite:* CEN 325 or equivalent.

CEN 622 Slope Stability (3.0); 3 cr. Slope stability analysis methods including stresses in soils, Mohr circles, failure theories, shear strength of cohesive and cohesionless soils. Use of software packages is also applied in an assigned project. *Prerequisite:* CEN 325 or equivalent.

CEN 623 Geotechnical Reliability Analysis and Reliability-Based Design (3.0); 3 cr. Review of Probability, Characterization of geotechnical uncertainties, Estimating random properties from spatial data, Simulation of geotechnical variability, Reliability analysis methods (FOSM, FORM, Monte Carlo simulation etc…), Reliability-based design of geotechnical structures, Partial factors and Load and Resistance Factor Design (LRFD). *Prerequisite:* CEN 325 and MAT 326.

CEN 661 Air pollution Engineering (3.0); 3 cr. Characterization of sources, emissions, transport, transformation, effects, and control of air pollutants. *Prerequisites:* Department approval.

CEN 662 Solid Waste Management (3.0);3 cr. Engineering principles, socioeconomic and regulatory issues related to solid and hazardous waste management. Integrated solid waste management system, hazardous waste management practices. Design and decisions in waste management alternatives. *Prerequisites:* CEN 462.

CEN 663 Bioremediation (3.0); 3 cr. Microbiology, Cell structure, morphology, cell nutrition and growth, energy transfer and utilization, aerobic and anaerobic microbial metabolism, biological wastewater process theory and modeling, biological nutrients removal, and disinfection of relevant microorganisms, enzyme kinetics and kinetic coefficients for biotreatment, laboratory techniques of treatment. *Prerequisites:* CEN 462 or equivalent.

CEN 664 Integrated Water Management (3.0); 3cr. Water resources, water quality, planning and management. Watershed stresses, ecological endpoints; optimization, environmental protection; total maximum daily load process; standards and environmental goals; economic and equity issues; and watershed restoration. Legal framework, Clean Water Act, EU Water Framework and the Lebanese Framework. *Prerequisites:* CEN 360 or equivalent.

CEN 665 Advanced Hydrology (3.0); 3cr. Hydrologic principles of surface and ground water as an integrated resource. Hydrologic cycle, hydrologic measurements and monitoring, surface and ground water hydrology. Hydrologic design, stochastic hydrology, and simulation modeling. *Prerequisite:* CEN 360 or equivalent.

CEN 666 Advanced Water and Wastewater Treatments (3.0); 3cr. Design for removal of impurities from water. Treatment, unit operations and processes. Industrial wastewater, advanced chemical treatment technologies, land treatment, membrane technologies, liquid and solid streams recycling or reuse. *Prerequisites:* CEN 463 or equivalent.

CEN 667 Water Distribution, Drainage and Sewerage Systems (3.0); 3cr. Water demand and pipeline, components of piped systems, pipe material, bedding and laying, hydraulics flow in pressurized networks, water transportation and distribution systems, storm water drainage systems and foul sewerage systems. Operation and maintenance of piped systems. Design tools using computer models. *Prerequisites:* CEN 463 or equivalent.

CEN 669 Environmental Impact Assessment (3.0); 3cr. Global approach to the Environmental Impact Assessment of projects on the environment. Project evaluation, constraints, limitations, precautions. Introduction to mitigation processes, legal measures, methodologies, investigation techniques, in-situ surveillance. *Prerequisites:* CEN 462 or equivalent.

C. Structures and Materials

CEN 600 Advanced Mechanics of Materials (3.0); 3 cr. Three dimensional strain and stress states, application of energy methods, torsion of noncircular members, nonsymmetrical bending of straight beams, shear center for thin-wall beam cross sections, curved beams.

CEN 601 Elasticity (3.0); 3 cr. Stress-Strain, elasticity formulation, solution by potentials, stress functions, torsion, thick cylinders, rotating disks, thermal stresses, straight simple beams, curved beams. *Prerequisite:* CEN 600.

CEN 602 Matrix Method for Structural Analysis (3.0); 3 cr. Displacement (stiffness) method, truss applications, rectilinear, tapered and curved beams, matrix transformation, frame analysis, influence coefficients and coordinate transformation, force method. *Prerequisite:* CEN 311.

CEN 603 Dynamics of Structures (3.0); 3 cr. Theory and application of structural dynamics for single and multiple degree-of-freedom models of buildings due to dynamic forces. Concepts of overall seismic design of buildings, proportioning, and detailing to achieve satisfactory seismic response. *Prerequisite:* MEN 201, CEN 311 or equivalent.

CEN 604 Design of Structural Systems (3.0); 3 cr. The whole structural design process including definition of functional requirements, selection of structural scheme, formulation of design criteria, preliminary and computer-aided proportioning, and analysis of response, detailing. *Prerequisites:* CEN 430, CEN 440 or equivalent.

CEN 605 Earthquake Resisting Structures Design (3.0); 3cr. Earthquake analyses and design of structures; static and dynamic forces, Lebanese earthquake design codes; Soil properties and local ground conditions,

ductility and demands on structural components; inelastic behavior of structural components, redundancy. Shear walls and bracing under cyclic loading of concrete structures. Design applications. *Prerequisite:* CEN 311 or equivalent.

CEN 606 Finite Element Methods (3.0); 3 cr. Theory and application of finite element methods as an analysis tool for two-dimensional stress problems in engineering; solution of advanced three-dimensional stress problems in engineering.

CEN 607 Nonlinear Finite Element Methods (3.0); 3 cr. Isoparametric finite element discretization, incremental equations of motion. Total and update lagrangian formulation. Nonlinear geometry, nonlinear material problems. Use of software packages for final solutions. *Prerequisite:* CEN 606.

CEN 611 Prestressed Concrete (3.0); 3 cr. Fundamentals of analysis and design of post-tensioned and pre-tensioned structural members, proportioning of members, calculation of the amount and positioning of reinforcement. *Prerequisite:* CEN 210 or equivalent.

CEN 612 Concrete Technology - Materials and Admixtures (3.0); 3cr. Properties, behavior and technology of concrete in both fresh and hardened states; microstructure properties, strength, dimensional stability, and durability. Concrete materials, mix proportioning, early age properties, hydraulic cements, chemical admixtures. Advances and future challenges in concrete technologies and mechanics. Project.

CEN 613 Strengthening and Rehabilitation of Concrete Structures (3.0); 3cr. Evaluation, analyses and design of concrete existing structures. Strengthening and repair methods and procedures to rehabilitate concrete structures. Non-destructive testing methods, properties, behavior and application of repair materials chemically-modified, durability. Design Project.

CEN 614 Special Topics in Concrete (3.0); 3cr. Earthquake load and seismic design of structures. Torsion in reinforced concrete members. Design of shear walls. Design of corbels, brackets and deep girders. Design of rectangular and circular water tanks. Design of spherical domes. *Prerequisite:* CEN 430 or equivalent.

CEN 615 Design of Composite Construction (3.0); 3cr. Introduction to composite construction. Composite beams, composite box girders in bridges, composite floors and composite columns**.** Design of Multi-storied commercial and residential composite building. Seismic behavior of composite structures. *Prerequisites:* CEN 430 and CEN 440 or equivalent.

CEN 616 Advanced Steel Design (3.0); 3 cr. Design of structural systems for multiple loads, combined loading, torsion, and fatigue in structural members, plate and box members. *Prerequisite:* CEN 440 or equivalent.

CEN 617 Probability and Statistics for Civil Engineers (3.0); 3cr. Introduction to random variables, probability distributions, expectations and moments. Random processes. Methods of perturbation. Monte Carlo simulation. Stochastic finite element. *Prerequisite:* MAT 326 or equivalent.

D- Project Management

CEN 684 Building: Energy and Environment (3.0); 3cr. Energy efficiency and environmental quality, analyses of various utility rate structures, life cycle cost and techniques, renewable and conventional energy sources, dynamics of the envelope, energy audit procedures, effect of operation and maintenance on the energy use. Project.
Prerequisites: CEN 462 or equivalent.

CEN 685 Risk Engineering (3.0); 3cr. Analysis of uncertainty in engineering projects and processes including planning, design and construction. Review and application of probabilities, statistics, and decision analysis applications. Variability of loads, environmental concerns; materials properties; prediction and system reliability analysis. Risk analysis and the decision process. *Prerequisite: MAT 326 or equivalent.*

CEN 690 Advanced Project Management (3.0); 3cr. Presentation of concepts and important issues in managing projects effectively. It includes project selection, planning, negotiation, budgeting, cost estimation, scheduling, resource allocation, control, auditing, and termination. *Prerequisite: CEN 393 or equivalent.*

CEN 691 Six Sigma Techniques and Total Quality Management (3.0); 3cr. Advanced topics in Engineering Management and Total Quality Management (TQM). Topics such as costs of quality, statistical tools, initiating change, advanced topics, and TQM in practice will be covered in addition to Six Sigma Quality Techniques. ***Prerequisite: CEN 393 or equivalent.***

CEN 692 Financial Engineering (3.0); 3cr. Use of principle and financial economics in engineering. Capital asset pricing, term structure of interest, and other capital allocation models will be covered. Assessment of real-options using binomial lattice, Black-Scholes and other pricing models. ***Prerequisite: CEN 392 or equivalent.***

CEN 693 Simulation Modeling (3.0); 3cr. Principles and methods for discrete-event simulation modeling. Use of simulation in the planning systems. Simulation modeling perspectives and languages, variance reduction methods, model validation, and output testing. ***Prerequisite: Department Approval.***

CEN 694 Dynamic Optimization (3.0); 3cr. Methods including dynamic programming, the calculus of variations, and optimal control theory. Focus is on the modeling and solution of practical problems applying these techniques. ***Prerequisite: Department Approval.***

CEN 695 Advanced Construction Planning (3.0); 3 cr. Job Planning and management, selection of construction equipment, soil stabilization, tractors, scrapers, excavating equipment, trucks, operation analysis, drilling rock, blasting, tunneling. *Prerequisite: CEN 493 or equivalent.*

CEN 696 Advanced Operations Research (3.0); 3 cr. Review of quantitative methods to gain skills in modeling and decision-making. It includes z-transforms and difference equations, Markov Chains, decision analysis techniques, goal programming, game theory, queuing theory and nonlinear programming. ***Prerequisite: Department Approval.***

CEN 697 Decision Analysis (3.0); 3 cr. Review of methods of optimizing decisions. It includes decision models, fuzzy controls, statistical decision theory, formal logic, game theory, stochastic programming, information theory, multiobjective decisions, and qualitative aspects of the decisions. ***Prerequisite: Department Approval.***

CEN 698 Special Topics in Engineering Infrastructures (3.0); 3cr. Presentations of recent issues in Engineering Infrastructure related to a developed project or research. This course complement students knowledge by addressing latest techniques and their implementation. *Prerequisite: Department Approval.*

CEN 699 Sustainable Development Planning (3.0); 3cr. Policy and planning for sustainable development. Sustainability as a method of social, organizational, and political development based on cases from the MENA region. Discussions on ecological enhancement; sustainable technology development, international and intergenerational fair trades, and democratic governance. *Prerequisite: CEN 462 or equivalent.*

Required Course

CEN 790 Master Thesis; 6cr. Implementation of a proposal developed with the approval of the advisor. It includes a Thesis report and a final defense in front of a committee. *Prerequisite:* Approval of the Department Curriculum Committee.

Faculty of Engineering
Department of Mechanical Engineering
Master of Science in Mechanical Engineering

Approved by the BOD on July 17, 2012
Approved by the UC on Nov. 5, 2012

1. Objectives

The proposal consists of establishing a Master of Science (M.S.) in Mechanical Engineering to be offered to candidates holding a bachelor degree in mechanical engineering or equivalent from a recognized university.

The educational objectives of the program are the following:

- To provide mechanical engineers with the opportunity to further develop their knowledge and skills in mechanical engineering so that they can adapt very quickly to technological changes in the workplace.
- To produce graduates with the ability to practice their profession with advanced skills or to continue for upper doctoral studies.
- To prepare graduates for personal and professional success, both as individuals and in team environments.

2. Admission Requirements

Admission to the Master of Science in Mechanical Engineering program is subject to the graduate admission requirements of the university as stated in the catalog under "Graduate Admission". In addition, the following requirements are to be met:

a. Bachelor degree in mechanical engineering or its equivalent from a recognized university;
b. Cumulative GPA of 3.0 or equivalent from a recognized faculty of engineering;
c. GRE test.

Furthermore, applicants should be able to demonstrate proficiency in the English language. All English requirements, as stated in the catalog under "Graduate Admission", are to be fulfilled.

3. Graduation Requirements

The program leads to the degree of Master of Science in Mechanical Engineering awarded once the following requirements are fulfilled:

a) The candidate must complete a total of 30 credits with a minimum cumulative GPA of 3.0/4.0. All courses are to be passed with a minimum of B grade as per rules and regulations concerning graduate studies at NDU. Failed courses may be repeated once provided that the grade on the failed course is equal to D or higher. Failing a course with an F grade means an automatic exclusion from the program. The 30 credits are divided into two groups:
   - **24 credits** of coursework including
     - 3 credits of advanced computational methods for mechanical engineering
     - 12 credits of required courses to be selected from four different restricted pools of courses (one course from each pool)
     - 6 credits of elective courses to be chosen from a list of upper level courses compatible with the thesis main topic.
     - 3 credits of research-oriented skills.

- **6 credits** of thesis work during which the student is expected to perform advanced research on a given topic of his/her choice provided that in-house expertise is available for guidance purposes. Topics for research are to be approved by a thesis supervisor and the work is to be presented in public in front of a thesis committee and interested audience.

b) Holders of a bachelor of engineering in mechanical engineering (5-year program leading to the degree of BE) from a recognized university may apply to transfer a maximum of twelve credits from their undergraduate upper level courses equivalent to 500-level mechanical engineering courses at NDU. The courses must fit within the program as outlined in sections 3(a) and 4 of the present proposal. Only courses with a B grade can be considered for transfer.

c) The candidate must attend a series of 0-carrying credit seminars as recommended by the graduate committee of the department. The total number of seminars is to be determined by the same graduate committee. The course grading is based on attendance and is pass or fail.

d) The residency requirements and maximum load per semester are as per rules and regulations for graduate programs at Notre Dame University (Catalog 2009-2010, p.105).

4. Course Pools

4.1 Mandatory Course (3 credits):

One advanced course related to computational methods is required to start the master program.

- MEN 600 Computational Methods for Mechanical Engineering 3 cr.

Equivalent courses as approved by the appropriate graduate committee may be considered as substitutes.

4.2 Restricted Pools (12 credits):

4.2.a Mechanics/Sciences of Materials - 3 credits:

- MEN 601 Physical Metallurgy 3 cr.
- MEN 602 Theory of Elasticity 3 cr.
- MEN 603 Materials and Their Properties 3 cr.

4.2.b Thermal/Fluid Sciences - 3 credits:

- MEN 605 Statistical Thermodynamics 3 cr.
- MEN 606 Viscous Flows 3 cr.
- MEN 607 Principles of Combustion 3 cr.

4.2.c Manufacturing/Machinery – 3 credits:

- MEN 610 Advanced Vibrations 3 cr.
- MEN 611 Advanced Mechanical Design 3 cr.
- MEN 612 Advanced Manufacturing Processes 3 cr.

4.2.d Control/Mechatronics – 3 credits:

- MEN 615 Advanced Mechatronics 3 cr.
- MEN 616 Advanced Topics in Control Theory 3 cr.
- MEN 617 Advanced Instrumentation 3 cr.

