

**Notre Dame University
Faculty of Engineering
Mechanical Engineering Department**

Annual Report

Academic Year 2010-2011

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1. Introduction

The Mechanical Engineering Department at Notre Dame University, Lebanon, is striving to graduate mechanical engineers able to cope with all challenging issues that normal engineers may face in nowadays societies. The challenges are not only technical, for which our graduates are well prepared, but also societal and, in this respect, ME graduates have the luggage necessary to help them move forward. To achieve its goals, the ME program at NDU involves a balance between not only theoretical and practical issues, but also between technical and non-technical or cultural aspects.

ME students at NDU are served by a group of devoted faculty members, both full-timers and part-timers, spending their time to guide them in all their expectations. Moreover, the university offers them state-of-the-art laboratories, which are under continuous upgrade. The program is also continuously updated to include the latest ideas related to engineering education in order to offer an up-to-date degree in mechanical engineering.

The latest development of the ME major concerns the opening of a new branch at North Lebanon Campus. Students can be directly admitted to the ME major at NLC and will follow a parallel program with the same rules and regulations. Currently, most of full-time faculty members at the main campus are making the shuttle to the NLC twice per week in order to teach MEN courses up to the same standards as adopted at the main campus.

2. Personnel

2.1 Full-Time Faculty

- **Walid Assaf**, Professor Emeritus, Ph.D., Nuclear Engineering, 1965, Iowa State University (USA). *Areas of interest:* Thermodynamics, Energy, Prime Movers.
- **Michel El Hayek**, Associate Professor & Chairperson, Docteur Européen, Sciences Appliquées, 1997, Faculté Polytechniques de Mons (Belgium). *Areas of interest:* Fluid Mechanics, Thermal Sciences, Numerical Techniques.
- **Ghazi Asmar**, Associate Professor, Ph.D., Mechanical and Aerospace Engineering, 1997, University of Missouri, Columbia (USA). *Areas of interest:* Mechanics of Materials, Vibrations, Numerical Techniques.
- **Francis Francis**, Assistant Professor, Ph.D., Mechanical and Manufacturing Engineering, 2003, University of New South Wales (Australia). *Areas of interest:* Materials Science, Engineering Mechanics, Manufacturing.
- **Najib Metni**, Assistant Professor, Docteur, Automatique et Traitement du Signal et des Images, 2006, Université de Nice, Sophia-Antipolis (France). *Areas of interest:* Control, Mechatronics, Robotics.
- **Charbel Bou Mosleh**, Assistant Professor, Ph.D., Aerospace Engineering Sciences, 2005, University of Colorado at Boulder (USA). *Areas of interest:* Fluid Mechanics, Thermodynamics, Numerical Techniques.

- **Marwan Azzi**, Assistant Professor, Ph.D., Materials Engineering, 2008, McGill University (Canada). *Areas of interest*: Materials Sciences, Manufacturing, Mechanics of Materials.

2.2 Part-Time Faculty

- **Tony Jabbour**, Ph.D., Mechanical Engineering, 1998, Ecole Polytechnique de Montréal (Canada). *Areas of interest*: Mechanical Design, Machinery, CAD/CAM.
- **Ali Hammoud**, Ph.D., Mechanical Engineering, 1990, University of Wales, Swansea (UK). *Areas of interest*: Applied Fluid Mechanics, HVAC.
- **Chady Azoury**, Doctorat, 2004, Université Paul Sabatier - Toulouse (France). *Areas of interest*: Engineering Mechanics, Drafting.
- **Souhail Matar**, Ph.D., Mechanical Engineering, 1997, Byelorussian Polytechnic Academy (Belarus). *Areas of interest*: Internal Combustion Engines, Machinery.
- **Georges Challita**, Doctorat, Mechanical Engineering, 2009, Ecole Centrale de Nantes (France). *Areas of interest*: Mechanics of Materials, Vibrations.
- **Rayan Slim**, Doctorat, 2007, Ecole des Mines de Paris (France). *Areas of interest*: Thermodynamics, Energy.

2.3 Full-Time Co-Academics

- **Wissam Daou**, B.E., Mechanical Engineering, 2000, Notre Dame University (Lebanon), Laboratory Assisatnt.

