The University of New Mexico

Universidad Carlos III de Madrid

AGREEMENT TO ESTABLISH JOINT INTERNATIONAL GRADUATE ENGINEERING PROGRAMS BETWEEN THE UNIVERSIDAD CARLOS III DE MADRID (UC3M) AND THE UNIVERSITY OF NEW MEXICO (UNM)

ANTECEDENTS

In accordance with the Agreement of Cultural and Academic Cooperation established between the Universidad Carlos III de Madrid (UC3M) and the Regents of the University of New Mexico (UNM), on October 23, 2013, UC3M, represented by its Rector, Daniel Peña Sánchez de Rivera, and UNM, represented by its Provost and Executive Vice President for Academic Affairs, Dr. Chaouki Abdallah, agree to enhance their relationship as described in the following clauses and conditions of this agreement, which restates and entirely replaces the May 12, 2014 agreement concerning the same subject matter.

CLAUSES

Clause 1: Objective

The purpose of this agreement is to establish Joint International Programs that facilitate students who are registered on a full-time basis at UC3M or at UNM to jointly pursue Masters degrees at the partner university. The objectives of the joint program are:

1.1 To encourage collaborative research and intellectual interaction between UC3M and UNM through the activities of the participating students and their advisors;

1.2 To enhance human-resource development at both institutions by sharing the strengths and resources available to UNM and UC3M; and

1.3 To establish a joint Masters Program in electrical engineering at UNM (MS-EE), and in telecommunications engineering (MTE) or multimedia and communications (MMC) at UC3M, as described in Annex 1.

Clause 2: Student Status

2.1 Students must be registered at their home universities on a full-time basis and must complete a minimum number of credit hours before they may apply to the partner university (see details below and in Annex 1).

2.2 Students must apply as international students and must be admitted under the normal academic requirements, financial standards, application deadlines, and language requirements at the host university and its college or department.

2.3 Students shall abide by applicable immigration laws and regulations.

2.4 Students shall pay for their own tuition and mandatory fees at the host university, and will have the same options to apply for graduate assistantships or financial assistance as do other international graduate students, subject to applicable laws and policies governing the host university. Tuition and fees are subject to annual review and adjustment.

2.5 Students shall pay any special course, recreation, administrative, or lab fees at the host university.

2.6 Students shall pay for health insurance and any other insurance that that meets the host university's requirements. The host university will offer assistance with health insurance enrollment. All students must provide documentary proof of coverage to the host university. Insurance purchases can be waived for students whose current insurance coverage is reviewed by the host university and determined to meet host university requirements.

2.7 Students shall pay any medical costs that are not covered by health insurance.

2.8 Students shall pay for their own living, travel, and personal expenses. The host university's international programs office will help students locate appropriate housing on campus or off campus, as applicable.

2.9 No more than two calendar months after completing the Program:

a. UC3M students must visit http://registrar.unm.edu/Transcripts/request-online.html to request that their transcript be transmitted directly to UC3M.

b. UNM students must contact the international office at UC3M to request that their transcript be transmitted directly to UNM.

c. All students shall provide course syllabi to their home university at the beginning of each semester.

Clause 3: Masters Degree Program

The Program is open to Master's students from UNM and UC3M, who will study one year at their home university and one year at the host university to earn the Joint Degree. UNM and UC3M will assess the qualifications of Program candidates. The host university will respect the home university's nomination of students, but the admission of a student to the Program is the prerogative of the host university. UC3M and UNM reserve the right to determine the dates by which students must be selected in order to guarantee the efficient processing of their applications. The host university will provide an orientation session, academic counseling at registration and as needed thereafter, and an academic advisor for each student.

Annex 1 lists the courses required for each Joint Masters Degree. UC3M will offer some courses in English and some courses in Spanish. The Parties agree to consider offering internships as part of the Program. On-line graduate courses will be accepted to meet Program requirements, subject to the policies and procedures of the university that provides the on-line courses, and of the university that is asked to grant credit for the on-line courses.

Clause 4: Application/Transfer of Credit to Partner University

The application or transfer of credits toward a Masters degree at UNM must adhere to the policy described in the University Catalog (http://registrar.unm.edu/UNM%20Catalog/index.html).

4.1 Course work must have carried graduate credit.

4.2 Course work must be from an accredited institution.

4.3 Students transferring a course to UNM must have obtained the equivalent of a grade "B" or better. Students transferring a course to UC3M must have obtained the equivalent of a grade "5" or better.

4.4 Course work and grades must be listed on the Program of Study form.

4.5 Upon completion of required course work and thesis or dissertation, students shall receive one degree from each of the partner universities.

Clause 5: Credit-Hour Equivalency

1 credit hour at UNM is equivalent to 2 ECTS credit hours at UC3M.

Clause 6. Program Administration

The academic requirements of this agreement will be administered by a permanent, joint management committee whose members are selected from the Parties' participating faculty.