4.3 Elective Courses (6 credits):

Choose two courses from the following pools including at least one 700-level course. The 600-level courses of the restricted pools (section 3.2), other than the already taken courses, may also be considered to fulfill the elective requirements. It is highly recommended that the electives be chosen from an area closely related to the topic of the master thesis.

4.3.a Mechanics/Sciences of Materials Elective Courses:

- MEN 620 Continuum Mechanics 3 cr.
- MEN 621 Theory of Elastic Stability 3 cr.

- MEN 624 Fracture Mechanics 3 cr.
- MEN 625 Experimental Stress Analysis 3 cr.
- MEN 626 Mechanics of Composite Materials 3 cr.
- MEN 720 Solidification & Melting 3 cr.
- MEN 721 Theory of Plasticity 3 cr.
- MEN 722 Advanced Theory of Fracture 3 cr.

4.3.b Thermal/Fluid Sciences Elective Courses:

- MEN 631 Convective Heat Transfer 3 cr.
- MEN 632 Radiative Heat Transfer 3 cr.
- MEN 634 Experimental Methods in T/F Sci. 3 cr.
- MEN 636 Turbomachinery: Design & Analysis 3 cr.
- MEN 645 Computational Fluid Dynamics 3 cr.
- MEN 730 FEM for Fluid Dynamics 3 cr.
- MEN 731 Turbulent Flows 3 cr.
- MEN 732 Multiphase Flows & Heat Transfer 3 cr.
- MEN 734 Micro Flows & Heat Transfer 3 cr.
- MEN 737 Applied Combustion and Pollution 3 cr.

4.3.c Manufacturing/Machinery Elective Courses:

- MEN 650 Vehicle Dynamics 3 cr.
- MEN 652 Machining Processes 3 cr.
- MEN 654 Metalworking Processes 3 cr.
- MEN 655 Computer Aided Manufacturing 3 cr.
- MEN 750 Optimization Methods in Design 3 cr.
- MEN 751 Reliability in Mech. Design 3 cr.
- MEN 753 Design for Sustainability 3 cr.

4.3.d Control/Mechatronics Elective Courses:

- MEN 660 Nonlinear & Adaptive Control 3 cr.
- MEN 663 Machine Vision 3 cr.
- MEN 760 Vehicle Control Systems 3 cr.
- MEN 761 Robotics: Design, and Control 3 cr.
- MEN 764 Micorelectromechanical Systems 3 cr.

4.3.e Engineering Analysis & Special Topics Elective Courses:

- MEN 672 Finite Element Method 3 cr.
- MEN 673 Perturbation Methods 3 cr.
- MEN 681 Special Topics in ME 3 cr.
- MEN 781 Advanced Topics in ME 3 cr.
- MEN 770 Advanced Finite Element Method 3 cr.

4.4 Thesis & Seminars Courses (9 credits):

- MEN 680 Seminars in ME 0 cr.
- MEN 700 Research Methods 3 cr.
- MEN 790 Master Thesis 6 cr.

5. Suggested Program

Year I

Fall Semester (I)			**9 crs**
MEN	600	Computational Methods for ME	3 cr.
MEN	XXX	Course Pool 4.2.a	3 cr.
MEN	XXX	Course Pool 4.2.b	3 cr.
Spring Semester (II)			**9 crs**
MEN	680	Seminars in Mechanical Engineering	0 cr.
MEN	700	Research Methods in Mechanical Eng.	3 cr.

MEN	XXX	Course Pool 4.2.c	3 cr.
MEN	XXX	Course Pool 4.2.d	3 cr.

Year II

Fall Semester (III)			**9 crs**
MEN	XXX	Elective	3 cr.
MEN	790	Master Thesis	6 cr.
Spring Semester (IV)			**3 crs**
MEN	7XX	Elective	3 cr.

6. Course Descriptions

MEN 600 Computational Methods for Mechanical Engineering (3.0); 3 cr. Advanced numerical techniques for mechanical engineering fields involving differential and integro-differential equations, special functions and integrals, transforms, etc.

MEN 601 Physical Metallurgy (3.0); 3 cr. Equilibrium and phase relations in metallic systems. Kinetics of phase transformations. Annealing and precipitation phenomena. Solution thermodynamics. Dislocations, plasticity, work hardening and fracture of crystalline solids. *Prerequisite: MEN 200 or equivalent*.

MEN 602 Theory of Elasticity (3.0); 3 cr. Stress and strain at a point. General equations of elasticity. Plane stress, plane strain problems. Torsion of prismatic bars. Energy methods. *Prerequisite: MEN 302 or equivalent*.

MEN 603 Materials & Their Properties (3.0); 3 cr. Structure-processing-properties relationship of materials including metals, polymers, glasses and ceramics, electronic materials, and composites. *Prerequisite: MEN 200 or equivalent*.

MEN 605 Statistical Thermodynamics (3.0); 3 cr. Fundamentals of statistical mechanics. Quantum mechanics and statistics as applied to thermodynamics. Behavior of gases and solids. Fermi and Bose systems. Chemical equilibrium. *Prerequisite: MEN 211 or equivalent*.

MEN 606 Viscous Flows (3.0); 3 cr. Fundamentals of real flow phenomena: concepts of stress and strain and derivation of Navier-Stokes equations. Application to boundary layers, creeping flows and lubrication. Flow instabilities and turbulence. *Prerequisite: MEN 321 or equivalent*.

MEN 607 Principles of Combustion (3.0); 3 cr. Fundamentals of combustion processes. Combustion thermodynamics and reaction kinetics. Combustion phenomena: ignition, quenching, detonation and deflagration. Flame instabilities. Diffusion and premixed flames. Introduction to turbulent combustion. *Prerequisites: MEN 310, MEN 321 or equivalents.*

MEN 610 Advanced Vibration (3.0); 3 cr. Advanced topics in vibration theory and its application to mechanical systems. Topics include vibration analysis of multi-degree of freedom systems, distributed and nonlinear systems, random vibration analysis, and vibration control. *Prerequisite: MEN 330 or equivalent.*

MEN 611 Advanced Mechanical Design (3.0); 3 cr. Application of Quality Function Deployment for product design. Design for manufacture. Design for assembly. Design for disassembly. System design and rapid prototyping. *Prerequisite: MEN 437 or equivalent*.

MEN 612 Advanced Manufacturing Processes (3.0); 3 cr. Advances in manufacturing technology. Application of computer numerical control (CNC) to various product manufacturing. Hydro forming processes. Selective laser sintering. Powder metallurgy. Electrochemical machining. *Prerequisite: MEN 340 or equivalent*.

MEN 615 Advanced Mechatronics (3.0); 3 cr. Advanced concepts of Mechatronics. Embedded microcontrollers and their programming. Power and interfacing electronics. Actuators and sensors, and

their integration to create complete functional mechatronics systems; Design and development of intelligent machines, emphasizing topics related to sensor-based control of mobile robots. *Prerequisite: MEN 401 or equivalent*.

MEN 616 Advanced Topics in Control Theory (3.0); 3 cr. Fundamentals of modern and advanced control systems. Analog and digital control. Multivariable systems. Robust and optimal control of linear systems. Introduction to intelligent control techniques (neural network, fuzzy logic,…). Case studies involving applications in mechanical engineering fields. *Prerequisite: MEN 435 or equivalent*.

MEN 617 Advanced Instrumentation (3.0); 3 cr. Fundamentals of experimental methods. Data acquisition and signal processing. Uncertainty analysis. Design and selection of analog and digital sensors used in mechanical engineering. *Prerequisite: MEN 401 or equivalent*.

MEN 620 Continuum Mechanics (3.0); 3 cr. Mechanics of continuous media. Basic concepts of stress, strain, constitutive relationships; conservation laws are treated using Cartesian tensor notation. Examples from both solid and fluid mechanics investigated. *Prerequisites*: *MEN 302, MEN 321 or equivalents*.

MEN 621 Theory of Elastic Stability (3.0); 3 cr. Buckling of Columns, frames and plates. Kinematic approach to stability. Large deflections. Energy approach to buckling. Plate and shell buckling. Inelastic buckling of columns. Creep buckling. *Prerequisite*: *MEN 302 or equivalent*.

MEN 624 Fracture Mechanics (3.0); 3 cr. Mechanics of flawed structures. Concepts include Griffith theory, Irwin analysis, energy analysis of cracked bodies, fracture toughness testing, plane strain, plane stress, transition temperature concepts, subcritical flaw growth. *Prerequisite*: *MEN 302 or equivalent*.

MEN 625 Experimental Stress Analysis (3.0); 3 cr. Experimental techniques including strain gages and strain gage-based devices. Interferometric techniques. Photoelasticity and geometric Moire methods. *Prerequisite: MEN 302 or equivalent*.

MEN 626 Mechanics of Composite Materials (3.0); 3 cr. Introduction to composite materials. Lamina and laminate mechanical properties. Micromechanics. Mechanical and hygrothermal behavior of laminae and laminates. Lamina and laminate strength theories. *Prerequisite: MEN 302 or equivalent*.

MEN 631 Convective Heat Transfer (3.0); 3 cr. Fundamentals of convection. Forced convection. Free convection. Similarity between momentum and heat transport. Interaction with other heat and mass transfer mechanisms. Introduction to numerical techniques. *Prerequisite: MEN 310 or equivalent*.

MEN 632 Radiative Heat Transfer (3.0); 3 cr. Fundamentals of radiation. Prediction of radiative properties using classical electromagnetic theory. Properties of real materials. Governing equations. Radiation between nondiffuse and nongray surfaces. Radiation in the presence of other energy transfer modes. Approximate and computer solution techniques. *Prerequisite: MEN 310 or equivalent*.

MEN 634 Experimental Methods in Thermal/Fluid Sciences (3.0); 3 cr. Theory and practice in the use of instrumentation for measuring temperature, velocity, pressure and concentration; measurement of classical flow fields; Laser-based measurement techniques. *Prerequisite: MEN 310 or equivalent*.

MEN 636 Turbomachinery: Design & Analysis (3.0); 3 cr. Representation of performance of turbomachines. Mechanism of energy transfer. Factors limiting design and performance including surge, choking, and cavitation. Two- and three-dimensional flow phenomena. Performance analysis including multistage effects and off-design performance. Introduction to computational techniques. *Prerequisite: MEN 321 or equivalent*.

MEN 645 Computational Fluid Dynamics (3.0); 3 cr. Physical and mathematical foundations of computational fluid mechanics and heat transfer with emphasis on applications: governing equations and mathematical approximations; partial differential and integral equations, discretization and solution methods, stability and convergence. Introduction to physical modeling of turbulence, combustion, and radiation. *Prerequisites: MEN 310 or equivalent, MEN 600*.

MEN 650 Vehicle Dynamics (3.0); 3 cr. Dynamic modeling of vehicles. Tire mechanics. Suspension kinematics. Vehicle stability. Vehicle structural design criteria. Vehicle vibrations and ride criteria. Design considerations for vehicles. *Prerequisites: MEN 430, MEN 435 or equivalents*.

MEN 652 Machining Processes (3.0); 3 cr. Introduction to machining operations. Cutting tools and tool wear mechanisms. Cutting forces and mechanics of machining. Machining process simulation. Surface generation. Temperatures of the tool and workpiece. Machining dynamics. Non-traditional machining. *Prerequisite: MEN 340 or equivalent*.

MEN 654 Metalworking Processes (3.0); 3 cr. Fundamentals of metal forming theory. Stress-strain relationships in elasticity and plasticity. Methods for analyzing metalworking processes. Workability of metals. Individual constraints in metalforming and their influence on the forming process. Fundamentals of theory and practice of basic bulk metal and sheet metalworking processes. Calculation of energy and loads in forming. Selection of forming equipment. *Prerequisite: MEN 340 or equivalent*.

MEN 655 Computer Aided Manufacturing (3.0); 3 cr. Fundamentals of industrial automation. Numerical control (NC) systems. Part programming. Robotics in manufacturing. Materials handling and automated storage systems. Group technology. Automated identification and inspection systems. Flexible manufacturing systems. *Prerequisites: MEN 340, MEN 435 or equivalents*.

MEN 660 Nonlinear & Adaptive Control (3.0); 3 cr. Analysis of the qualitative behavior of nonlinear systems. Synthesis and design of controllers for such systems. Introduction to nonlinear system. Theory and stability analysis. Techniques for nonlinear control design with particular emphasis on techniques applicable to mechanical and mechatronics systems. *Prerequisite: MEN 435 or equivalent*.

MEN 663 Machine Vision (3.0); 3 cr. Design and analysis of autonomous systems with computer vision. Image formation and low level image processing. Theory and techniques for extracting features from images. Measuring shapes and locations. Object recognition. Design projects using image processing software and hardware systems. *Prerequisite: MEN 401 or equivalent*.

MEN 672 Finite Element Methods (3.0); 3 cr. The concepts and fundamentals of the finite element method with applications to problems in solid and fluid mechanics and heat transfer. *Prerequisites: MEN 302, MEN 321 or equivalents*.

MEN 673 Perturbation Methods (3.0); 3 cr. Solution of nonlinear problems in solid and fluid mechanics and dynamics by use of asymptotic perturbation techniques. Asymptotic expansions. Regular and singular perturbations and applications in dynamics, potential, viscous and compressible flows. Uniformly valid approximations in various physical problems. Generalized boundary-layer techniques. Coordinate straining techniques. Matched asymptotic expansions and multiple scales. Problems with several time or length scales. *Prerequisite: MEN 600.*

MEN 680 Seminars in Mechanical Engineering; 0 cr. A series of seminars related to mechanical engineering to be attended on regular basis as advised by the graduate advisor. *Prerequisite: Department Approval*.

MEN 681 Special Topics in Mechanical Engineering (3.0); 3 cr. A course to accommodate various topics related to mechanical engineering non listed with a specific course name. *Prerequisite: Department Approval*.

MEN 700 Research Methods in Mechanical Engineering; 3 cr. Development of research-oriented skills. Choice of topics. Literature reviews. Communication skills. Copyright issues. Social and environmental impacts. *Prerequisite: Department Approval*.

MEN 720 Solidification & Melting (3.0); 3 cr. Thermodynamics, kinetics, and morphologies of solid-liquid interfaces. Heat flow phenomena in casting and crystal growth. Structure of molten systems. Mechanics of solidification of metals under equilibrium and nonequilibrium conditions. Nucleation and

growth phenomena. Solute redistribution during freezing. Metal transport during freezing. Grain size control. Application of theory to production of engineering alloys. *Prerequisite: MEN 601*.

MEN 721 Theory of Plasticity (3.0); 3 cr. Plastic yield conditions and stress-strain relations. Behavior of elastic-perfectly plastic members. Plain strain in plastic members. *Prerequisite: MEN 602*.

MEN 722 Advanced Theory of Fracture (3.0); 3 cr. Review of linear elastic and elastic-plastic fracture mechanics. Fracture dynamics. Ductile fracture. Stable crack growth and mixed mode fracture. Analytical methods for fatigue and life assessment in advanced materials. Design of structures against fracture. Discussion of advanced topics from the recent literature. *Prerequisite: MEN 624*.

MEN 730 FEM for Fluid Dynamics (3.0); 3 cr. Analysis of finite element methods for basic problems in fluid mechanics. Scalar transport equations. Compressible and incompressible Navier-Stokes equations. Emphasis on developing and analyzing formulations that are stable and higher-order accurate such as Galerkin/least-squares methods and SUPG methods. *Prerequisite: MEN 672*.