2.4 Part-Time Co-Academics

- Sylvie Melki, B.E., Mechanical Engineering, 2009, Notre Dame University (Lebanon).

2.5 Full-Time Non Academics

- **Fady Awad**, Laboratory Technician.
- **Ghada Khoury**, Secretary.

2.5 Promotions & Faculty Development

- Dr. Charbel Bou Mosleh has been appointed Visiting Assistant Professor in the Aeronautics and Astronautics Department at Stanford University and as such he is leading research projects at Stanford this summer 2011 for the US Army High Performance Computing Research Center Summer Institute.

3. Research & Publications

All ME faculty members are involved in research and publications to various extents. The different fields of research are related to the areas of interest as listed under Personnel section. The following items deserve special mention:

- The Department is contributing to the project of establishing a joint research unit between NDU and the Lebanese University in the area of energy harnessing and harvesting. Two faculty members, M. El Hayek, principal investigator, and Ch. Bou Mosleh, co-investigator, are involved in the project.
- A collaboration link has been established with Stanford University through the efforts of Dr. Charbel Bou Mosleh. Currently, the collaboration is limited to faculty exchanges. The department is actively investigating the possibility of establishing collaborative research programs in which NDU faculty members may contribute, especially in the area of computational engineering.
- A collaboration link has been established with Wayne State University, Detroit, USA, within the framework of the MOU between NDU and WSU. The first outcome of such collaboration is the organization of the first International Conference on Advanced Research and Applications in Mechanical Engineering which was held at NDU from June 13 to June 15, 2011. A second edition is being investigated and expected to take place sometimes in spring/summer 2013.

The following papers were published by ME Faculty during the academic year 2010-2011. Most publications are in refereed journals and international conferences.

1. E. Chakar, and G. Asmar, “Resonant Mode Suppression in a Vibratory System: Application to Earthquake Engineering”, 17th International Scientific Conference, USEK, Kaslik, Lebanon, 2010.
2. M. Azzi, J.E. Klemberg-Sapieha, L. Martinu, “Corrosion Behavior of Cr(Si)N/301 stainless steel system”, ECS transactions, accepted after peer review.
3. C. Bou-Mosleh, “CFD-Based Aerodynamic Analysis of a Battle-Induced Damaged F-16 Wing”, Proceedings of the International Conference on Advanced Research and Applications in Mechanical Engineering, pp. 57-62, NDU, 2011.
4. D. Amsallem, C. Bou-Mosleh and C. Farhat, “Nonlinear Model Reduction Using Local Reduced-Order Bases”, 7th International Congress on Industrial and Applied Mathematics (ICIAM 2011), Vancouver, BC, Canada, July 18-22, 2011.
5. K. Carlberg, D. Amsallem, J. Cortial, C. Bou-Mosleh, and C. Farhat, “Efficient Model Reduction of Large-Scale Nonlinear Systems in Fluid Dynamics”, 2011 SIAM Conference on Computational Science and Engineering, Reno, NV, February 28–March 4, 2011.
6. M. Hayek, J. Assaf, W. Lteif, “Experimental Investigation of the Performance of Evacuated-Tube Solar Collectors under Eastern Mediterranean Climatic Conditions” Energy Procedia (Elsevier), Vol.6, pp.618-626, 2011
7. M. Hayek, “Impulse-Based Vs. Lift-Based Vertical Axis Wind Turbines: CFD

Predictions”, Proceedings of the International Conference on Advanced Research and Applications in Mechanical Engineering, pp. 75-80, NDU, 2011.

Furthermore, most full-time faculty members of the department are involved in reviewing activities for local institutions and international journals and conferences.

4. Committees & Services

All full-time faculty members were involved in a way or another in committee works at all levels, from the departmental level up to the university level.

4.1 Departmental Level

The department control bodies are made of the following three committees with their composition:

- Department Personnel Committee: Dr. M. El Hayek (Chairperson), Dr. W. Assaf, Dr. G. Asmar (Secretary), Dr. F. Francis, Dr. N. Metni.
- Department Curriculum Committee: Dr. M. El Hayek (Chairperson), Dr. W. Assaf, Dr. G. Asmar, Dr. F. Francis, and Dr. N. Metni, Dr. Ch. Bou Mosleh (Secretary), Dr. M. Azzi.
- Department Outcome Assessment Committee: Dr. N. Metni (Chairperson), Dr. W. Assaf, Dr. G. Asmar, Dr. F. Francis, and Dr. Ch. Bou Mosleh (Secretary).

