**Recommendations for China University of Petroleum/University of Calgary 3+2 program in Geomatics Engineering**

China University of Petroleum (UPC) and University of Calgary met in Fall 2018 to discuss the possibility of 3+2 degree program whereby UPC students would complete 3 years (6 terms), then attend University of Calgary for the final year of their UPC undergraduate degrees (terms 7 and 8) and then remain for an additional year to complete a University of Calgary course-based Masters of Engineering (MEng) in Geomatics Engineering.

UPC and UCalgary exchanged course outlines and course information and independently suggested mappings between the two undergraduate programs with the goal of creating a one year program that would both complete the UPC undergraduate degree and prepare students for a course-based MEng.

The UCalgary 4th year program begins with a 10 day field course. There is a full year capstone design project, a course on professional ethics (ENGG 513) and then students choose six technical electives and also complete one complementary studies course.

Students in the UPC Surveying and Mapping Engineering program normally take the following courses in their final year, including a capstone design course and a mixture of mandatory and selective courses. Proposed UCalgary courses are given in the column on the right:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UPC Course | Class Hours | Credits | Term | UCalgary Course | Class Hours | Credits | Term |  |
| Mandatory Courses |  |  |
| 1368 Surveying and Mapping Laws and Regulations and Project Management | 32 | 2.0 | 7 | ENGO 455 Land Tenure and Cadastral SystemsorENGG 515 Project Management |  |  | WinterFall |  |
| 1339 Marine Surveying | 32 | 2.0 | 7 | ENGO 545 Hydrographic Surveying |  |  | Fall |  |
| 1001 Seminars on Latest Development in Geomatics (1 credit) | 16 | 1.0 | 7 | no equivalent Can be learned before arriving Calgary |  |  |  |  |
| 1999 Graduation Project | 12weeks | 12.0 | 8 | ENGO 500 – Geomatics Engineering Project (6 units) |  |  | Fall & Winter |  |
| Selective Courses |  |  | 7 |  |  |  |  |  |
| 01371 3S (GNSS, RS, GIS) technology principle & application | 32 | 2.0 | 7 | no equivalentany course integrated by GNSS, RS and GIS |  |  |  |  |
| 01002 Professional English | 32 | 2.0 | 7 | UCalgary English course, TBDOr any professional course if they like |  |  |  |  |
| 01372 Real estate measurement and management | 32 | 2.0 | 7 or 8 | ENGO 581 – Land Use Planning |  |  | Winter | If needed |
| 01360 Space Geodesy  | 32 | 2.0 | 7 | ENGO 423 - Geodesy |  |  | Winter |  |
| 01388 Satellite ocean remote sensing | 32 | 2.0 | 7 | ENGO 559 – Digital Imaging |  |  | Fall |  |
| 01374 Major Surveying and Practice | 2weeks | 2.0 | 8 | ENGO 501 – Field Surveys |  |  | Last 2 weeks August |  |
| 01376 GIS application development | 32 | 2.0 | 7 | ENGO 551 – Advanced Geospatial Topics |  |  | Winter |  |

1 Class Hours = 50 minutes lecture and 10 minutes pause

UCalgary recommends that UPC Surveying and Mapping Students take the following courses in Calgary for the 4th year:

August (Summer Term)

ENGO 501 – Field Surveys

Fall Term

ENGG 515 – Project Management

ENGO 545 – Hydrographic Surveying

ENGO 559 – Digital Imaging

ENGO 500A – Geomatics Engineering Project

A professional English class (to be determined)