MEN 731 Turbulent Flows (3.0); 3 cr. Transition from laminar to turbulent flow. Statistical parameters of turbulence. Instability theories. Phenomenological theories. Transport mechanisms of turbulence. Applications to wall bounded and free flows. Modeling of turbulent flows. *Prerequisite: MEN 606*.

MEN 732 Multiphase Flows & Heat Transfer (3.0); 3 cr. Fundamentals of multiphase fluid mechanics, pressure drop, stability analysis, critical flow and dynamic waves, flow regime analysis, and phase separation and distribution phenomena. Single and multicomponent boiling and condensation heat transfer phenomena. Introduction to computational techniques. *Prerequisites: MEN310 or equivalent, MEN 606*.

MEN 734 Micro Flows & Heat Transfer (3.0); 3 cr. Theory and applications of micro flows. The continuum hypothesis and the various flow regimes. Shear and pressure driven micro flows. Electrokinetically driven liquid micro flows. Compressibility effects of the micro flow of gases. Particulate flows in bio-applications. Modeling techniques. *Prerequisites: MEN 310 or equivalent, MEN 606*.

MEN 737 Applied Combustion and Pollution (3.0); 3 cr. Chemical equilibrium and reaction kinetics. Structure of flames. Flammability limits. ignition and quenching. Flame stabilization. Combustion of liquid and solid fuels. Pollutant formation in combustion. Reduction of emission by modification of combustion parameters. Burners for liquid fuel and pulverized solid particles. Combustion of solid fuel in fixed and fluidized bed. *Prerequisite: MEN 607*.

MEN 750 Optimization Methods in Design (3.0); 3 cr. Optimum design of mechanical elements and systems. Formulation and solution of mechanical design problems by use of mathematical programming methods. *Prerequisite: MEN 611*.

MEN 751 Reliability in Mechanical Design (3.0); 3 cr. Theory and applications of probabilistic methods in the analysis and synthesis of engineering systems. Review of basic probability concepts, random variables and distributions and uncertainty quantification and propagation. First-order, second-order and advanced mean value reliability methods. Monte Carlo simulation, variance reduction techniques, sensitivity analysis and reliability-based design optimization. *Prerequisite: MEN 611*.

MEN 753 Design for Sustainability (3.0); 3 cr. Environmentally conscious design or Ecodesign. Applicable standards and limits. Life cycle assessment. Sustainable technology for sustainable planning. Case studies: Waste reduction and management and renewable energy sources. *Prerequisite: MEN 611*.

MEN 760 Vehicle Control Systems (3.0); 3 cr. Overview and analysis of different sensors, actuators, and control devices in mobile robots and automotive systems. Cruise control. Engine and transmission control. Anti-lock brakes. Traction control. Active suspensions. Human factors and the role of the driver in the control loops. System failure analysis. *Prerequisite: MEN 615*.

MEN 761 Robotics: Design and Control (3.0); 3 cr. Advanced approaches to modeling, control and applications of robot manipulators: Kinematic modeling of manipulators; methods for obtaining dynamic model of manipulators; control of manipulators based on independent joint and multivariable control approaches, control of the contact forces between a manipulator and its environment; and adaptive control of manipulators. *Prerequisite: MEN 540 or equivalent*.

MEN 764 Microelectomechanical Systems (3.0); 3 cr. Introduction to Microelectromechanical (MEMS) systems. Basic concepts of smart materials. Microsystem design and analysis. Simulation and manufacturing. Typical applications: microsensors, microfluids, etc. *Prerequisite: MEN 615*.

MEN 770 Advanced Finite Element Methods (3.0); 3 cr. Advanced concepts of the finite element method. Hybrid and boundary element methods. Nonlinear, steady-state, propagation, and eigenvalue problems. *Prerequisite: MEN 672*.

MEN 781 Advanced Topics in Mechanical Engineering (3.0); 3 cr. A course to accommodate advanced topics related to mechanical engineering non listed with specific course name and requiring basic skills developed in lower level courses. *Prerequisite: Department Approval*.

MEN 790 Master Thesis; 6 cr. Implementation of a research project including the writing of a thesis report and a final presentation. *Prerequisite: MEN 700*.

Revision History (Reference: Rev.4 or Version Approved by FCC):

- Rev.5: Removed GRE score and added pre-requisites to all courses.

Faculty of Humanities
Department of Mass Communication
Changes - Bachelor of Arts - Advertising and Marketing (102 credits)

Approved by the BOD May 22, 2013
Approved by the UC June 18, 2013

General Education Requirements (GER)	**33 credits**
a- **Communication Skills in English**	6 cr.
b- Communication Skills in Arabic	3 cr.
c- **Philosophy and Religion**	**6 cr.**
d- **Cultural Studies & Social Sciences**	**6 cr.**
e- **Citizenship**	**6 cr.**
f- **Science & Technology**	**6 cr.**

1. COA courses do not satisfy the GER for Communication Arts students if these courses are also required for the major.
2. Communication Arts students may satisfy their Philosophy requirement by taking COA 360 Media Ethics.
3. Communication Arts students must take STA 202 to fulfill 3 of the 6 credits required in the Science and Technology group.

Core Requirements		**19 credits**
ADM 475	Seminar Series in Advertising	1 cr. (new course)
COA 201	Mass Media Essentials	3 cr.
COA 230	Information Gathering and Analysis	3 cr. (new course)
COA 252	Principles of Public Relations	3 cr.
COA 359	Mass Media and Society	3 cr.
COA 362	Research Methods	3 cr.
PDP 201	Basic Photography	3 cr.

Major Requirements: Advertising and Marketing		**40 credits**
ADM 216	Principles of Advertising	3 cr.
ADM 341	Media Planning	3 cr
ADM 352	Creativity and Copywriting	3 cr.
ADM 453	Global Advertising	3 cr.
ADM 481	Internship in Advertising	1cr.
ADM 490	Senior Study	3 cr.
COA 270	Studio Workshop	1cr.
COA 275	Editing I	2cr.
COA 316	TV Production	3cr.
COA 475	Computer Graphics and Video Animation	3cr.
FDP 201	Basic Design	3cr.
FDP 214	Design for Advertising	3cr.
MRK 201	Fundamentals of Marketing	3cr.
MRK 311	Consumer Behavior	3cr.
MRK 321	Promotional Strategy	3cr.

Students must choose 6 credits from the following pool electives:		**6 credits**
ADM 351	E- Commerce	3cr.

ADM 469	Selected Topics in Advertising 1	3cr. (new course)
ADM 470	Selected Topics in Advertising 2	3cr. (new course)
ADM 450	Consumer Activation Programs	3 cr. (new course)
BAD 201	Fundamentals of Management	3cr.
COA 311	Radio Programming	3cr.
COA 315	World Cinema Survey	3cr.
COA 350	Current Issues	3cr.
COA 352	Media Laws and Responsibility	3 cr.
COA 360	Media Ethics	3cr.
COA 365	Talk Shows	3 cr.
COA 367	Foreign Correspondence	3 cr.
COA 368	International Communication	3 cr.
COA 499	Independent Study	3 cr.
JOU 210	Media Language	3 cr.
JOU 310	News Writing and Reporting	3 cr.
JOU 323	Web Journalism	3 cr.
JOU 340	Public Relations Techniques	3 cr.
JOU 341	Public Relations Planning and Event Management	3 cr. (new course)
JOU 450	Specialized Journalism	3 cr.
JOU 460	Case Study in Public Relations	3 cr.
JOU 461	Public Relations and Protocol	3 cr. (new course)
JOU 465	Public Relations and Image Consultancy	3 cr. (new course)
MRK 313	Salesmanship	3 cr.
MRK 433	Marketing Strategies and Policies	3 cr.

Free Electives	**4 credits**
Total number of credits	**102 credits**

Faculty of Humanities
Department of Mass Communication
Changes - BA in Communication Arts (Journalism and Electronic Media)

Approved by the BOD May 22, 2013
Approved by the UC June 18, 2013

General Education Requirements (GER)	**33 credits**
a. **Communication Skills in English**	6 cr. (same)
b. Communication Skills in Arabic	3 cr. (same)
c. **Philosophy and Religion**	**6 cr. (same)**
d. **Cultural Studies & Social Sciences**	**6 cr. (same)**
e. **Citizenship**	**6 cr. (same)**
f. **Science & Technology**	**6 cr. (same)**

4. COA courses do not satisfy the GER for Communication Arts students if these courses are also required for the major
5. Communication Arts students may satisfy their Philosophy requirement by taking COA 360 Media Ethics
6. Communication Arts students must take STA 202 to fulfill 3 of the 6 credits required in the Science and Technology group.

Core Requirements		**19 credits**
COA 201	Mass Media Essentials	3 cr.
COA 230	Information Gathering and Analysis	3 cr. (new course)
COA 252	Principles of Public Relations	3 cr.
COA 359	Mass Media and Society	3 cr.
COA 362	Research Methods	3 cr.
JOU 475	Seminar Series in Journalism	1 cr. (new course)
PDP 201	Basic Photography	3 cr.

Major Requirements: Journalism		**35 credits**
ARB 302	Practices in the Use of Arabic Language	3 cr.
COA 270	Studio workshop	1 cr.
COA 275	Editing I	2 cr.
COA 415	Broadcast News Operations	3 cr.
COA 425	Writing and Reporting for the Electronic Media	3 cr.
JOU 210	Mass Media Language	3 cr.
JOU 310	News Writing and Reporting	3 cr.
JOU 323	Web Journalism	3 cr.
JOU 350	Investigative Journalism	3 cr. (new course)
JOU 370	Newspaper Production	1 cr.
JOU 371	The Newsroom	3 cr. (new course)
JOU 450	Specialized Journalism	3 cr.
JOU 480	Journalism Internship	1 cr.
JOU 490	Senior Study	3 cr.

Students must choose 9 credits from the following pool electives **9 credits**

Suggested list of pool courses:

ADM 216	Principles of Advertising	3 cr.
ADM 341	Media Planning	3 cr.
ADM 352	Creativity and Copywriting	3 cr.
BAD 201	Fundamentals of Management	3 cr.
COA 311	Radio Programming	3 cr.
COA 315	World Cinema Survey	3 cr.
COA 316	TV Production	3 cr.
COA 350	Current Issues	3 cr.
COA 352	Media Laws and Responsibility	3 cr.
COA 360	Media Ethics	3 cr.
COA 365	Talk Shows	3 cr.
COA 366	Diction and Presentation	3 cr.
COA 367	Foreign Correspondence	3 cr.
COA 368	International Communication	3 cr
IAF 322	Lebanese Diplomacy	3 cr.
IAF 331	Geopolitics	3 cr.
IAF 402	Human Rights in International Politics	3 cr.
JOU 333	News Analysis and Editorial Writing	3 cr.
JOU 340	Public Relations Techniques	3 cr.
JOU 341	Public Relations Planning and Events Management	3 cr. (new course)
JOU 369	Selected Topics in Journalism	3 cr.
JOU 451	Fashion and Lifestyle Journalism	3 cr. (new course)
JOU 452	Arts, Music, Literature, and Culture Journalism	3 cr. (new course)
JOU 453	Sports Journalism	3 cr. (new course)
JOU 454	Public Administration Journalism	3 cr. (new course)
JOU 455	Business and Economics Journalism	3 cr. (new course)
JOU 456	Human Rights and Ethics Journalism	3 cr. (new course)
JOU 460	Case Studies in Public Relations	3 cr.
JOU 461	Public Relations and Protocol	3 cr. (new course)
JOU 465	Public Relations and Image Consultancy	3 cr. (new course)
PDP 321	Photojournalism and Documentary	3 cr.
POS 320	Media and Politics	3 cr.

Free Electives	**6 credits**
Total number of credits	**102 credits**

Faculty of Humanities
Department of Mass Communication
Changes - MA Media Studies (39 credits)

Approved by the BOD May 22, 2013
Approved by the UC June 18, 2013

Emphasis I: Advertising
Emphasis II: Television Management and Production (was Electronic Media)
Emphasis III: Electronic Journalism and Public Relations (was Journalism)

Core Requirements **15 credits**

COA 610	Theories of Mass Communication	3 cr.
COA 613	Semiotics of Images (new course)	3 cr.
COA 652	Advanced Research Methods in Mass Communication	3 cr.
COA 680	Seminar in Mass Communication Law and Ethics	3 cr.
COA 681	Seminar in Cross Cultural Communication	3 cr.

Emphasis I
Advertising Major Electives: choose 12 credits **12 credits**

ADM 620	Advertising and Marketing Management	3 cr.
ADM 621	Seminar in Integrated Marketing Communication	3 cr.
ADM 635	Advanced Advertising Campaigns (new course)	3 cr.
ADM 650	Advanced Media Planning	3 cr.
ADM 651	Advanced Creative Strategy in Advertising	3 cr.
ADM 681	Seminar in Advertising and Society	3 cr.

Emphasis II
Television Management & Production Major Electives: choose 12 credits **12 credits**

COA 620	Comparative Broadcasting	3 cr.
COA 630	Broadcast Station Management	3 cr.
COA 635	Television and Promotional Strategies (new course)	3 cr.
COA 650	Advanced Television Production	3 cr.
COA 655	Documentary Films (new course)	3 cr.
COA 685	Entrepreneurship in Media (new course)	3 cr.

Emphasis III
Electronic Journalism & Public Relations Major Electives: choose 12 credits 12 credits

JOU 610	Newsroom Management	3 cr.
JOU 621	Editorial Operations	3 cr.
JOU 630	Public Relations Programs and Campaigns	3 cr.
JOU 631	International Public Relations	3 cr.
JOU 635	Issue Anticipation and Crisis Management	3 cr.
JOU 640	Online Journalism	3 cr.
COA 655	Documentary Films	3 cr.

Major Pool Electives: choose 6 credits 6 credits

ADM 651	Advanced Creative Strategy in Advertising	3 cr.
ADM 681	Seminar in Advertising and Society	3 cr.
COA 611	Issues in Communication Technology	3 cr.
COA 631	Media and Politics	3 cr.
COA 660	Independent Study	3 cr.
COA 682	Seminar on the Lebanese Media	3 cr.
COA 685	Entrepreneurship in Media	3 cr.
JOU 620	The Art of Interviewing	3 cr.
JOU 631	International Public Relations	3 cr.
JOU 680	Seminar in Selected Topics	3 cr.

Thesis Requirements 6 credits

COA 690	Thesis I	3 cr.
COA 691	Thesis II	3 cr.

Television Management and Production may choose to replace COA 690 and COA 691 with

COA 692	Film	6 cr.

New Courses - description

ADM 635 Advanced Advertising Campaigns (3 cr.)

The course provides students with an in-depth understanding of the principles and practices that businesses use for their marketing communication strategies including advertising using traditional and new media. It introduces students to advanced research, strategy formation, client presentation, and execution of an advertising campaign for a national client. The purpose is to come up with breakthrough advertising strategies that provide companies with a competitive advantage in the marketplace.

COA 613 Semiotics of Images (3 cr.)

The course introduces students to semiotic tools that would enable them to analyze and understand visual culture texts, pictures, and multimodal texts. It will draw on historical and contemporary examples from new media, television, film, and other forms of visual communication. (The objective is to critically analyze and interpret visual phenomena with an understanding of the underlying cultural and political power structures.)