Various meetings were organized throughout the academic year for which minutes were issued and archived in the department files.

4.2 Faculty Level

The department contributes to the control bodies of the faculty as follows:

- Council of Chairpersons: Dr. M. El Hayek.
- Faculty Personnel Committee: Dr. M. El Hayek
- Faculty Curriculum Committee: Dr. F. Francis.
- Faculty Outcome Assessment Committee: Dr. N. Metni & Dr. M. El Hayek.

4.3 University Level

The department contribution to university-level committees is as follows:

- Accreditation Steering Committee: Dr. M. El Hayek.
- Faculty Representative; Dr. G. Asmar (as Faculty Rep, Dr. Asmar is member of various university committees).
- Faculty Concern Committee: Dr. G. Asmar (Chairperson)

4.4 Community Services

Besides committee works, the ME faculty members are well known for their commitment and continued services to ME students and to the entire NDU community in general. In fact, two student branches of learning societies are operating within the mechanical engineering department, namely, the ASME Students Branch, advised by Dr. G. Asmar, and the ASHRAE Students Branch, advised by Dr. M. El Hayek. Beyond that, the department is working to establish a local section for the international organization “Engineers Without Borders” at NDU. The section is to operate under the umbrella of the Lebanese chapter of the same institution and is to become official next fall 2011.

5. Academics

A new branch for the ME major has been started at NLC last fall 2010 and around 10 students are currently enrolled there. Those students are not included in the statistics listed below because they are in their first year and usually ME students start their first year with non-MEN courses. Therefore, their impact on the overall performance of the department is still limited. In spite of this, it is worth mentioning that the department is applying the same academic rules and standards at NLC since most of the full-time faculty members teaching at the main campus are making the shuttle twice per week to teach MEN courses to ME and non-ME students at NLC.

5.1 Statistics

The overall performance of the department from an academic point of view is shown in the following tables.

5.1.1 Courses Offered & Results

		Fall 2010	Spring 2011
3-Credit Courses	Number of Sections	34	35
	Average Class Size	26.38	26.77
	Average GPA	2.33	2.43
1-Credit Courses	Number of Sections	9	11
	Average Class Size	16.22	14.18
	Average GPA	3.22	3.18
Eng. Design I (1 cr.)	Number of Sections	6	6
	Average Class Size	5.67	5.5
	Average GPA	3.90	4.0
Eng. Design II (2 cr.)	Number of Sections	5	6
	Average Class Size	3.4	5.67
	Average GPA	3.93	3.91

5.1.2 Teaching Load (in mechanical engineering only – credits taught in other departments / campuses are not included)

	Summer 2010	Fall 2010	Spring 2011
W. Assaf	4	10	7.67
M. El Hayek	3.2	7.67	9
G. Asmar	3.2	11.33	6
F. Francis	3.07	12	12
N. Metni	3.6	11.33	12
Ch. Bou Mosleh	0	13.33	12
M. Azzi	0	9	12
W. Daou	1	3	3
Total Full-Time	18.07	77.66	73.67
A. Hammoud	3	9	9
T. Jabbour	2	5	5
Ch. Azoury	0	5	8
S. Matar	6	9	12
G. Challita	0	9	9
R. Slim	0	6	9
D. Nasrallah	0	0	3
F. El Chiti	0	0	3
S. Melki	0	2	4
Total Part-Time	11	45	62
Total	29.07	122.66	135.67

5.1.3 Courses Taught (in mechanical engineering / main campus only – courses taught in other departments / campuses are not included)

	Summer 2010	Fall 2010	Spring 2011
W. Assaf	MEN210, MEN599	MEN210, MEN211, MEN517, MEN598	MEN211, MEN510, MEN598, MEN599
M. El Hayek	MEN399, MEN599	MEN310, MEN520, MEN598, MEN599	MEN310, MEN550, MEN598, MEN599
G. Asmar	MEN399, MEN599	MEN302(2), MEN503, MEN598, MEN599	MEN302, MEN598, MEN599
F. Francis	MEN380, MEN399	MEN201(2), MEN340, MEN598, MEN599	MEN201, MEN340, MEN534. MEN598, MEN599