Clause 7: Program Review

Every two years after this agreement is signed the management committee will review the progress of this joint program and suggest modifications to this agreement if needed. Any changes shall be approved at UNM by the Dean of the School of Engineering, the Faculty Senate Graduate Committee, and the Provost, and at UC3M by the Rector.

Clause 8: Term, Renewal, Modification, and Termination

8.1 This agreement is signed in duplicate. The coordinators at each university or their designees shall keep a copy of the agreement and any addendums.

8.2 This agreement shall become effective for an initial term of seven years from the date of the last signature by the Parties' duly authorized representatives. It may be renewed or modified in writing by the Parties' duly authorized representatives. However, the joint management committee may modify Annex 1 as needed from time to time in the normal course of the committee's oversight of academic requirements without the need to modify the clauses of this agreement.

8.3 Either party may terminate this agreement by giving the other party at least six (6) months' written notice, but any students who have already been accepted into the Program will not be affected and will be allowed to complete their studies, subject to any applicable policies governing the time period for degree completion.

Both institutions declare the following addresses and contact persons for the Program:

UNIVERSIDAD CARLOS III DE MADRID
Responsable de Movilidad Internacional
Universidad Carlos III de Madrid-Edificio
Rectorado– Despacho 8.1.11C/ Madrid, 126
28903 Getafe, Spain
Email: david.gil@uc3m.es

THE UNIVERSITY OF NEW MEXICO
Dean, School of Engineering
MSC01 1140
1 University of New Mexico
Albuquerque, NM 87131-0001 U.S.A.
Email: soe@unm.edu

In accordance, we sign two identical and equally valid originals of this Specific Agreement.

UNIVERSIDAD CARLOS III DE MADRID

Juan Romo Urroz, Rector

Date: October 7/2015

THE REGENTS OF THE UNIVERSITY OF NEW MEXICO

Dr. Chaouki Abdallah, Provost and Executive Vice President for Academic Affairs

Date: June 22/2015

~~Dr. Melinda Tinkle~~, Chair Dr. Jennifer Thacher
Faculty Senate Graduate Committee

Date: 5/21/15.

Dr. Joseph Cecchi, Dean
School of Engineering

Date: 5/7/2015

Dr. Jane Lehr, Chair
ECE Department

Date: April 28, 2015

Annex 1 – Courses Required for the Joint Master's Degree: MS-EE from UNM and MTE or MMC from UC3M

The students will obtain two Master degrees:

1) Master of Science in Electrical Engineering (MS-EE) from UNM, and

2) Master in Telecommunication Engineering (MTE) or
   Master in Multimedia and Communications (MMC) from UC3M

Curriculum for students starting at UC3M in the MTE Program

First year at UC3M: 60 ECTS
Design and operation of communication networks
Advanced multimedia services
Design of electronic circuits for communications
Radiofrequency subsystems and antennas
Data Processing
Design of telematic applications
Electronic instrumentation and optoelectronics
Design and simulation of communication systems
Advanced techniques for signal processing in communications
Project management and telecommunications regulation

Second year at UNM: 19 credit hours
ECE 540. Advanced Networking Topics (3 credits)
ECE 512. Advanced Image Synthesis (3 credits)

The above two courses cover the competencies of the required UC3M course called "Multidisciplinary applications of information and communication technologies." Alternatively, two other courses with similar multidisciplinary content may be chosen with approval of the UNM and UC3M Program coordinators. If students cannot take ECE 540 and ECE 512 or two equivalent courses, they must take "Multidisciplinary applications of information and communication technologies" at UC3M.

Two additional elective courses from ECE 5xx or 6xx (6 credits)

ECE 590. Graduate Seminar. (1 credit)
ECE 599. Master's Thesis. (6 credits)

Curriculum for students starting at UC3M in the MMC Program

First year at UC3M: 30 ECTS
5 courses to be chosen from the MMC curriculum

Second year at UNM:
4 core courses in a chosen specialty (12 credits)

ECE 599. Master's Thesis. (6 credits)

If UC3M nominates students to the Joint Degree Program when they are admitted to the MMC degree program, the students can complete 30 ECTS at UC3M in one semester and 18 credit hours at UNM in the following semester, thereby obtaining the Joint Degree in one year. Alternatively, UC3M students may complete 60 ECTS at UC3M followed by an International Complement consisting of 18 credit hours at UNM to obtain the Joint Degree.