COA 635 Television and Promotional Strategies (3 cr.)
This course focuses on the design and development of promotional strategies for television. It covers areas in television promotion including program format, genres, production processes, scheduling, rating systems, and program development processes. It also covers the historical and conceptual development of broadcast advertising while dealing with the implications of new media.

COA 655 Documentary Films (3 cr.)
Advanced exploration of Documentary Cinema, its structure, forms, cinematography techniques, aesthetics, and schools. The course involves analysis of documentary productions and its use in new media. Prerequisite: COA 610.

COA 685 Entrepreneurship in Media (3 cr.)
This course familiarizes students with the fundamentals of entrepreneurship and the evolving business models for media. It also emphasizes the transformations in the new media landscape. Students are expected to create a business plan for a media start-up.

COA 690 Thesis I 3 (cr.)
Specific research on a significant topic selected by the candidate upon consultation with advisor. Students are expected at this stage to write a proposal that includes a statement of the topic, a review of literature, a presentation of the theoretical foundations, and a statement of the nature of the data collection, procedures, and analysis. Students must complete 21 major credit hours prior to registering for this course. To pass this course, students must defend their thesis proposal. Prerequisite: COA 601 and COA 652.

COA 691 Thesis II (3 cr.)
This course is the logical extension of thesis 1. At this stage, students work on their data gathering and analysis, finalize the writing, and formatting of the study. Prerequisite: COA 690.

COA 692 Film (6 cr.)
Specific film on a significant topic selected by the candidate upon consultation with advisor. Students are expected to write a proposal that includes a rationale about their idea, a synopsis, review of literature and limitations. In addition to the film itself students must also present a prompt-book to explain the treatment, the script, and the storyboard. Students must complete 21 major credit hours prior to registering for this course. Prerequisite: COA 601, COA 652 and COA 655.

JOU 635 Issue Anticipation and Crisis Management (3 cr.)
This course will provide students with the skills to foresee potential problems; locate solutions, and react adequately. It also prepares them to apply highly sophisticated communication strategies to crisis management.

JOU 640 Online Journalism (3 cr.)
This course focuses on promoting the best practices in online journalism covering both multimedia and online storytelling. Journalism students will acquire hands-on experience in the production of many content types of digital media.

Faculty of Humanities
Department of Mass Communication
Undergraduate New Courses

Approved by the BOD May 22, 2013
Approved by the UC June 18, 2013

ADM 450 Consumer Activation Programs (3 cr.)
This course describes new and innovative ways of advertising to the consumer. Terms like shopper marketing, brand activation, advergaming, and branded content are becoming an essential part of the programs advertisers are creating for consumers in order to activate marketing communication in alternative media forms different from regular TV, radio, or press. Prerequisite: ADM 352.

ADM 469 Selected Topics in Advertising 1 (3 cr.)
Variable topics in Advertising and Marketing not covered in specific courses in the curriculum. Prerequisite: COA 201, ADM 216, MRK 201.

ADM 470 Selected Topics in Advertising 2 (3 cr.)
Individual study topics in Advertising and Marketing to be proposed by students or instructors or suggested by the department. Prerequisites: COA 201, ADM 216, MRK 201.

ADM 475 Seminar Series in Advertising (1 cr.)
Consisting of series of lectures, seminars, and workshops on topics related to Advertising and Marketing organized by the department. Pass or Fail grade only. Prerequisite: Junior standing.

COA 230 Information Gathering and Analysis (3 cr.)
This course helps students to improve their information literacy, and their basic information gathering and analysis using various navigation techniques and tools.

JOU 350 Investigative Journalism (3 cr.)
This course focuses on the different investigative reporting techniques and uses the scientific method to connect events with accurate fact-checking, detection of secrets, use of public records and packaging the whole product. Prerequisite: JOU 210.

JOU 371 The Newsroom (3 cr.)
This course introduces students to the different newsroom responsibilities including preparing newscasts and expanding their skills in newsroom management. Prerequisite: COA 275.

JOU 450 Specialized Journalism (3 cr.)
This course covers different areas of journalism, such as foreign affairs, sports, arts, lifestyle, environment, business, human rights, and others. Prerequisite: JOU 310.

JOU 475 Seminar Series in Journalism (1 cr.)
This course consists of a series of lectures, seminars, and workshops on topics related to journalism and electronic media organized by the department. In English and Arabic. Pass or Fail grade only. Prerequisite: Junior standing.

JOU 451 Fashion and Lifestyle Journalism (3 cr.)
This course covers journalism skills in writing for fashion and lifestyle; it involves covering related events and understanding the craft of fashion design, design schools and a brief idea about history of fashion. Prerequisite: JOU 450.

JOU 452 Arts, Music, Literature, and Culture Journalism (3 cr.)
This course offers an overview of major schools and genres of arts, theatre, music, architecture, etc. from the perspective of a journalist. It also provides students with proper training in order to cover artistic and cultural events such as musical concerts, plays, films, and art exhibitions, literary publications, among others. Prerequisite: JOU 450.

JOU 453 Sports Journalism (3 cr.)
This course covers journalism skills in writing for sports; it involves understanding game rules and regulations, different types of sports, and the nature of sport events including covering sport events for TV and printed media. Prerequisite: JOU 450.

JOU 454 Political Administration and Foreign Affairs Journalism (3 cr.)
This course is meant to familiarize students with the administrative structure of the Lebanese political administration and with the way it functions, with decision making procedures in the Lebanese parliament, the cabinet, the presidential palace, and all ministries; it also introduces students to diplomatic protocols, traditions, and conventions. Prerequisite: JOU 450.

JOU 455 Business and Economics Journalism (3 cr.)
This course provides journalism students with a genuine understanding of the worlds of business and economics. Students are expected to practice business reporting and to learn how to decipher financial statements and analyze business statistics in addition to understanding the exchange market. Prerequisite: JOU 450.

JOU 456 Human Rights and Ethics Journalism (3 cr.)
This course helps journalism students to identify media accuracy while reporting on human rights. It also identifies the positive and the negative influence of journalism practices on audiences. Prerequisite: JOU 450.

JOU 461 Public Relations and Protocol (3 cr.)
The course acquaints students with key public relations skills and event management techniques while providing them with proper exposure to all facets of planning, executing, and analyzing corporate events in-line with corporate goals and objectives. Students are supposed to examine each phase of a successful event and to focus on project management skills needed to research, design, plan, market, co-ordinate, and evaluate events. Special emphasis is placed on the critical role public relations plays throughout the management process. Students are expected to learn the tactics, tools and insights required to create winning events that are successfully publicized. Prerequisite: COA 252.

JOU 465 Public Relations and Image Consultancy (3 cr.)
The course acquaints students with the concept of image consultancy and its tools, while emphasizing the use of these tools in influencing the public perception of corporations, individuals, and organizations. It also provides students with the opportunity to review, discuss, and examine the professional environment and public relations' role in achieving business objectives of organizations. It finally introduces students to the techniques and mechanics that are used to master the delivery of winning campaigns to influence public opinion. Prerequisite: COA 252.

FNAS – BIO 204
New Biology course introduced to the Civil Engineering program

Approved by the BOD on May 20, 2013
Approved by the UC on June 25, 2013

BIO 204 – Environmental Biology - 3 credits

Rationale:
The Civil and Environmental Engineering Program curriculum at NDU lacks a single biology course that introduces students to basic biological concepts and highlights their environmental implications. Acknowledging the interconnectedness of the two disciplines – biology and engineering, biological literacy is nowadays viewed as fundamental to graduating engineers in the work place, especially when considering environmental issues or challenges. In this respect, and upon the request of the Faculty of Engineering at NDU, the Sciences Ad Hoc Committee For Establishing a Biology Course for Engineers would like to propose a basic, 3-credit introductory course in Environmental Biology – **BIO 204**. The course is intended for **Engineering students** majoring in **Civil and Environmental Engineering** and is to be integrated into their program curriculum. This is especially pivotal to meeting the ABET accreditation requirements which the Department is currently seeking. The proposed course is divided into two main parts which provide basic education in biology, connect to major environmental issues and touch on related public/environmental health topics.
Briefly, the value of the course can be seen as three fold:

1- broaden the knowledge of engineers in the biological field;
2- help engineering students grasp the connection between their field of study and the living world (for example the potential impacts of technologically-driven changes on environmental and public health);
3- incorporate into the revised Civil and Environmental Engineering Program.

Following is a tentative syllabus to the course, as suggested by the DCEE, with minor modifications (addition of chapters on toxicology).

BIO 204 - Environmental Biology (3 cr.)

Approved by the BOD on May 20, 2013
Approved by the UC on June 25, 2013

Course description:
This course is intended to expose engineers and scientists to the concepts and terminology that are relevant to the broad range of biological disciplines. The first part of the course discusses general introductory topics in biology. The second part emphasizes topics related to environmental applications, namely, sanitary microbiology, ecology and toxicology.

Course (learning) objectives: this course is intended for students majoring in civil and environmental engineering to further their knowledge in the biological field. Upon the completion of this course the student is expected to

1- describe biological and ecological organization and elaborate on their interconnectedness,
2- discuss the adverse impacts of biological and chemical hazards, as well as other forms of environmental disturbance, on ecosystem balance,
3- list strategies for environmental protection and remediation.

Textbook:
Environmental Biology for Engineers and Scientists, David F. Vaccari, Peter F. Strom, and James E. Alleman. Wiley Publishers, 2006.

Tentative course syllabus

Part I Perspectives on Biology

1. The Cell: The Common Denominator of Living Things
2. Energy and Metabolism
3. Genetics
4. Plants
5. Animals
6. Humans
7. Microorganisms: Their Activity and Effect on Human Health

Part II Ecology: the Global View of Life

1. Ecosystems and Applications
2. Fate and Transport of Toxins
3. Dose-Response Relationships
4. Toxicology
5. Biodiversity, Habitat Diversity, and Overpopulation
6. Genotype and Phenotype, Mutations, and Environmental Adaptation
7. Environmental Extinction Events
8. Living Together: Communities and Ecosystems
9. Biological Applications for Environmental Protection and Remediation

FNAS - Chemistry GER New Courses

Approved by the BOD on May 20, 2013
Approved by the UC on June 25, 2013

Rationale for GER Courses in Chemistry: CHM 201 (Chemistry in Everyday Life) and CHM 202 (Chemistry in Arts)

Many non-science students perceived their chemistry courses to be an unpleasant learning experience. However chemistry is everywhere and touches on almost every aspect of our daily lives. These courses will provide students a positive experience in learning chemistry, as well as, both the motivation and intellectual tools to continue learning chemistry over their lifetime. They will break the mold by using real-world topics that will engage and challenge the students. By relating chemistry to daily life and arts, these courses are expected to attract students especially from different fields.

In **CHM 201,** Students are going to learn the chemical principles that underlie the real-world experiences of everyday life and the pressing issues in the twenty-first century. They are going to develop the critical thinking skills knowledge needed to analyze them and the ability to assess risks and benefits of different scenarios.

In **CHM 202**, students will know about the influence of chemistry in visual arts while at the same time becoming acquainted with the scientific literacy. By knowing about the properties and hazards of the materials and chemicals used in different pieces of art, students will be better informed in taking decisions.

CHM 201 (3 cr.) - Chemistry in Everyday Life: Course Description

This course emphasizes the importance of chemistry in our everyday life. It provides students with a practical understanding of substances such as fuel, plastics, detergents, and drugs. This helps them to adopt sustainable practices and healthier lifestyles.

CHM 202 (3 cr.): Chemistry of Art: Course Description

This chemistry course is directed to students with no prior knowledge in chemistry. It explores the intersection of chemistry with arts. The Basic principles of chemistry are applied to topics of colors, paints, paper, fibers, clay, glass, and metals. Art conservation and restoration in addition to chemical hazards in art are also covered.

CHM 201 (3 cr.) - Chemistry in Everyday Life

Textbook: *Chemistry in Context: Applying Chemistry to Society*, 7th Edition, 2012, A**merican Chemical Society,** ISBN-13 9780073375663

Outline:

- Introduction
    - Classifying matter: pure substances, elements, and compounds
    - Atoms and molecules
    - Names and formulas: the vocabulary of chemistry
    - Chemical change: the role of oxygen in burning
- Water for life
    - The unique properties of water
    - The role of hydrogen bonding
    - Aqueous solutions
    - A closer look at solutes

    - Names and formulas of ionic compounds
    - The ocean – an aqueous solution with many ions
    - Covalent compounds and their solutions
- Energy from combustion
    - Fossil fuels and electricity
    - Efficiency of energy transformation
    - The chemistry of coal
    - Petroleum
    - Measuring energy changes
    - Energy changes at the molecular level
    - The chemistry of gasoline
    - New uses for an old fuel
    - Biofuels I – ethanol
    - Biofuels II – biodiesel, garbage, and biogas
- The fires of nuclear fission
    - Nuclear power worldwide
    - How fission produces energy
    - How nuclear reactors produce electricity
    - What is radioactivity?
    - Radioactivity and you
    - The weapons connection
    - Nuclear time: the half-life
    - Nuclear waste
    - Risks and benefits of nuclear power
- Energy from electron transfer
    - Batteries, galvanic cells, and electrons
    - Other common galvanic cells
    - Battery ingredients
    - Hybrid vehicles
    - Fuel cells: the basics
    - Hydrogen for fuel cell vehicles
    - Photovoltaic cells: the basics
    - Electricity from renewable (sustainable) sources
- The world of polymers and plastics
    - Polymers
    - Adding up the monomers
    - Polyethylene
    - The ‘big six”: theme and variations
    - Condensing the monomers
    - Polyamides: natural and nylon
    - Recycling plastics
- Cosmetics
    - Healthy options versus cosmetics products
    - Toxicity
    - Safety
    - Natural alternatives
    - Essential oils
- Green alternatives
    - Soap
    - Detergents
    - Kitchen chemicals

- Biopesticides

CHM 202 (3 cr.): Chemistry of Art:
Textbook: *Art in Chemistry, Chemistry in Art*. Greenberg, Barbara R., and Dianne Patterson, 2nd Edition, Teacher Idea Press, 2008, ISBN-9781591583097

Suggested lecture topics

- Introduction to the boundary between arts and science
- Color and light
  - The interaction of light and matter
  - Light and the human brain: how painters impacted our vision
- Paint
  - Pigments colorants, binders and media
  - Early paintings: frescos and chemical reactions
  - Restoration and conservation: color, ethics and the *Sistine Chapel*
  - Scientific and artistic evaluations of paintings
  - Archeology of paintings
  - The art of forgery
- Supports and grounds
  - Preparation of grounds and whiting compounds
  - Watercolor papers
  - Paper making
- Sculpture and three-dimensional works in arts
  - Rocks, minerals, crystals, and glass
  - Clay, pottery, and ceramics
  - Glazing pottery
  - Ceramic kiln: clay in the oven
  - The name and shape of organic molecules
  - Modeling hydrocarbon molecules
  - Polymers and modern art
  - Structure and properties of matter and the periodic table
- Jewelry
  - Heavy metals
  - Native metals and their alloys
  - Making electrochemical cells and electroplating
  - Soldering and coloring
- The art of forgery
  - Analytical chemistry of fakes and forgeries
  - Fakes and forgeries case studies
- Chemical hazards in art
  - Artists' Illnesses
  - Chemical hazards
  - Precautions for preventing health problems

FNAS – Department of Computer Science
Introduction to Practical Computing (3 cr.)
CSC100 - New Freshman Course

Approved by the BOD on May 15, 2013
Approved by the UC on June 25, 2013

Course Rationale

Nowadays, some aspects of technology are integral part of undergraduate courses. For instance, word processing, electronic presentations, spreadsheets, and multimedia are necessary tools for every course. In addition, skills in animation, web development and programming can be used in the students' personal, academic, and professional life. We propose to offer a Freshman course for the students who want to enrich their knowledge and skills in Information Technology and computing. Through both its content and structure, the course aims to appeal to a broad audience of students, whether they expect to major in computer science related tracks or to just discover the challenges and capabilities of these disciplines.