N. Metni	MEN399, MEN598, MEN599	MEN401, MEN435, MEN540, MEN598, MEN599	MEN401, MEN435, MEN439, MEN598, MEN599
Ch. Bou Mosleh		MEN210(2), MEN321(2), MEN598, MEN599	MEN210(2), MEN321, MEN598, MEN599
M. Azzi		MEN200, MEN202, MEN340	MEN200, MEN202, MEN302, MEN340
W. Daou	MEN431	MEN376, MEN431(2)	MEN431(3)
A. Hammoud	MEN320	MEN320(2), MEN515	MEN320(2), MEN515
T. Jabbour	MEN270, MEN370	MEN370(2), MEN437	MEN370(2), MEN440
Ch. Azoury		MEN270(2), MEN201	MEN201(2), MEN270(2)
S. Matar	MEN201, MEN410	MEN201, MEN202, MEN430	MEN201, MEN202, MEN430
G. Challita		MEN330(2), MEN440	MEN330(2), MEN437
R. Slim		MEN210, MEN211	MEN210(2), MEN211
D. Nasrallah			MEN435
F. El Chiti			ENG310
S. Melki		MEN376(2)	MEN270, MEN376(3)

5.1.4 Advising Load (enrolled students at main campus only)

	Fall 2010	Spring 2011
W. Assaf	46	39
M. El Hayek	122	127
G. Asmar	50	47
F. Francis	66	58
N. Metni	34	33
Ch. Bou Mosleh	10	10
Total	328	314

5.2 Curriculum Development

Various proposals to upgrade the ME program were developed and approved by the Department Curriculum Committee and all higher level committees (Faculty Curriculum Committee, University Curriculum Committee, ...). The proposals include:

- Adding MAT 339, Numerical Analysis, 3cr, to the ME program as a core course.
- Reducing the number of technical electives to 4 courses (12 credits) instead of 5 courses (15 credits).
- Adding two Science Laboratory courses, PHS 273, Experimental Physics for Engineers, 1cr, and CHM 271, Principles of Chemistry Laboratory, 1cr, to the ME program as core courses.
- Adding a new required major course MEN 489, Practical Training in Mechanical Engineering, 1 cr., to replace the existing MEN 380, Practical Training in Mechanical Engineering, 3cr.
- Adding the following courses to the pool of technical electives:
 - MEN 511 Heat Exchangers Design (3.0); 3 cr.
 - MEN 512 Industrial Refrigeration (3.0); 3 cr.
 - MEN 516 Piping Networks (3.0); 3 cr.
 - MEN 518 Renewable Energy Systems (3.0); 3 cr.
 - MEN 523 Applied Aerodynamics (3.0); 3 cr.
 - MEN 526 Fundamentals of Gas Turbines (3.0); 3 cr.
 - MEN 541 Automotive Mechatronics (3.0); 3 cr.
- Removing the following courses from the pool of technical electives:
 - MEN 500, Energy Principles & Variational Methods in Mechanics, 3cr
 - MEN 501, Continuum Mechanics, 3cr
 - MEN 502, Theory of Elasticity, 3cr
 - MEN 504, Theory of Elastic Stability, 3cr
 - MEN 505, Theory of Plasticity, 3cr
 - MEN 590, Mechanical Engineering Software, 3cr
- Updating the course number and/or description of the following courses:
 - MEN 401, Introduction to Mechatronics, 3cr: Change the course description
 - MEN 435, Automated Control, 3cr: Change the course description
 - MEN 510, Energy Conversion, 3cr: Change the course description

Such changes are an additional milestone in the process of upgrading the ME program started in 2008 and applicable to ID#2011 and beyond. The process is continuous with the main objective of making the ME Program at NDU of an international status according to the standards in the field (ABET, ...)

A new master in mechanical engineering program has been developed and approved by the ME Curriculum Committee and the faculty curriculum committee. The program involves a balance between required and elective courses plus a 9-credit thesis course. The proposal is

pending approval at upper levels and at the Ministry of Education, Directorate of Higher Education.