Curriculum for students starting at UNM in the MTE program

First year at UNM: 30 credits

The courses depend on the chosen specialty as follows:

Systems & Controls

ECE 500 Theory of Linear Systems
ECE 541 Probability Theory & Stochastic Processes
ECE 546 Multivariable Control Theory
ECE 523 / 421. Analog Electronics
ECE 569 / 469. Antennas for Wireless Communications Systems
ECE 536. Computer System Software
ECE 570. Optoelectronic Semiconductor Materials and Devices
ECE 539. Digital Signal Processing
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

Signal Processing

ECE 500 Theory of Linear Systems
ECE 541 Probability Theory & Stochastic Processes
ECE 539 Digital Signal Processing
ECE 523 / 421. Analog Electronics
ECE 569 / 469. Antennas for Wireless Communications Systems
ECE 547. Neural Networks
ECE 536. Computer System Software
ECE 570. Optoelectronic Semiconductor Materials and Devices
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

Image Processing

ECE 533 Digital Image Processing
ECE 541 Probability Theory & Stochastic Processes
ECE 539 Digital Signal Processing
ECE 523 / 421. Analog Electronics
ECE 569 / 469. Antennas for Wireless Communications Systems
ECE 547. Neural Networks
ECE 536. Computer System Software
ECE 570. Optoelectronic Semiconductor Materials and Devices
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

Communications

ECE 500 Theory of Linear Systems
ECE 541 Probability Theory & Stochastic Processes
ECE 542 Digital Communications Theory
ECE 523 / 421. Analog Electronics
ECE 569 / 469. Antennas for Wireless Communications Systems
ECE 547. Neural Networks
ECE 536. Computer System Software
ECE 570. Optoelectronic Semiconductor Materials and Devices
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

Optoelectronics

ECE 561 Electrodynamics
ECE 570 Optoelectronic Semiconductor Materials & Devices
ECE 572 Physics of Semiconductors
ECE 523 / 421. Analog Electronics
ECE 569 / 469. Antennas for Wireless Communications Systems
ECE 547. Neural Networks
ECE 536. Computer System Software
ECE 539. Digital Signal Processing
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

Applied Electromagnetics

ECE 561 Electrodynamics
ECE 560 Intro. to Microwave Engineering
ECE 569 Antennas for Wireless Communications
ECE 523 / 421. Analog Electronics
ECE 547. Neural Networks
ECE 536. Computer System Software
ECE 570. Optoelectronic Semiconductor Materials and Devices
ECE 539. Digital Signal Processing
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

Microelectronics

ECE 520 VLSI Design
ECE 523 Analog Electronics
ECE 576 Modern VLSI Devices
ECE 569 / 469. Antennas for Wireless Communications Systems
ECE 547. Neural Networks
ECE 536. Computer System Software
ECE 570. Optoelectronic Semiconductor Materials and Devices
ECE 539. Digital Signal Processing
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

Power and Energy

ECE 582 Electric Drives and Transformers
ECE 584 Photovoltaics
ECE 588 Future Energy Systems
ECE 523 / 421. Analog Electronics
ECE 569 / 469. Antennas for Wireless Communications Systems
ECE 547. Neural Networks
ECE 536. Computer System Software
ECE 539. Digital Signal Processing
ECE 540. Advanced Networking Topics
ECE 538. Advanced Computer Architecture

If any of these courses has not been taken by the student he or she may take an equivalent one at UC3M in addition to second-year requirements.

Second year at UC3M: 36 ECTS
Advanced multimedia services (*)
Design and simulation of communication systems (*)
Project management and telecommunications regulation
Multidisciplinary applications of information and communication technologies (**)
Master's Thesis
(*) Some of these courses may be offered in Spanish only
(**) If the student has taken ECE 512 and ECE 540 at UNM he or she need not take this course and may choose any other 6 ECTS to reach the total required number of ECTS.

Curriculum for students starting at UNM in the MMC program

First year at UNM: 15 credits
3 core courses according to the chosen specialty (9 credits)
Two additional courses to choose from ECE 5xx or 6xx (6 credits)

Second year at UC3M: 30 ECTS
3 courses (18 ECTS) to choose from the following:

Digital Signal Processing Applications
Information Theory
Data Processing
Advanced Signal Processing
Speech and Audio Processing
Digital Communications
Signal Processing in Communications
Multimedia Information Management
Image and Video Processing
Applications of Data Processing
Broadband Communications
High Frequency Technology
Advanced Communications

Master's Thesis (12 ECTS)

Content equivalencies for UNM students obtaining the MTE at UC3M

The following MTE courses at UC3M are equivalent to the UNM courses listed below with respect to the competencies acquired by students.

UC3M	UNM
Design and operation of communication networks	540. Advanced Networking Topics *and* 538. Advanced Computer Architecture
Design of electronic circuits for communications	523 / 421. Analog Electronics
Radiofrequency subsystems and antennas	569 / 469. Antennas for Wireless Communications Systems
Data Processing	ECE500 Theory of Linear Systems (Fall) *and* ECE541 Probability Theory & Stochastic Processes (Fall) *and* ECE546 Multivariable Control Theory (Spring) *or* 547 Neural Networks *or* 595-013 Machine Learning *or* 595-009 Advanced Machine Learning
Design of telematic applications	536. Computer System Software
Electronic instrumentation and optoelectronics	570. Optoelectronic Semiconductor Materials and Devices
Advanced techniques for signal processing in communications	539. Digital Signal Processing