FNAS – Department of Computer Science
CSC 203 - Information Age and Ethics

Approved by the BOD on May 20, 2013
Approved by the UC on June 25, 2013

Course Rationale

With the global widespread proliferation of computers and technology in people's lives, related and closely tied ethical issues are increasing in number and complexity. Regardless of students' academic backgrounds and majors, our computer science department shares the responsibility of making them aware of these ethical issues and to have them prepared to meet possible challenges. Indeed, learning about computer ethics can empower students to become "good" digital citizens. Therefore, offering at least one GER computer ethics to the undergraduate population is a pressing necessity. Such a course is intended to give fuller, richer, deeper understanding of the social impact of technologies and the ethical issues in human activities affected by these technologies. Upon successful completion of this course, students will be able to:

- describe and distinguish between the various ethical theories
- identify the different technology issues that involve ethics
- apply ethical principles to these technology issues
- use a rational, coherent methodology to address moral issues in information technology

This course fits the best as a GER Philosophy course as it addresses the study of moral philosophy related to ethical decision making in the technology and information age.

FNAS - Department of Computer Science
CSC 205 - Adventures in Computational Thinking

Approved by the UCC on April 24, 2013
Approved by the BOD on May 20, 2013

Rationale for offering the course as GER

Computational thinking (CT) is a skill, which, according to Janette Wing, the professor who coined the term, is fundamental for everyone like reading, writing and arithmetic. The National Science Foundation in the USA has funded many projects to incorporate CT in University curricula.

In its basic form, CT is a skill that allows people to find solutions to problems that are encountered in everyday's life. For example a waitress trying to seat customers, while taking into account the size of available tables and the number of people to be seated. Or how can one find a heuristic method to find their way back home when lost.

Course Description

The aim of this course is to introduce programming concepts in an appealing and fun way. Even though it places special emphasis on concepts such as structured programming, algorithms and recursion, students will learn to translate ideas into running programs using one of the easiest programming languages ever invented. In addition to learning to develop essential tools for problem solving such as flowcharts, students will implement a number of fun projects using the Scratch environment, a purely graphical language. Programming in Scratch is nothing more than dragging blocks into a canvas and building bigger blocks from smaller blocks.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

- Use essential techniques for problem solving such as pseudocode and flowcharts.
- Use problem solving strategies to resolve situation that happen every day
- Use basic programming constructs: constants, variables, assignment statements, expressions, types (including arrays and strings) and control structures (sequential flow, conditional statements, and loops).
- Build iterative and recursive procedures.
- Build animations visually.
- Practice all the above concepts using the Scratch visual programming language.

Textbook

Super Scratch Programming Adventure, The Lead Project, No Scratch Press, 2012

Recommended Readings

Blown to Bits, available online at www.bitsbook.com

Teaching Methodology and Techniques

Classes involve lectures, guided projects, problem solving and group work.

Grading and Evaluation

Projects 50% Midterm 20% Final Exam 30%

Outline

1. Introduction to Scratch.
2. Capturing events and drawing using Scratch.
3. Making the correct decisions (using if/else statements in Scratch).
4. Making the computer work for us (Using repetitions in Scratch).
5. Simplifying tasks (modular programming in Scratch).
6. Searching for a needle in a haystack (binary search trees in Scratch).
7. Who comes first (Sorting values using Scratch)
8. Project Presentations and Course Review

FNAS – Department of Computer Science
CSC 206 - Games and Society

Approved by the UCC on May 7, 2013
Approved by the BOD on May 20, 2013

Course Rationale

The evolution of video games is having a major impact in our society with both positive and negative effects. Whether on campuses, at restaurants, in public areas or in social settings, we are witnessing how technologies and games are shaping our culture and society. According to the Entertainment Software Association (ESA), video gaming is the fastest growing form of entertainment reporting that total sales of video games in 2011 were $24.75 billion. In a survey carried out by Galt (2012), the average child in the UK spends three hours and 11 minutes each day playing video games, watching TV or using smartphones. The Kaiser Foundation survey showed that students spend more than 10 hours per week just playing video games.

This course emphasis is on *understanding games in their historical and cultural context with their impact on society*. The course also provides the students a glimpse on how to create and design video games.

FNAS - Department of Sciences
New Major - M.S. in Industrial Chemistry

Approved by the BOD on May 22, 2013
Approved by the UC on June 25, 2013

Rationale for Opening a Graduate Program (M.S.) in Industrial Chemistry at NDU-Louaize

In line with the university mission of providing quality education, the proposed graduate program - M.S. in Industrial Chemistry - at NDU-Louaize will enrich the scope of basic and applied sciences. The qualifications and competencies of full time faculty members at NDU warrant an outstanding eminence of this new program. We do believe that investing in the M.S. program in Industrial Chemistry will reinforce the important role of NDU-Louaize in higher education and benefit both our students and society. Many challenges, including but not limited to industrial development, food security and safety, environmental concerns, and globalization, are braving our society nowadays. Our institution will be proud to prepare graduates who can face these defies by building academic confidence in them, which is rooted in a sound curriculum, a genuine scientific education, solid research skills, and societal and industrial connections.

Currently, in the Department of Sciences at NDU-Louaize, the majority of students with good academic standing pursue higher degrees in chemistry, including doctoral studies, in prestigious institutions in Lebanon and abroad. This is clearly an attestation to the high quality of education that we are offering at the undergraduate level. This same tradition of excellence will be continued at the graduate level.

Many students enrolled in the chemistry undergraduate program at NDU-Louaize wish to have an M.S. program in Chemistry, namely the industrial track, in addition to requests that the Department of Sciences has received from outside sources**.** It would be appropriate for us to grasp this opportunity and open a graduate program in industrial chemistry to fulfill this demand. This step will generate the momentum necessary to harness the compelling potential of full time faculty members with Ph.D.'s in chemistry and related sciences. The chemistry lab facilities combined with the proficiency of faculty members will ensure an outstanding research atmosphere to our graduate students. This will also open the door for collaboration with other universities in Lebanon and abroad on common research projects and will provide the possibility of establishing exchange programs. We have faith that opening a graduate program in industrial chemistry will set NDU-Louaize and the Department of Sciences at a higher level of academic excellence.

Support Facilities

The Chemistry laboratory is equipped with up-to-date instruments which serve teaching and research in several disciplines, including:

- Analytical Chemistry Unit: equipped to carry out extraction, purification, analysis, and quantification of substances in different kinds of samples. Equipment include microwave digestion system, UHPLC equipped with different detectors & a fraction collector, GC / GC MS, FTIR, AA, Capillary Elecrophoresis, Rancimat, calorimeter, etc…
- Material Science: preparation and separation of nanoparticles (particles with nanometer scale size)

- Interface **(**Material Science-Biochemistry and Biology): grafting of biomolecules on nanoparticles and analysis for biomedical applications
- Organic Synthesis: synthesis and purification of new molecules of interest in various fields

- Cold room & Dark room (multi-purpose)
- Computers and softwares for educational purposes (to serve different courses)

Library Resources

Faculty and students have access to a rich collection of print and electronic resources in the sciences, including books, journals, online databases, DVDs, maps, etc., provided through the NDU Libraries.

Proposed Graduate Program

The Department of Sciences offers a Master of Science (M.S.) in Industrial Chemistry which includes thesis work. The program provides students with solid education in advanced topics in chemistry and their technical applications. Students are also prepared to critically solve problems and be creative in designing industrial research projects.

The Degree of Master of Science in Industrial Chemistry

Admission Requirements

In addition to the university graduate admission requirements, students holding a B.S in Chemistry with a GPA of 2.7-2.99 will be accepted on probation. The probation will be removed if the students receive a minimum of a B average for 6 credits taken during their first semester. Students from other majors may be given provisional admission pending satisfactory completion of prerequisite courses consisting of a maximum of 12 credits of undergraduate chemistry courses, as specified by the Faculty Graduate Committee. The credits earned for these prerequisite courses will not be counted towards the 36 credits required for the M.S. in Industrial Chemistry. Students are expected to be proficient in the English language, otherwise they should pass the University English Entrance Test or its equivalent. Normally a maximum of 9 transfer credits from previous work completed at another accredited institution of higher education is permitted upon the discretion of the Faculty Graduate Committee.

Graduation Requirements

To satisfy the requirements for the degree of M.S. in Industrial Chemistry, the student must complete a total of 36 credits, including 6 credits of thesis work, with an overall average of at least 3.0/4.0.
Thesis work provides the necessary background and research experience to students planning to work in the industrial sector or pursue a Ph.D. and indulge in scientific research.

Degree Requirements - 36 Credits

	# of credits
1- Complete the following required major courses: CHM 603, CHM 606, CHM 609, CHM 604 **or** CHM 608, CHM 602, CHM 680, CHM 681.	**15 cr.**
2- Complete 9 credits of electives in the major from the following list of courses: CHM 605, CHM 612, CHM 615, CHM 624, CHM 628, CHM 633, CHM 634, CHM 635, CHM 641, CHM 645, CHM 647, CHM 648, CHM 670, CHM 671, CHM 673.	**9 cr.**
3- Complete 6 credits of graduate level courses related to the field and approved by the department.	**6 cr.**
4- Complete the M.S. thesis requirements.	**6 cr.**

In addition, students must pass a comprehensive written exam which should be conducted after having completed at least 18 credits, including required courses.

Master of Science in Chemistry Suggested Program - 36 Credits

Fall Semester I (10 Credits)			
CHM	609	Industrial Chemical Processes	3 cr.
CHM	606	Chemistry in the Workplace	1 cr.
CHM	603	Advanced Organic Chemistry	3 cr.
CHM	6xx	Major Elective	3 cr.
Spring Semester I (12 Credits)			
CHM	604	Kinetics and Catalysis	3 cr.
		Or	
	608	Advanced Inorganic Chemistry	
CHM	602	Chemometrics	3 cr.
CHM	6xx	Major Elective	3 cr.
CHM	6xx	Free Elective	3 cr.
Fall Semester II (7 Credits)			
CHM	6xx	Major Elective	3 cr.
CHM	680	Seminar I	1 cr.
CHM	691	Thesis I	3 cr.
Spring Semester II (7 Credits)			
CHM	6xx	Free Elective	3 cr.
CHM	681	Seminar II	1 cr.
CHM	692	Thesis II	3 cr.

Regulations concerning the thesis work of the Master of Science in Chemistry

Master Thesis
Students may register for the thesis (CHM 691/692) upon the completion of at least 19 credits with an overall average of at least 3.0/4.0 and after receiving the approval of both the Department Chairperson and the thesis advisor. The grade will be reported as pass or fail.

Jury for the Oral Defense
The jury shall be composed of three members, including the thesis advisor, as appointed by the Department Chairperson.

Schedule for the Oral Defense
The oral defense for the master thesis shall be scheduled within a month from the date of submission of thesis copies to the jury members.

Evaluation and Grade
The jury shall evaluate the work for the master thesis and assign the appropriate grade by a majority vote.

Final Copy of the Master Thesis
The student shall submit two bound copies of the approved final version of the master thesis, one to the Thesis Advisor and the other to the University Library.

Graduate Courses: Chemistry

CHM 602 Chemometrics (3.0); 3 cr. This course analyzes data generated from instrumentation used in chemistry. It emphasizes on the understanding and practical application of chemometric methods such as principal components analysis (PCA) and partial least squares (PLS) regression, using basic statistics and computational computer programming.

CHM 603 Advanced Organic Chemistry (3.0); 3 cr. The course focuses on the study of thermodynamics, kinetics, and stereochemistry of reaction mechanisms. Topics include nucleophilic substitution, elimination, radical reactions, aromaticity and electrophilic substitution in aromatic rings. In addition, a comprehensive study on non classical carbocations, carbanions, carbenes, and carbanoids is extensively considered.

CHM 604 Kinetics and Catalysis (3.0); 3 cr. This course covers the principles and applications of heterogeneous and homogeneous catalysis. Catalyst synthesis and characterization, adsorption, reaction kinetics, and mass transfer effects are covered. The types of reactions considered include nitrogen fixation, chlorine chemistry, catalysis by transition metal complexes, and catalysis in petroleum refining.

CHM 605 Advanced Analytical Chemistry (3.0); 3 cr. The course focuses on major separation techniques employed in chemistry, and illustrates the methodology applied for treating analytical data. Optimization and qualification of several analytical tools are also discussed. Aspects of instrumentation, data processing and chemometrics are emphasized in each analytical technique discussed.

CHM 606 Chemistry in the Workplace (3.0); 1 cr. This course covers the basic theories of management functions: planning, organizing, leading, and controlling. It explores current issues and challenges in chemical industry, such as increasing effectiveness, developing a strong project, stimulating the application of new research findings, and the appropriate use of resources in goal achievement.

CHM 608 Advanced Inorganic Chemistry (3.0); 3 cr. This course covers the structure of inorganic compounds, the chemistry of coordination compounds and mechanisms of inorganic reactions. Physical methods of determination of the structure of inorganic molecules are addressed. The fundamental concepts of coordination chemistry are developed. Mechanisms of substitution and oxidation-reduction reactions, metal ion catalysis and photochemistry, with the application of symmetry rules are also addressed.

CHM 609 Industrial Chemical Processes (3.0); 3 cr. This course focuses on industrial processes used in converting raw materials into useful industrial products. The course emphasizes on understanding the relationship between natural resources, chemical transformation and industrial waste generation with insights derived from green chemistry.

CHM 612 Green Chemistry (3.0); 3 cr. This course introduces modern approaches to chemical products and processes that reduce or eliminate the use and generation of hazardous substances to human health and the environment. Students are required to participate in discussions as well as in oral presentations about real-cases in green chemistry in a wise and organized manner.

CHM 615 Food Chemistry and Processing (3.0); 3 cr. This course deals with the chemical and physical composition of food substances and additives as well as the relationship between the chemical nature of food and its rheological and sensory properties. It develops the changes taking place during processing and storage of foods as well as the methods of analysis used in the food industry.

CHM 624 Ecotoxicology and Risk Assessment (3.0); 3 cr. This course discusses the effects of chemicals in the environment; their sources, transports, reactions, and fates in the biosphere. It emphasizes the multidisciplinary nature of environmental problems and the role of chemists in identifying, measuring, controlling, and preventing chemical pollution in the environment.

CHM 628 Biosensors (3.0); 3cr. This course introduces the field of biosensors, design and performance analysis. Fundamental applications of biosensor theory, such as recognition, transduction, signal acquisition, and post processing data analysis, are explored. Selected topics from simple biomedical tests to nanofabricated lab-on-a-chip devices are discussed.

CHM 633 Chemistry of Polymers and Their Applications (3.0); 3 cr. This course explores the preparative methods, characterization techniques and application of well-defined polymers in material science, drug delivery and biomedical applications. Physical behavior in solution, thermodynamics, mechanical properties, and statistics of polymers are explored.