5.3. Senior Projects

The following senior design projects were successfully presented during the academic year 2010-2011.

5.3.1 Summer 2010

Senior Project	Prepared by	Advised by
Solacoff Machine	Cyril Coussa, Elie Azar	F. Francis
Pipe Wrapping Machine	Paul Farah, Patrick Khadra	G. Asmar
The Air Powered Go-Kart	Rabih Takla, Joseph El-Khoury	M. Hayek
Flat Oval Duct Friction; Analysis and Production using CFD	Mtarios Rahme	M. Hayek
First NDU Humanoid Design of a Biped Robot	Edward Chahine, Elie El Haddad, Rami El Zeinaty	N. Metni
Air Conditioning and Ventilation Design, Drainage and Water Distribution of a 19 Floors Tower in Abu Dhabi	Roger Ghanem, George Abi Aad	W. Assaf

5.3.2 Fall 2010

Senior Project	Prepared by	Advised by
Induced force Knee-Ligament Material Selector	Mario Hourani, Joseph Khoury, Naim Beaini	F. Francis
A Comprehensive Study of Submersibles with a Practical Implementation Method	Ibrahim El Khoury	F. Francis
Electric Car: Clean and Efficient City Car for a Sustainable Transportation	Roger Sakr, Carl Kortbawy, Zouhair Arja	F. Francis
Design of an Earthquake Shaking Table	Joan Ishak, Jean-Paul Mailhac	G. Asmar
The Hovercraft	Rabih Keyrouz, Hakmoun Ghossein	G. Asmar
First NDU GLFTR: Design of the Green Line Follower Transportation Robot	Charbel Lahoud, Jeffry El Chartouni	N. Metni
Mini-ME: Master Slave Anthropomorphic Robotic Arm with Force Feedback	Rodrigue Chemali	N. Metni
Engines Running Using Straight Waste Vegetable Oils (SWVO)	Alain Zakhour, Elie Lebbos	W. Assaf

5.3.3 Spring 2011

Senior Project	Prepared by	Advised by
Cold Room - VCRC	Patrick El Khoury	Ch. Bou Mosleh
Benefits of V and Inverted V Formation Flight (Numerical Prediction)	Ihab Mucharrafi	Ch. Bou Mosleh
Solar Stirling Engine	Daoud Abou Mosleh, Paul Hani	Ch. Bou Mosleh
AA-1 Liquid Propelled Rocket	Antoine Aad	Ch. Bou Mosleh
Solar Thermal Power Plant	Micheal Kattoura	Ch. Bou Mosleh
Windmill Water Pump WMWP V.1	Cyril Khalifeh	Ch. Bou Mosleh
Piping Network Simulator	Pierrot Antoun	Ch. Bou Mosleh
Hydraulic Scrap Metal Baler	Ralph Jawhar, Ziab Ibrahim	F. Francis
Filter-Cutting Machine	Elie Khalil, Elias Bader	F. Francis
Electricity Generating Speed Bump	Maroun El Hage, Rida Moussa, Amine Massihi	G. Asmar
Submarine: Analysis, Design and Manufacturing	David Nakhle, Ali Farroukh	G. Asmar
Mine Detector Hexapod	Lamis Abdo	G. Asmar
The Electrohydrodynamic Thruster	Joseph Imad	G. Asmar
Hotel Jewel of Amman: Fire Fighting	Antoine Fatte	M. Hayek
Heating, Ventilation and Air-Conditioning of a 20-floor Hotel in Amman, Jordan	Sevag Kendirjian	M. Hayek
Rescue Robot Team	Elie Bechalany	M. Hayek
Low Pressure Solar Desalination Machine	Ralph Trad, Karl Nakouzi, Fares El Beiano	M. Hayek.
HVAC of Khartoum Hotel	Vartenie Aramali	M. Hayek
Air-Conditioning, Ventilation and Plumbing Design of the Caravan Serai Hotel in Abu Dhabi	Rima Akiki, Michel Tohme	M. Hayek
Blood Flows in Stenosed Arteries: CFD Analysis	Mireille Hantouche	M. Hayek
CRM2011: Cap Removal Machine	Antoine Akiki	N. Metni
Flapping Wing MAV: Analysis and Design	Paul Khoury, Elias Salloum	N. Metni
The Automatic Walker	Dory Abou Jaoude, Joseph Saad	N. Metni
Mobile Stretch Wrapping Machine	Wael Choueiry	N. Metni
Design of Solar Powered Cold Storage	Hanna Obeid, Joseph Khoury	W. Assaf