CHM 634 Electrochemistry (3.0); 3 cr. This course addresses the fundamentals and applications of electrochemistry. It provides an overview of electrode processes and potentials, thermodynamics of cells, and kinetics of electrode reactions. It discusses electroanalytical and physical electrochemical techniques including potential step methods, potential sweep methods, and hydrodynamic methods.

CHM 635 Surface Chemistry (3.0); 3 cr. This course emphasizes on fundamental concepts of surface chemistry. Considerations of thermodynamics, kinetics, surface structure, electronic structure, catalysis and reactivity will be explored using examples from the current literature.

CHM 641 Petrochemistry (3.0); 3 cr. This course addresses the origin and processing of crude oil, the physical and chemical properties of refined oil, and petrochemicals and their applications. It also covers the market and consumption of petroleum products worldwide.

CHM 645 Principle of Pharmacology (3.0); 3cr. A study of pharmacokinetics and pharmacodynamics of drugs in relationship to dose and time. The principles of drug action and interaction in different systems of the body are discussed through representative substances. *Equivalent to BIO 645.*

CHM 647 Organic Synthesis (3.0); 3 cr. The course involves an extensive survey on molecular structure and application of new synthetic strategies in designing organic material from both mechanistic and synthetic viewpoints. Students learn how to plan the synthesis of complex molecules, the use of protecting groups, as well as reduction, oxidation and alkylation reactions in modern organic chemistry.

CHM 648 Nanoscience and nanomaterials (3.0); 3 cr. This course covers fundamental concepts of a wide array of nanomaterials, such as carbon nanotubes, nanostructured metal and metal oxides /ceramics/ composites, nanowires, quantum dots, nanoclays, functional hybrid nanoparticles, and bio-related and magnetic nanomaterials. Advanced optical and electronic characterization techniques, and their usefulness in nanotechnology and bionanotechnology are described.

CHM 670 Tutorial I; 2 cr. Individual study on a specially selected topic in chemistry directed by a faculty member. Prerequisite: graduate standing and consent of the instructor.

CHM 671 Tutorial II; 3 cr. Individual study on a specially selected topic in chemistry directed by a faculty member. Prerequisite: graduate standing and consent of the instructor.

CHM 673 Analytical Chemistry Laboratory (0.4); 1 cr. This laboratory provides hands-on experience on techniques such as atomic absorption, liquid chromatography, gas chromatography/mass spectrometry, gas chromatography/ nitrogen phosphorus detector and electron capture detector, electrochemistry, Fourier transform infrared spectroscopy. The remainder of the term is devoted to special projects in which students apply what they have learned to solve chemical problems in the laboratory.

CHM 680 Seminar I – Industrial Training; 1 cr. Practical training in industry is required for all students in order to have them gain knowledge and hand-on-experience of various industrial processes.

CHM 681 Seminar II; 1 cr. Oral presentations and discussions by students on selected topics in chemistry in an area of special interest.

CHM 691 Master Thesis I; 3 cr.

CHM 692 Master Thesis II; 3 cr.

Faculty of Nursing and Health Sciences
New - BS in Health Communication

Approved by the BOD on May 29, 2013
Approved by the UC on July 26, 2013

Rationale behind the Suggested Program

Health communication is one of the most exciting and fastest growing disciplines in the field of communication. It is an area that is gaining popularity at a fast pace, mainly because success of healthcare and public health care systems heavily depend on accurate and clear understanding as well as conveying technical medical information/terminology to various audiences, including lay people. Yet, journalists, with no specialization in Health Communication, dominate the Lebanese job market. In Lebanon, a number of universities, AUB, NDU, LAU, USEK and Lebanese University, offer undergraduate degrees in Journalism/Communication while none offer a degree in Health Communication or a minor in Public Health. Though Journalism and health communication both revolve around the process of disseminating information to various audiences, using various types of media, the two programs of study are quite distinct.

Journalism is the field of study that involves the preparation of written, visual, or audio material intended for dissemination of factual, ongoing events of public concern through public media. Similar to journalism, **Health Communication** is a field of communication that entails use of various types of media, newspapers, magazines, online publications and broadcasts, to spread knowledge to public. However, this discipline, compared to journalism, specifically tackles public health problems by describing epidemiological trends of disease /death burden, promoting healthy behavior change and mobilizing institutions and policy makers to reduce disease /death burden. This is achieved through the design, execution and evaluation of impact of health and wellness promotion messages/ materials and health marketing campaigns on reduction of disease/death rates in a population. Health communication also deals with reporting on any health alarms and notifying the public about the best safety practices to take during situations involving risk and crisis. Journalism, as compared to Health Communication, therefore, presents a broader scope in terms of the types of information tackled, usually focusing on news and current events. Journalism also does not deal with influencing public opinion and policy on health care issues by designing, implementing and evaluating impact of interventions on health status of populations.

Changing human behavior is a very challenging task. The supply of health communication specialists, empowered with the required communication skills and health knowledge, is essential to improve population health by influencing individuals to adopt healthier lifestyles as well as promoting policy change. Over the last decade, the need for health communication professionals has been widely accepted and communication for health has become a recognized professional area across a wide range of public and private health providers and implementers of health programs worldwide. The immediate design and launch of programs in health communication seem to be crucial to improving health of populations. NDU opts to be a pioneer institution in starting up such an indispensible program in Lebanon.

Admission Requirements

For Admission requirements to the degree of BS in Health Communication, refer to the section entitled "Undergraduate Admission" of the university catalog.

Graduation Requirements

To receive the degree of BS in Health Communication a student must fulfill all requirements of the degree program, complete all required courses, accumulate a total of 92 credits with an overall grade point average (GPA) of at least 2.0/4.0 and a minimum GPA of 2.3/4.0 in both the core and major

requirements, and clear all accounts with the university. Candidates for degrees are reminded that grades of "l" assigned during the last semester to courses required for graduation will result in delaying of graduation.

Degree Requirements (92 Credits)

General Education Requirements 27 cr.

a) Communications Skills in English and Arabic 9 cr.

- ENL 213 and ENL 223
- One course from ARB 211, ARB 212, ARB 224, ARB 231, ARB 317

b) Philosophy and Religion 6 cr.

- One course from REG 212, REG 213, REG 215, REG 313, REG 314
- One course from COA 360, ENS 205, PHL 311, POS 345

c) Cultural Studies and Social Sciences 6 cr.

- One course from ARP 215, COA 315, COA 359, FAP 215, HUT 305, HUT 306, MUS 210, NTR 215
- One course from BAD 201, ECN 200, ECN 211, ECN 212, PSL 201, SOL 201, SOL 301, SOL 313

d) Citizenship 3 cr.

- One course from COA 350, HIT 211, POS 201, POS 210, POS 240, POS 319, POS 337

e) Science and Technology 3 cr.

- One course from AST 201, BIO 203, CSC 201, GEO 203, ENS 202, HEA 204

Core Requirements 24 cr.

COA 201, COA 252, HEA 210, HEA 214, JOU 210, NHS 203, NTR 210, STA 202

Major Requirements 38 cr.

COA 425, COA362, HEA 310, HEA 314, HEA 320, HEA 330, HEA 430, HEA 434, HEA 480, HEA 490, JOU 310, JOU 323, JOU 350

Free Electives 3 cr.

Undergraduate Courses: Bachelor of Science in Health Communication

COA 201 Mass Media Essentials (3.0); 3 cr. This course focuses on the study of various types of mass media. It surveys the historical, economic, regulatory, and other aspects of the mass media.

COA 252 Public Relations (3.0); 3 cr. History, principles and practices of public relations with emphasis on publicity, public opinion and crisis management. *Prerequisite*: COA 201.

COA 362 Mass Communication Research (3.0); 3 cr. Students will become familiar with research design, data collection analysis, and the various quantitative and qualitative means of measurement of public opinion and hypothesis testing of media-related issues. Students will practice conducting a focus group and interpreting the results. They will write and conduct a questionnaire. A fully formatted, documented research paper incorporating the principles of the course is required. May not be taken concurrently with COA 490. *Prerequisite:* STA 202.

COA 425 Writing and Reporting for the Electronic Media (3.0); 3 cr. Principles and practices of news writing and reporting for the electronic media. Includes an overview of the major forms of writing, news styles, news gathering, and news evaluation.

HEA 210 Introduction to Public Health (3.0); 3 cr. Provides an overview of the field of public health: covers nature and scope of public health, public health principles, analytical methods of public health, determinants of public health (biological, social, and environmental determinants), relationship of the public health system with the overall health care system, public health agencies/ institutions, public health workforce, core functions and public health practice, and public health interventions. The course will host guest speakers and public health practitioners from Lebanon.

HEA 214 Essentials of Human Disease (3.0); 3 cr. Provides students, who have little or no background in the biological sciences, with a basic understanding of the pathogenesis, signs and symptoms, diagnosis, procedures, treatment and prognosis of various common and important diseases and how to identify critical points at which such pathogenesis could either be prevented or interrupted. Infectious, nutritional, metabolic, genetic, and environmental risks and the impact of such risks on various organ systems are thoroughly examined. Students completing this course will acquire a basic understanding of technical medical terminology.

HEA 310 Occupational and Environmental Health (3.0); 3 cr. Provides a basic understanding of occupational and environmental health and its relationship to public health; covers environmental epidemiology, toxicology, risk communication, water, soil, and air quality, food safety, waste disposal, ionizing and non-ionizing radiation, noise pollution, occupational health, the built environment and health, injury prevention and control, environmental policy and regulation, and environmental controversies in public health. Selected cases from Lebanon, Arab region and the Middle East will be highlighted. *Prerequisite*: HEA 210, NHS 203.

HEA 314 Health Marketing and Advertising (3.0); 3 cr. Provides students with a basic understanding of essential concepts, methods, and models of marketing and advertising and how they are being used to increase the effectiveness of public health programs/ interventions. Case studies from diverse health related settings and contemporary trends in health marketing and advertising as well as emerging research areas will also be covered. *Prerequisite*: HEA 210.

HEA 320 Health Behavior (3.0); 3 cr. Provides a comprehensive coverage of frequently used social and behavioral theories at the individual, interpersonal, and community and group levels that guide our understanding of health related behavior and form the basis for health promotion and disease prevention efforts. Examines real life examples of how these theories can be put into practice in health promotion and disease prevention efforts. *Prerequisite*: HEA 210.

HEA 330 Health Communication (3.0); 3 cr. An introductory survey of health communication issues, including patient-provider communication, socio-cultural diversity/context and issues in healthcare, communication within healthcare organizations, media and health, risk and crisis communication, new technologies and health communication, health communication ethics, and health communication research. *Prerequisite*: HEA 320.

HEA 430 Health Writing and Reporting (3.0); 3 cr. Introduces students to basic techniques of health news writing and reporting; they will learn how to write clear, accurate, and audience appropriate health news. The course includes developed discussion regarding various aspects of writing mechanisms and structure and also ties in practical applications to common writing situations found in the healthcare setting. Examples include magazine-style features, communications/promotional pieces, new media content (including blogs), news releases and advocacy pieces. *Prerequisite*: JOU 310; *Corequisite*: HEA 330, COA 425.

HEA 434 Health Campaign Planning: Design & Evaluation (3.0); 3 cr. This course will explore best practices for health campaign design across a variety of media and contexts. Students will be asked to apply theoretical concepts to design clear, accurate, and appropriate health campaign messages for a variety of target audiences and to offer recommendations on evaluation research design. *Prerequisite*: HEA 314, HEA 330.

HEA 480 Practicum in Health Communication (0.3); 2 cr. Students are placed in practicum settings with the health and media organizations. There would be a once-a-week classroom meeting to cover important writing/reporting/communication issues, and the students would spend additional hours each week completing projects for their assigned organizations. *Prerequisite*: HEA 430.

HEA 490 Senior Study in Health Communication (3.0); 3 cr. This course is a synthesis of the major ideas, perspectives, and concepts gained from the study of health communication. It requires students to critically analyze their experiences and integrate knowledge gained throughout the program into a culminating project. Students prepare a final health communication project that could be a publishable article or series of articles on an important health topic, an original research paper on a dimension of health communication, or a multimedia production on a health issue/problem, aimed at a particular audience. *Prerequisite*: HEA 430.

JOU 210 Mass Media Language (3.0); 3 cr. Principles of effective journalistic writing for mass media. Emphasis on writing basic news stories focusing on grammar, structure, and style. *Corequisite*: ARB 212 or ARB 231.

JOU 310 News Writing and Reporting (3.0); 3 cr. This course builds on principles practiced in JOU 210. Emphasis is laid on the process of information gathering, reporting, and writing for the mass media. The course stresses the elements of news, leads, and styles of advanced news stories. Students practice interviewing techniques. *Prerequisite*: JOU 210.

JOU 323 Web Journalism (3.0); 3 cr. Journalism in the Internet age is studied in this course. Blogging, podcasting, and citizen journalism will be examined and practiced. *Prerequisite*: JOU 210.

JOU 350 Investigative Journalism (3.0); 3 cr. Introduction to the different investigative reporting techniques. This course covers the scientific method to connect events with accurate fact-checking, detection of secrets, use of public records and then packaging the whole product. *Prerequisite*: JOU 210.

NHS 203 Principles of Epidemiology (3.0); 3 cr. An integrated course that introduces the basics in Epidemiology and Biostatistics. Topics include population measures of mortality and morbidity, epidemiological study designs and concepts such as sources of bias, confounding and effect measure modification and ethics in clinical trials and research. Methods of presenting health-related data, probability models and assessment of causal associations and differences are also covered. Special attention is given to the Lebanese context.

NTR 210 Human Nutrition (3.0); 3 cr. Study of macro- and micro-nutrients and their roles in the body, as well as the nutritional needs of an individual throughout the lifespan. *Passing grade: C*

STA 202 Statistics for Humanities (3.0); 3 cr. This course is designed to introduce students of the humanities to the most important basic statistical techniques used in their field of research, and to the SPSS software package. The course material covers data collection, organization and graphing; describing distributions: scores, central tendency, and variation; sampling and probability distributions; estimation and hypothesis testing; chi-square test; correlation; analysis of variance. The associated computer lab sessions allow the students to apply the methods learned to data sets and interpret findings.

Bachelor of Science in Health Communication
Suggested Program (92 Credits)

Fall Semester I (15 Credits)

COA	201	Mass Media Essentials	3 cr.
HEA	210	Introduction to Public Health	3 cr.
NHS	203	Principles of Epidemiology	3 cr.
ENL	213	Sophomore English Rhetoric (GER)	3 cr.
ARB	---	GER	3 cr.

Spring Semester I (15 Credits)

COA	252	Public Relations	3 cr.
HEA	214	Essentials of Human Disease	3 cr.
JOU	210	Mass Media Language	3 cr.
ENL	223	Communication Arts (GER)	3 cr.
NTR	210	Human Nutrition	3 cr.

Fall Semester II (15 Credits)

HEA	310	Occupational and Environmental Health	3 cr.
HEA	320	Health Behavior	3 cr.
JOU	310	News Writing and Reporting	3 cr.
STA	202	Statistics for Humanities	3 cr.
____	____	GER	3 cr.

Spring Semester II (18 Credits)

COA	362	Mass Communication Research	3 cr.
HEA	314	Health Marketing and Advertising	3 cr.
HEA	330	Health Communication	3 cr.
JOU	323	Web Journalism	3 cr.
____	____	GER	3 cr.
____	____	GER	3 cr.