5.4. Practical Training

A total of 72 students did register in MEN 399, Practical Training in Mechanical Engineering, and one student in MEN 380, the new Practical Training in Mechanical Engineering, in summer 2010. 15 students went to the Gulf region to carry out their training (9 of them were admitted at Petrofac International), 1 to Germany and 1 to Nigeria. The remaining students were distributed among local industrial partners like Mercedes Benz (7

students), Indevco (5 students), Dar Al Handassah (3 students), etc. Students' testimonies were collected and reflect the positive impact the training is having on ME students in general.

6. Department Activities

Several activities were organized by the department during the academic year 2010-2011, especially by students clubs and local branches of professional societies. The major events are listed here for information:

- The department organized its first international conference or the International Conference on Advanced Research and Applications in Mechanical Engineering (ICARAME'11) from June 13 to June 15, 2011 at NDU. The conference is co-organized by NDU and Wayne State University within the framework of the MOU between the two institutions. A total of 58 papers were accepted for presentation with a large percentage from USA (22 papers) and Iran (19 papers). Three keynote speakers of international reputation were invited to the conference and the opening ceremony featured an inaugural talk by Mr. N. Frem, Head of the Association of Lebanese Industrialists and CEO of Indevco Group. The event was supported by the Lebanese National Council for Scientific Research (CNRS) and two industrial partners, namely, Petrofac International and MSC Software.
- The department organized with the collaboration of MSC Software a full day seminar about the latest development in computational mechanics as incorporated in the newest editions of the software tools developed by MSC Software like SimExpert, Nastran, etc. The event took place at NDU on October 10, 2010, and featured morning presentations and afternoon workshops. Participants from sister universities and local industrial companies did show up at the event.
- The local section of the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) organized the first Lebanese ASHRAE Student Convention (LASC) with the support of the Lebanese ASHRAE Chapter at NDU. The event took place on May 21, 2011 and featured talks by experts and a student competition. A one-page description was published in NDU Spirit issue N.52.
- A Petrofac Day was organized by the Department on March 01, 2011. It included a presentation about the company and its strategy followed by hiring tests. The tests were attended by nearly 35 students from mechanical, civil, electrical and computer engineering majors.
- Two presentations about "Engineers Without Borders" were organized by the department on November 15, 2010 and May 23, 2011. The result is the establishment of a new EWB student section at NDU (the first EWB student section in Lebanon).
- A presentation by Mr. Rabih Khairallah, head of the fourth Branch of the Order of Engineers and Architects of Beirut, was given on June 10, 2011. The presentation outlined the rules and regulations of the fourth branch in particular and of the Order of Engineers and Architects in general.

- A presentation by Dr. S. Matar, PT Faculty, entitled “Under the Hood” was given on November 12, 2010. The presentation was attended by a large crowd of ME students.

7. Students

7.1 Statistics

The overall performance of the department from a student point of view is shown in the following tables.

7.1.1 Student Enrollment – Main Campus

	Fall 2010	Spring 2011
Year 1	108	79
Year 2	64	68
Year 3	63	61
Year 4	65	60
Year 5	27	46
Total	327	314

7.1.2 Student Enrollment – North Lebanon Campus

	Fall 2010	Spring 2011
Year 1	5	6
Year 2	3	2
Year 3	0	2
Year 4	0	0
Year 5	0	0
Total	8	10

7.1.3 Graduates (see Appendix A for complete lists)

	Summer 2010	Fall 2010	Spring 2011
Total	10	15	34

7.1.4 New Students (accepted and enrolled students)

	Fall 2010	Spring 2011
New - Main	49	5
New - NLC	5	2
Total	54	7

7.1.5 Transfer Students (accepted and enrolled in ME in 2010-2011)

From	Main	NLC
EE	15	1
CCE	12	0
CEE	2	1
Sciences & Arch	2	0
Undeclared	3	0
Outside	1	0
Total	35	2

7.2. Students' Excellence

Many ME students are excelling at various levels both academic and social. The following students deserve special mention:

- Multiple teams from NDU did participate in the 3rd Student Professional Development Conference of the ASME District J (Middle East and Africa) which was organized from April 29 to 30, 2011, at the American University of Beirut. The conference involves a major student design competition and some secondary competitions like oral presentation competition, poster presentation competition, etc. Various teams from middle-eastern universities were attending like AUB, NDU, LAU and BAU from Lebanon, King Fahd University from KSA, Khalifa University and Pits Bilani University from the UAE, and AUC from Egypt. NDU teams proved to be the best in the major competition and won the first two places as follows:
 - First Place: Joseph Salame, Wissam Bejjani, Jad Habib, Boutros Nasr
 - Second Place: Chrsitian Zeidan

The first team is expected to participate in the upcoming International Mechanical Engineering Congress in November 2011 and to compete with similar winners from other ASME districts.

Furthermore, the NDU student Joseph Tayoun won the third place in the Old Guard oral presentation competition.

- Mireille Hantouche represented the District J of the ASME as finalist in the Old Guard Oral Presentation at the International Mechanical Engineering Congress organized by ASME in Vancouver, Canada, in November 2010.
- Charles Haddad received the 2009-2010 Dean's Award for Academic Excellence owing to his highest GPA among the 2009-2010 graduates. Moreover, Charles was accepted to follow a master degree with full scholarships at the University of Tennessee Space Institute.
- A team made of Rabih Jenadri, Arz Tawk and Robert Mousallem was awarded the 2009-2010 Dean's Award for Engineering Innovation for his final year project consisting of the design and manufacturing of CNC router able to engrave workpieces made of plastic, wood, etc. and directly interfaced with AutoCAD.

- Rodrigue Chemali received the 2009-2010 Dean's Award for Outstanding Services owing to his involvement in the organization of the second SPDC of the American Society of Mechanical Engineers at NDU in May 2010. In recognition of that, Rodrigue was elected vice-chair of the ASME Region J's SDOB for the academic year 2010-2011.
- PETROFAC did organize on March 01, 2011, its round of hiring tests at NDU. 35 students (21 ME, 9 CEE, 4 EE and 1 CCE) attended the tests and 17 of them (12 ME, 3 CEE, 1 EE and 1CCE) were selected for the next step or the interviews.

Many ME graduates were accepted at AUB and abroad to follow a master degrees and are performing very well according to the feedbacks the department is collecting from various sources.

8. Equipments & Facilities

State of the art laboratory equipments are being used in the department in order to train students on various practical issues related to mechanical engineering. This year, the department acquired a full set of 6 ELVIS units developed by NI with their environment including the LabVIEW software package and three control units (DC motor control, HVAC control, and pendulum control). The entire set is to be used to run a mechatronics/control laboratory course to be offered for the first time in fall 2011.

The list is being expanded on regular basis and a proposal to acquire a manufacturing laboratory set has been submitted. The set includes combined machine tools (Lathe/milling/drilling), stand drills, saws, and one CNC lathe with their accessories. More and more equipments are to be added in the near future. Expected equipments include a renewable energy laboratory set and additional expansion of the instrumentation set available in the department.

Parallel to the state-of-the-art laboratory equipments, the department is planning to enhance its expertise in terms of computational activities related to the various fields of mechanical engineering. To that end, engineering and scientific software are needed and the department has started a process of acquiring state-of-the-art computational tools. The first on the list is a finite-element package, namely NSTRAN and its associated tools like MARC, DYTRAN, PATRAN, etc... A university license (150 users) is being used for the third year. Moreover, a university license involving one research node and 25 educational nodes was acquired last spring 2011 by the department for the CFD package developed by ANSYS Corp (including Fluent, CFX and IcemCFD). Additional software are to be added as the department evolves towards more advanced issues in computational and modeling sciences.

9. Future Plans

The past academic year saw a boost in the department activities, especially in term of activities at an international scale. Further progress is still needed and several plans are being considered in order to improve the overall performance of the department in meeting students' and market needs.