Fall Semester III (15 Credits)

COA	425	Writing and Reporting for the Electronic Media	3 cr.
HEA	430	Health Writing and Reporting	3 cr.
JOU	350	Investigative Journalism	3 cr.
REG	----	GER	3 cr.
____	____	GER	3 cr.

Spring Semester III (14 Credits)

HEA	434	Health Campaign Planning: Design & Evaluation	3 cr.
HEA	480	Practicum in Health Communication	2 cr.
HEA	490	Senior Study in Health Communication	3 cr.
____	____	GER	3 cr.
---	---	Free Elective	3 cr.

Faculty of Nursing and Health Sciences
New Major - BS in Nutrition Business

Approved by the BOD on May 29, 2013
Approved by the UC on July 26, 2013

Support Facilities

1- Nutrition lab
2- Biology lab facilities
3- Chemistry laboratory facilities
4- Library resources including a rich collection of print and electronic resources in the Sciences, including books, journals, online databases, DVDs etc.

The Degree of Bachelor of Science in Nutrition Business

Rationale behind the Suggested Program

Similar to other professions, Nutrition and Dietetics is widening its spectrum of careers into almost all other lines of work. It is becoming a common component of radio and television programs, magazines and newspapers, ministries, food processing industry, and others. In addition, the professional career of graduates is no longer limited to opening a clinic or working as dieticians in a hospital, but is rather broadened in scope to include establishing, or working for, businesses like diet centers, restaurants or catering companies offering healthy cuisine. Graduates are also working in industries involved in the development, production, and promotion of, among others, disorders-related nutritional food products (diabetes, celiac disease…), sports supplements, and synthetic micronutrients supplements (vitamin and minerals, amino acids, antioxidants,…). Therefore, the dietetics component of the degree needs to be substituted by basic business courses to equip the graduates with the minimum background to perform well in the industry and be able to start his or her own business.

Admission Requirements

For Admission requirements to the degree of BS in Business Nutrition, refer to the section entitled "Undergraduate Admission" of the university catalog.

Graduation Requirements

To receive the degree of BS in Nutrition Business, a student must fulfill all requirements of the degree program, complete all required courses, accumulate a total of 92 credits with an overall grade point average (GPA) of at least 2.0/4.0 and a minimum GPA of 2.0/4.0 in both the core and major requirements, and clear all accounts with the university. Candidates for degrees are reminded that grades of "I" assigned during the last semester to courses required for graduation will result in delaying of graduation.

Degree Requirements (92 Credits)

General Education Requirements 27 cr.

a) Communications Skills in English and Arabic 9 cr.

- Two courses from the subcategory English (6 cr.) ENL 213 and ENL 223 or ENL 230
- One course from the subcategory Arabic (3 cr.) ARB 211, ARB 212, ARB 224, ARB 231, ARB 317

b) Philosophy and Religion 6 cr.

- One course from the subcategory **Religion** (3 cr.) REG 212, REG 213, REG 313, REG 314
- One course from the subcategory **Philosophy** (3 cr.) ENS 205, PHL 211, PHL 311, POS 345

c) Cultural Studies and Social Sciences 6 cr.

- One course from the subcategory **Cultural Studies (3 cr.):** HUT 305, HUT 306, MUS 210, FAP 215, COA 359, COA 315, NTR 215, ARP 215

Social Sciences (3 cr.): ECN 200

d) Citizenship 3 cr.

One course from HIT 211, POS 201, POS 210, POS 240, IAF 301, POS 319, POS 337

e) Science and Technology 3 cr.

CSC 201, MAT 201, MAT 202, MAT 204, MAT 211, STA 202, STA 210, HEA 204.

Core Requirements 18 cr.

CHM 205, CHM 213, NHS 203, NHS 205, MIS 310, BAD 201

Major Requirements 44 cr.

NTR 210, NTR 313, NTR 320, NTR 330, NTR 335, NTR 425, NTR 435, NTR 450, NTR 495, MRK 201, MRK 215, BAD 321, ACO 201, BAD 429, MAT 205.

Free Electives 3 cr.

Undergraduate Courses: Bachelor of Science in Nutrition Business

ACO 201 Principles of Accounting I (3.0); 3 cr. Introduction to the basic principles, concepts, and techniques of financial accounting. Explanation of the basic techniques of measuring, classifying, summarizing, reporting, and interpreting financial information. The passing grade for this course is "C".

BAD 201 Fundamentals of Management (3.0); 3 cr. An introduction to the basic elements of the managerial process and the basic theories of management. Topics covered include: management objectives; organizational structure; material and human resource utilization; human relations; decision making, planning, organizing, staffing, directing, and controlling.

BAD 321 Managing a Small Business (3.0); 3 cr. Procedures and techniques needed to start-up, purchase and manage a small firm. Emphasis on the differences between small and large firm environments and problems. Topics covered include: franchising; market research; site selection; sales and advertising; pricing and credit policies; managing human resources; financial planning; accounting and budgeting. Prerequisite: Junior Standing.

BAD 429 Operations Management (3.0); 3 cr. Introduction to the concepts, techniques and methodology of modern operations management. Topics covered include: forecasting; production planning and scheduling; facility location and layout; quality control; productivity; inventory systems; process design; maintenance and reliability. Prerequisite: Senior Standing.

CHM 205 – Basic Chemistry, 3 credits (3.0). This course provides a contemporary introduction to the basic principles in chemistry. It covers the principles of elements, atoms, and molecules, their physical changes, chemical reactivity, and electronic structure. It develops an understanding of bonding and structure, in addition to naming various compounds. Applications concerning quantitative composition of compounds, stoichiometric calculations, limiting reagent, and reaction yield are practiced in this course. The different states of matter are covered with the emphasis on the gas laws and the kinetic molecular theory of gases, and the colligative properties in the liquid state. Finally, acids and bases, titration, and buffers are discussed in the context of chemical equilibrium.

CHM 213 Basic Organic Chemistry (3.0) 3 cr. This course provides a brief overview to basic principles in Organic Chemistry including the nomenclature, structure, synthesis and reaction of the main function groups of organic compounds. *Prerequisite*: CHM 205 or CHM 211.

ECN 200 Survey of Economics (3.0); 3 cr. Survey of microeconomics and macroeconomics principles for non-Business Administration students. Students cannot receive credit for both ECN 200 and ECN 211 or ECN 212.

NHS 203 Principles of Epidemiology (3.0); 3 cr. An integrated course that introduces the basics in Epidemiology and Biostatistics. Topics include population measures of mortality and morbidity, epidemiological study designs and concepts such as sources of bias, confounding and effect measure modification and ethics in clinical trials and research. Methods of presenting health-related data, probability models and assessment of causal associations and differences are also covered. Special attention is given to the Lebanese context.

NHS 205 Physiology for Nursing & Allied Health Professions (3.0); 3 cr. Provides an understanding of the basic principles of human body's functioning under normal healthy conditions necessary for nursing and allied health professions' students. It outlines principles of physiology along with a survey of various body systems (homeostasis; metabolism; nervous, muscular, cardiovascular, respiratory, gastrointestinal, renal, reproductive and endocrine systems). It serves as a foundation for the clinical topics covered in health sciences programs.

NTR 210 Human Nutrition (3.0); 3 cr. Study of macro- and micro-nutrients and their roles in the body, as well as the nutritional needs of an individual throughout the lifespan. *Passing grade for majors: C*

NTR 313 Foodservice Management (3.0); 3 cr. The course focuses on planning and service of safe, nutritionally balanced meals within budgetary margins as well as technical operations in a foodservice system. It includes regulations and standards, and the basics of total quality management in health care and other institutions. Prerequisite: NTR 201 or NTR 210. *Passing grade for majors: C*

NTR 320 Food Chemistry (2.0); 2 cr. Covers chemical composition, physical and sensory properties of foods. Focuses on the structural considerations of food components (water in foods, lipids, carbohydrates and proteins), chemicals in foods, browning reactions and flavor of foods. *Prerequisite:* CHM 213.

NTR 330 Community Nutrition (3.0); 3 cr. Focuses on community nutrition education programs in schools, health centers, government institutions, and mass media. Emphasis on current research in assessing community nutrition program needs as well as program implementation. *Prerequisite:* NTR 201 or NTR 210. *Passing grade for majors: C*

NTR 335 Sports Nutrition (3.0); 3 cr. In-depth coverage of both nutrition and exercise physiology while delivering practical, applied information useful to provide dietary and training guidelines for different kinds of sports. *Prerequisite*: (NTR 201 or NTR 210), and (BIO 215 or NHS 205)

NTR 425 Food Processing (2.2); 3 cr. Covers the changes in basic constituents of foods (carbohydrates, lipids, proteins, vitamins, minerals, food enzymes, and water) resulting from processing and preparation. Focuses on the principles of food spoilage and food preservation, and the different laboratory methods of food processing. *Prerequisite:* NTR 320.

NTR 435 Nutrition in the Life Cycle (3.0); 3 cr. Covers the basic nutritional needs of people throughout their life cycle (infancy, childhood, adolescence, adulthood and elderly people) and the special nutritional requirements during pregnancy and lactation. *Prerequisite:* NTR 430. NTR 201 Or NTR 210), and (NHS 205 Or BIO 215). *Passing grade for majors: C*

NTR 450 Dietetics Counseling and Communication (3.0); 3 cr. Application of the principles of dietetics counseling in hospital and clinical settings. Focuses on the techniques of behavior modification, counseling, and dietary intake evaluation. Emphasis on the team concept of patient care and strategies for promoting change in nutritional education. *Prerequisite:* Advisor's approval. *Passing grade for majors: C*

NTR 495 Project in Nutrition; 3 cr. Emphasizes current research in nutrition and dietetics. *Prerequisite:* Senior standing and consent of instructor.

MAT 205 Mathematics for Business and Economics II (3.0); 3 cr. Sequences; arithmetic and geometric progression. Simple interest; compound interest. Continuous compounding; annuities; amortization and sinking funds. Bonds and stocks. Capital budgeting and depreciation. Prerequisite: Sophomore Standing. Accumulation and discounting, simple and compound interest, effective and nominal interest, discount rates, forces of interest and discount, varying interest. Equations of value. Annuities immediate and due. Perpetuities. Amortization schedules and sinking funds. Introduction to bonds. Prerequisite: Sophomore Standing.

MIS 310 Business Information Systems (3.0); 3 cr. The course will prepare students to learn ways that organizations improve their business practices through the use of computer technology. It introduces the fundamentals of information technology as well as the current and future challenges resulting from those technologies in businesses. Topics covered include databases, competitive advantage using information systems, internet technologies, IT security, and introduction to the concepts of enterprise resource planning systems (ERP), customer relationship management systems (CRM), and supply chain management systems (SCM).

MRK 201 Fundamentals of Marketing (3.0); 3 cr. Introduction to the marketing process in social, economic, and legal environments. Topics covered include: consumer and institutional behavior patterns; market segmentation; product and service development; pricing strategy and promotion; channels of distribution; retailing and wholesaling; marketing research.

MRK 215 Fundamentals of Purchasing (3.0); 3 cr.; This course is designed to present the purchasing process as it relates to such topics as inventory control, price determination, vendor selection, negotiation techniques, and ethical issues. The focus of the course will be on the role and function of purchasing in the Logistics Management Process. *Prerequisite*: MRK 201.

Bachelor of Science in Nutrition Business
Suggested Program (92 Credits)

Fall Semester I (15 Credits)

CHM	205	Basic Chemistry	3 cr.
ENL	213	Sophomore English Rhetoric (GER)	3 cr.
NTR	210	Human Nutrition	3 cr.
ACO	201	Principles of Accounting I	3 cr.
MRK	201	Fundamentals of Marketing	3 cr.

Spring Semester I (15 Credits)

NHS	205	Physiology for Nursing & Allied Health Professions	3 cr.
CHM	213	Basic Organic Chemistry	3 cr.
ENL	223/230	English in the Work Place (GER)	3 cr.
MRK	215	Fundamentals of Purchasing	3 cr.
NTR	330	Community Nutrition	3 cr.

Fall Semester II (17 Credits)

NHS	203	Principles of Epidemiology	3 cr.
MAT	205	Mathematics for Business and Economics II	3 cr.
NTR	320	Food chemistry	2 cr.
BAD	201	Fundamentals of Management	3 cr.
____	____	GER	3 cr.
____	____	GER	3 cr.

Spring Semester II (15 Credits)

ECN	200	Survey of Economics (GER)	3 cr.
MIS	310	Business Information System	3 cr.
NTR	313	Foodservice Management	3 cr.
BAD	321	Managing a Small Business	3 cr.
____	____	GER	3 cr.

Fall Semester III (15 Credits)

NTR	335	Sports Nutrition	3 cr.
NTR	435	Nutrition in the Life Cycle	3 cr..
NTR	495	Project in Nutrition	3 cr.
NTR	450	Counseling and Communication Skills	3 cr.
____	____	GER	3 cr.

Spring Semester III (15 Credits)

BAD	429	Operations Management	3 cr.
NTR	425	Food Processing	3 cr.
____	____	GER	3 cr.
____	____	GER	3 cr.
____	____	Free Elective	3 cr.

Faculty of Nursing & Health Sciences
New - Minor in Nutrition

Approved by the BOD on April 10, 2013
Approved by the UC on July 26, 2013

Rationale:
Nutrition is the study of food quality and intake influence on health and well-being. The Minor in Nutrition covers the composition of food, specific nutrients' requirements in the diet, their physiological functions in the body and the consequences of food processing and nutrients deficiency.
The Minor in Nutrition is generally open to students majoring in Nursing, Medical Lab Technology, Biology, Chemistry, Hospitality Management and other business majors, Physical Education, Education, Psychology, and Communication Arts (Radio-TV).

FNAS & FNHS: The study of nutrition explores the role of diet in the causation of diseases of multi-factorial origin, such as heart disease, diabetes and cancer. The importance of nutrition in preventing diseases has now become well recognized in both developing and developed countries. Therefore, students majoring in Biology, Chemistry, Nursing, and Medical Lab Technology will find in a minor in Nutrition a fundamental support for their future academic and/or professional plan.

FBAE: Food and beverage industries, the main industrial sector in Lebanon, are urged to innovate in developing products for the Lebanese and international health-conscious consumer. National and international trends in food habits, food safety and nutritional awareness set the way for more and more demand for ready-to-eat, yet nutritious meals and a safe hospitality setting. For students in the Faculty of Business Administration and Economics, Hospitality Management employers would deeply value graduate holding a minor in Nutrition, a value-added knowledge that has been confirmed to be essential in this business whereby future menus will carry nutrition facts with abstracted analysis of the meal nutrients. Other Business Administration students heading to join food and beverage industries will enjoy a competitive leverage with a minor in Nutrition.

FH: Recreational centers and nutritional concepts have recently become two faces for the same coin. Nutrition has been identified as one of the main areas to be adopted in sport teams, gyms, and professional training programs for athletes. Physical education students should indispensably aim at acquiring the foundational knowledge pertaining to Nutrition through the proposed minor.
Nutrition is gaining ground in K 12 school programs, whereby students majoring in education would significantly enrich their curriculum vitae with a minor in Nutrition. Eating disorders have become a major threat in the present society. Their prevalence is dramatically on the rise and their psychological consequences are not to be taken too lightly. Treatment of cases may last from five to ten years with a very high rate of reoccurrence, and a team of professionals, including a nutritionist/dietician and a psychologist, is needed for optimal management. Psychology students, therefore, would find a minor in Nutrition a powerful tool for their career.

Rules and regulations:

- All the general rules and regulations for minors at NDU apply.
- Number of credits for the minor: 15 cr.
- Courses to be completed (see below course description as per Catalog 2012-2013):
  1. NTR 201 (Basic Human Nutrition; 3cr), Or NTR 210 (Human Nutrition; 3 cr.)
  2. NHS 205 (Physiology for Nursing & Allied Health Professions; 3 cr.)
  3. Choose one of the following:
     a. NTR 313 (Foodservice management; 3 cr.);

b. NTR 335 (Sports Nutrition; 3cr.);
c. NTR 450 (Dietetics Counseling and Communication; 3 cr.)

4. NTR 330 (Community Nutrition; 3 cr.)
5. NTR 435 (Nutrition in the Life Cycle; 3 cr.)

NTR 201 Basic Human Nutrition (3.0); 3cr. An introduction to the study of carbohydrates, fats, proteins, vitamins and minerals and their effects on health. An overview of the processes of digestion, absorption and their metabolism. Prerequisite: Sophomore Standing and ENL 105. Not open to students who take NTR 101.

NTR 210 Human Nutrition (3.0); 3 cr. Study of macro- and micro-nutrients and their roles in the body, as well as the nutritional needs of an individual throughout the lifespan. Passing grade for majors: C

NTR 313 Foodservice Management (3.0); 3 cr. The course focuses on planning and service of safe, nutritionally balanced meals within budgetary margins as well as technical operations in a foodservice system. It includes regulations and standards, and the basics of total quality management in health care and other institutions. Prerequisite: NTR 201 or NTR 210. Passing grade for majors: C

NTR 330 Community Nutrition (3.0); 3 cr. Focuses on community nutrition education programs in schools, health centers, government institutions, and mass media. Emphasis on current research in assessing community nutrition program needs as well as program implementation. Prerequisite: NTR 201 or NTR 210. Passing grade for majors: C

NTR 335 Sports Nutrition (3.0); 3 cr. In-depth coverage of both nutrition and exercise physiology while delivering practical, applied information useful to provide dietary and training guidelines for different kinds of sports. Prerequisite: (NTR 201 or NTR 210), and (BIO 215 or NHS 205)

NTR 435 Nutrition in the Life Cycle (3.0); 3 cr. Covers the basic nutritional needs of people throughout their life cycle (infancy, childhood, adolescence, adulthood and elderly people) and the special nutritional requirements during pregnancy and lactation. Prerequisite: (NTR 201 Or NTR 210), and (NHS 205 Or BIO 215). Passing grade for majors: C

NTR 450 Dietetics Counseling and Communication (3.0); 3 cr. Application of the principles of dietetics counseling in hospital and clinical settings. Focuses on the techniques of behavior modification, counseling and dietary intake evaluation. Emphasis on the team concept of patient care and strategies for promoting change in nutritional education. Prerequisite: Advisor's approval. Passing grade for majors: C

NTR 470 Dietetics Counseling and Communication Lab (1.0); 1 cr. Covers anthropometric measures techniques and dietary intake evaluation and computations as well as individualized practical nutritional evaluation and dietary intervention of a selected patient. Corequisite: NTR 450.

NHS 205 Physiology for Nursing & Allied Health Professions (3.0); 3 cr. Provides an understanding of the basic principles of human body's functioning under normal healthy conditions necessary for nursing and allied health professions' students. It outlines principles of physiology along with a survey of various body systems (homeostasis; metabolism; nervous, muscular, cardiovascular, respiratory, gastrointestinal, renal, reproductive and endocrine systems). It serves as a foundation for the clinical topics covered in health sciences programs.

Social Media Policy and Guidelines

Approved by the BOD on February 6, 2013

1. Introduction

1.1 Rationale

Notre Dame University-Louaize (NDU) acknowledges the great importance of social media in every aspect of life in the twenty-first century, including that of academia. Thus, NDU felt it necessary to benefit from available technology and organize technology usage in a way that is conducive to the quality education the University provides its students, while better fulfilling the mission of the University and improving its image and interaction with community members, the wider community, and the world at large.

Accordingly, NDU will provide access to social media websites to all members of its community: students, faculty, and staff. However, NDU also acknowledges the risks involved in such a strategy and thus, the aim of this policy is to organize and regulate the usage of social media as related to the University in a way that clarifies guidelines and responsibilities, reduces the risks of abuse, and maximizes educational benefits.

1.2 Definition

As used in this policy, the term social media refers to any web-based and/or mobile-based technologies that allow the creation and exchange of user-generated content used to foster communication in the form of interactive dialogue among organizations, communities, and individuals. Examples of these include, but are not limited to, Facebook, Twitter, YouTube, Flickr, Linkedin, Skype, MySpace, and Google+.

1.3 Scope

This policy and its guidelines apply to any form of usage of the University's network or the University's brand (image, logo, related names of departments, clubs, individuals, etc.) whether this usage takes place through the University's facilities or from any remote (off-campus) location.

This policy and its guidelines, while noting the different dimensions explicitly specified when needed, apply to both individual and to institutional or group voices/actions.

Under this policy, individuals are accountable to the University Bylaws and relevant authorities for all of their actions as if these actions are committed in person and on University grounds.

1.4 Enforcement

The University considers the violation of this policy in any way a significant offence and reserves the right to disconnect and/or suspend violators. Violators will be subject to disciplinary measures.

1.5 Training

The Division of Computing Services (DCS) will provide regular training sessions for those who would like to learn how to use social media tools for educational purposes.

2. Individual Usage

2.1 Access

Access to social media websites will be granted to all NDU community members (students, faculty, and staff). However, the DCS reserves the right to take necessary measures to ensure the security and optimal usage of the available Internet bandwidth capacity.

Implementation guidelines

1. Access to social media is automatic; no application is necessary.
2. The DCS will inform all members if and when overuse issues occur and recommend potential options for remaining within the capacity limitations.
3. Any problems which cannot be solved to the mutual satisfaction of all parties concerned will be referred to the appropriate University committee.

2.2 Individual Performance

With access to social media websites, individuals are responsible for using this resource to connect, collaborate, and communicate with other members of the NDU community as a form of responsible expression and for the sake of exchanging responsible and meaningful ideas and information that are beneficial to their academic performance and the academic process at the University in general. Individuals take full responsibility for any usage that may be deemed damaging to their academic performance.

Implementation guidelines

While using social media in any way related to NDU, users must abide by the following:

1. Comply with all Lebanese laws, University Bylaws, rules and policies, and all contracts, licenses, and disclaimers, whenever applicable.
2. Respect the privacy of other users and their accounts, regardless of whether or not those accounts are securely protected.
3. Respect the finite capacity of the available resources and limit use to the extent needed, so as not to consume an unreasonable amount of resources or to interfere unreasonably with the activity of other users.
4. Refrain from using resources for commercial purposes, personal financial gain, or other illegitimate benefits.
5. Balance freedom of expression when using social media with recipients' sensitivities regarding potentially offensive material.
6. Comply with copyright laws in the use, distribution, or reproduction of copyrighted materials, including but not limited to music or video files.
7. Understand that any information put on the web becomes public and is no longer retrievable; therefore, users must not post any information they do not want made public.
8. Adhere to established international guidelines when conducting human-subject research via social media.

2.3 Abuse and Duty to Report

Every individual (student, staff and faculty) has the duty to preserve the integrity and reputation of the University by abstaining from any abuse of the benefits the system provides and also by reporting any encountered violations or abuse.

Implementation guidelines

1. Individuals should be aware that the freedoms entailed with the use of social media are protected by the University's mandate to promote scientific research and creative work.
2. Potential abuse related to copyright infringements and content deemed offensive to individual members of the University or the institution as a whole will be balanced by the need to promote freedom of expression and a free flow of ideas.

3. Individuals will be held accountable for abuse of social media, failure to report such abuse by others, and the exaggerated use of the anti-abuse policy.

3. Institutional Usage

3.1 Departments and Offices

Every department, office or center at NDU is encouraged to use social media as a tool to improve interaction with its members and target audience in a way that improves outcomes and boosts the academic process.

Implementation guidelines

1. Department and/or office social media account administrators are to treat all accounts related to or associated with NDU as a workplace; therefore, all actions and interactions are governed by the standing University Bylaws, rules, and regulations.
2. The level at which accounts are administered and monitored must be in accordance with the established University hierarchy.
3. When opening a social media account, the appropriate NDU e-mail address *should* be used. Personal e-mails should not be used to open social media accounts for departments and/or offices. Communication on behalf of the department and/or office should take place through the professional account linked to the NDU e-mail.
4. The names of all accounts should be in accordance with the official department and/or office names as well as the official names and titles of the administrators.
5. Any problem, conflict, or mistake must be addressed at the appropriate level according to the established University hierarchy.
6. Any problem, conflict, or mistake must be resolved between the monitor and administrator before corrective action is taken. Corrective action is to be taken only by the account administrator.
7. Each department and/or office must take steps to ensure their faculty and staff members are informed of the social media policy and guidelines.
8. A department and/or office social media account administrator should apply the necessary privacy settings to prevent inappropriate content being posted by non-administrators.

3.1.1 Approval

Approval for opening social media accounts as well as the duty of monitoring them is to be handled at the lowest possible administrative levels. Accountability for any mistakes is also to be dealt with at the same level and according to the standing University Bylaws, rules, and regulations.

Official University accounts (mother account for the entire University) are to be approved and monitored by the Office of Public Relations, which may employ professional staff for the job.

3.1.2 Administration

The administration of the social media account will be managed similarly to other functions according to the existing administrative set up. Every account needs to be administered by two University employees, clearly defined and identified.

Implementation guidelines

When using the institutional accounts, administrators must abide by individual usage guidelines in addition to the following:

1. Department and/or office social media account administrators are to treat all accounts related to or associated with NDU as a workplace; therefore, all actions and interactions are governed by the standing University Bylaws, rules, and regulations.
2. The names of all accounts should be in accordance with the official department and/or office names as well as the official names and titles of the administrators.
3. Each department and/or office must take steps to ensure their faculty and staff members are informed of the social media policy and guidelines.
4. A department and/or office social media account administrator should apply the necessary privacy settings to prevent inappropriate content being posted by non-administrators.
5. Clearly identify themselves to the public using their formal official names and titles.
6. Clearly distinguish and separate between their institutional voice and personal voice by using two different accounts or posting a disclaimer whenever making personal comments so that the readers will not associate the person and his/her writings with the institution he/she is part of.
7. Assume at all times that they are representing NDU.
8. Abide by the formatting and naming guidelines set by the University.
9. Update the account frequently with information, news, and material related to functions and activities of their related department or office as considered useful to recipients.
10. Check the account frequently and respond to posts since social media platforms are aimed at two-way communication with an audience.
11. Link all accounts to the official University account.
12. The level at which accounts are administered and monitored must be in accordance with the established University hierarchy.
13. When opening a social media account, the appropriate NDU e-mail address *should* be used. Personal e-mails should not be used to open social media accounts for departments and/or offices. Communication on behalf of the department and/or office should take place through the professional account linked to the NDU e-mail.
14. Any problem, conflict, or mistake must be addressed at the appropriate level according to the established University hierarchy.
15. Any problem, conflict, or mistake must be resolved between the monitor and administrator before corrective action is taken. Corrective action is to be taken only by the account administrator.

3.2 Student Union and Student Clubs

Student bodies and entities are regulated by University Bylaws and policies and this is extended to any social media accounts that they may operate. Furthermore, the entity as a whole will be held responsible for any violations, abuse, or unauthorized usage that may happen on their accounts if the account administrators fail to take the necessary measures to rectify it.

Student Union accounts and club accounts have to be linked to and monitored by the relevant Student Affairs Office (SAO) administrators. The SAO will designate an individual who is to be included as co-administrator of the account.

Implementation guidelines

1. Every club or society at NDU can open an official account on any of the social media websites (e.g. Facebook, YouTube, etc.). The social media account's name should include the club's name, the word "NDU" or "Notre Dame University", and the word "official", for example "IEEE NDU-Official", "Notre Dame University Accounting Club-Official".
2. To open an official social media account, a club/society president should have the approval of the club advisor and the SAO.
3. The club/society president and advisor, as well as an SAO designated individual, should all be administrators of the account. The club/society advisor and the club president are active administrators, i.e. they are responsible for posting and approving information on the social media

accounts of the club/society. The SAO shall act as a non-active administrator, only monitoring the activities on the account. Any discrepancies will be handled by the University Student Affairs Committee (USAC), SAO, and club advisor.

4. The club/society accounts should be linked to the main NDU social media account if applicable.
5. The club/society as a whole will be held responsible for any violations, abuse, or unauthorized usage (e.g. accepting posts of a partisan or sexually explicit nature, plagiarism, or false information) that may happen on their social media accounts if the account administrators fail to take the necessary corrective measures.
6. If a club/society already has a social media account, it needs to notify the SAO and conform to the above-mentioned guidelines.

3.3 Faculty Members

3.3.1 Course Usage

Faculty members are encouraged to use social media in their courses to improve interaction and communication with the students, whether inside the classroom or remotely.

3.3.2 Personal Accounts

Faculty members must separate their personal accounts from the professional account they use for work-related matters. This will limit confusion for students and limit the student-teacher relationship from becoming too personal such that the relationship is detrimental to the academic process.

Implementation guidelines

To open a course account, faculty members should have the approval of the chairperson of their relevant departments, and include the chairperson or the person he/she designates as a co-administrator of that account.

Course accounts should be linked to Department accounts.

While using social media, faculty members should abide by the individual and institutional usage guidelines.

In addition, faculty members are never to consider social media as a formal way of communicating with students and passing on information to them. Social media is a support tool that does not and should not replace formal communication tools accepted by the University (Blackboard, NDU Webmail, official memos).

1. Social media usage for courses is an informal communication medium. The official media of communication are restricted to formal communication tools accepted by the University (e.g. Blackboard, NDU Webmail, official memos, etc.).
2. Faculty members are never to consider social media as a formal way of communicating with students and passing on the information to them. In addition, faculty members will not tolerate any excuses that course related announcements have not been posted on the course's social media accounts.
3. To open a course account, faculty members should have the approval of the chairperson of their relevant department.
4. The course instructor, course coordinator, and department chairperson should all be administrators of the account. The course instructor is an active administrator, i.e. he/she is responsible for posting and approving information on the social media accounts of the course. The course coordinator and department chairperson shall act as non-active administrators, only monitoring activities on the account. Any discrepancies will be handled between them and the instructor.

5. If a department opens its own social media account, then all courses of the department must be linked to that account if applicable.
6. Faculty members are encouraged to separate their personal accounts from the professional account they use for work related matters. This will limit confusion for the students and also limit the student-teacher relationship from becoming inappropriately personal in way that is detrimental to the academic process.
7. If a course already has a social media account, the instructor needs to notify the related department and conform to the above-mentioned guidelines.

3.4 University Staff

University staff and employees are strictly to refrain from using social media during working hours for any personal purpose or in any way that may be detrimental to their professional performance. Staff may use social media only when they are assigned an institutional task which requires that they do so.

While using social media institutionally at any time, whether within or outside working hours, staff members must abide by individual and institutional usage guidelines.

Implementation guidelines

1. University staff/employees are to use social media only when they are assigned an institutional task which requires that they do so (e.g. managing the department's social media accounts).
2. University staff/employees are to strictly refrain from using social media for personal use during working hours.
3. University staff/employees must separate their personal accounts from the professional account that they use for work-related matters.