- Expansion of the laboratories to includes new tools and systems that can be used to operate a set of new laboratory courses. On top of the list are equipments to operate a manufacturing laboratory (set of machines tools for student training). Such an expansion will push the ME laboratories at NDU among the best in the country for ME education and training.
- Development of computational facilities by acquiring both the hardware and software required. Such facilities may be used to create a kind of computational research center whose main goal may be to serve both NDU users and the local industry in term of computational expertise.

To achieve those goals and to sustain possible expansion, additional faculty members are needed in a near future. The capacity of the department to add new faculty members is rather large taking into account the non-negligible percentage of services being fulfilled by part-time faculty (see section 5, Academics, for more details).

Appendix A: ME Graduates 2010-2011

Summer 2010

ID #	Name	GPA
2006-0299	Elie Geryess AZAR	2.71
2006-0478	Cyril Antoine COUSSA	3.19
2006-0638	Paul Jamil FARAH	2.52
2005-2385	Habib Georges GHANEM	2.36
2005-1137	Elie Samir HADDAD	2.65
2006-1068	Patrick Micheal KHADRA	2.75
2006-0456	Joseph Milad EL KHOURY	3.50
2005-1960	Mtanos Youssef RAHME	3.48
2005-1637	Rabih Hanna TAKLA	3.54
2006-0900	Rami Louis EL ZEINATI	3.60

Fall 2010

ID #	Name	GPA
2005-5002	George Salim ABI AAD	2.33
2006-3333	Zouhair Chehab ARJA	3.18
2005-9021	Edward Tanos CHAHINE	2.33
2006-0822	Jeffrey Said CHARTOUNY	2.66
2006-0136	Rodrigue Riad CHEMALI	3.75
2004-6891	Ibrahim Adel EL KHOURY	2.44
2006-0150	Mario George EL HOURANI	3.58
2006-1631	Joanne Michel ISHAK	3.40
2006-0851	Joseph Samir KHOURY	2.55
2006-0226	Carl Antoun KORTBAWY	3.46
2006-0493	Charbel Antoine LAHOUD	2.67
2003-1050	Elias Youssef LEBBOS	2.16
2005-1927	Roger Elie SAKR	2.48
2004-6626	Alain Gaby ZAKHOUR	2.10
2005-1723	Abdo Dib ZEINOUN	2.69

Spring 2011

ID #	Name	GPA
2006 0281	Antoine Bryan AAD	2.77
2007 1115	Lamis Michel ABDO	2.87
2007 1278	Dory Maurice ABOU JAOUDE	3.19

2006 0689	Antoine Jacques AKIKI	3.13
2005 1161	Pierrot Habib ANTOUN	2.74
2007 1188	Vartenie Mardiros ARMALI	3.48
2006 0944	Naim Maurice BEAINI	3.42
2003 3234	Elie Georges BECHALANY	2.29
2004 6863	Wael Richard CHOUEIRY	2.15
2006 0475	Ali Taleb FARROUKH	2.84
2004 1643	Antoine Constant FATTE	2.74
2004 1606	Hakmoun Hamid GHOSSEIN	2.52
2005 1819	Maroun Tanios EL HAJJ	2.75
2006 0165	Paul Edmond HANI	2.52
2007 2080	Mireille Michel HANTOUCHE	3.79
2002 1410	Joseph Ibrahim IMAD	2.23
2006 0643	Ralph Maurice JAWHAR	2.54
2007 2644	Micheal Antoine KATTOURA	3.80
2006 0745	Sevag Vasken KENDIRJIAN	2.57
2006 0426	Rabih Hani KEYROUZ	2.66
2006 1337	Cyril Joseph KHALIFEH	2.56
2005 3502	Elie Georges KHALIL	2.39
2006 0489	Joseph Abdo KHOURY	2.31
2005 1365	Paul Pierre KHOURY	2.53
2006 0420	Patrick Elias EL KHOURY	2.80
2005 1483	Rida Ghassan MOUSSA	2.56
2007 8003	Ihab Farik MUCHARRAFIEH	3.11
2006 0811	David Sami NAKHLE	2.86
2005 1279	Karl Richard NAKOUZI	2.12
2006 1632	Hanna Atif OBEID	2.66
2007 1059	Joseph Youssef SAAD	3.25
2005 3454	Elias Naji SALLOUM	2.84
2006 0131	Michel Youssef TOHME	3.43
2005 1767	Ralph Elie TRAD	2.35