Winter Term

ENGG 513 – The Role and Responsibilities of the Professional Engineer in Society

ENGO 423 – Geodesy

ENGO 455 – Land Tenure and Cadastral Systems

ENGO 551 – Advanced Geospatial Topics

ENGO 500B – Geomatics Engineering Project

Not all of these course

Students in the UPC GIS Engineering program normally take the following courses in their final year. Proposed UCalgary courses are given in the column on the right:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UPC Course | Class Hours | Credits | Term | UCalgary Course | Class Hours | Credits | Term |  |
| Mandatory Courses |  |  |  |  |  |  |  |
| 01939 Design and Practice of Geographic Information System | 3 Weeks | 3.0 | 7 | ENGO 551 – Advanced Geospatial Topics LabsMaybe ENGO 451 ? |  |  | Winter |  |
| 01380 Geographic Information Web Services | 48 | 3.0 | 7 | ENGO 551 – Advanced Geospatial Topics |  |  | Winter |  |
| 01001 Seminars on Latest Development in Geomatics (1 credit) | 16 | 1.0 | 7 | no equivalentCan be learned before arriving Calgray |  |  |  |  |
| 01999 Graduation Design Project | 12 weeks | 12 | 8 | ENGO 500 – Geomatics Engineering Project (6 units) |  |  | Fall & Winter |  |
| Selective Courses |  |  |  |  |  |  |  |  |
| 01354 Computer Mapping Cartography | 32 | 2.0 | 7 | no equivalentsome Mapping Cartography is OK  |  |  |  |  |
| 01002 GIS English | 32 | 2.0 | 7  | UCalgary English course, TBDOr any professional course if they like |  |  |  |  |
| 01388 Satellite Oceanic Remote Sensing | 32 | 2.0 | 7 | ENGO 559 – Digital Imaging |  |  | Fall |  |
| 01342 GNSS data processing for surveying | 32 | 2.0 | 7 | ENGO 465 – Satellite Positioning |  |  |  |  |
| 01377 The technology and method of the geographical conditions survey | 32 | 2.0 | 7 | ENGO 573 – Digital Terrain Modelling |  |  | Winter |  |
| 01374 Professional research and practice | 2 weeks | 2.0 | 8 | ENGG 513 – The Role and Responsibilities of the Professional Engineer in Society |  |  | Winter |  |
| 01386 The Design and Development of Open Source Geographical Information System | 32 | 2.0 | 7 | no equivalent – some aspects of ENGO 551 |  |  |  |  |

1 Class Hours = 50 minutes lecture and 10 minutes pause

UCalgary recommends that UPC GIS Students take the following courses in Calgary for the 4th year. Note that there is less direct overlap between the UCalgary program and the UPC GIS program. We recommend that UPCs GIS students take ENGO 501, even though a similar course is not part of their home program. UCalgary students specializing in GIS take this course and do benefit from learning how field data is obtained. Also, because UCalgary does not have as many senior GIS courses as UPC, students will have to select two additional courses that have no direct equivalent in the UPC program.

August (Summer Term)

ENGO 501 – Field Surveys

Fall Term

ENGO 559 – Digital Imaging

ENGO 500A – Geomatics Engineering Project

A professional English Class (to be determined)

Two additional technical electives. Possibly ENGG 515 Project Management and one other.

Winter Term

ENGG 513 – The Role and Responsibilities of the Professional Engineer in Society

ENGO 465 – Satellite Positioning

ENGO 551 – Advanced Geospatial Topics

ENGO 573 – Digital Terrain Modelling

ENGO 500 B – Geomatics Engineering Project

Not all of these course

Additional notes about course mapping for Year 4.

1. UPC initially proposed ENGO 601 as a replacement for 01999 Graduation Design Project. We believe ENGO 500 is a more appropriate choice. ENGO 601 will be completed during the 5th year as part of the MEng.
2. UPC selective course 01372 Real estate surveying and management is similar to ENGO 581 that follows ENGO 579 Survey Law and Professional practice. However we recommend UPC students complete ENGO 455 Cadastral Studies as a replacement for 01368 Laws and regulations of surveying and project management and not take ENGO 579 and 581 as these are very specific to the Canadian common law legal system and planning regulations. These two courses could be available as part of the 5th year to students who have completed ENGO 455 during the 4th year and who have an excellent command of English.
3. UPC has a Term 3 selective course 01375 Remote Sensing of Environment that is very similar to ENGO 583 so ENGO 583 should not be available to students who have completed it at UPC.
4. UCalgary recommends ENGO 559 – Digital Imaging as a replacement for 01388 Satellite ocean remote sensing. It is not a perfect match, but ENGO 559 is our senior remote sensing course.
5. UPC 3rd year course 01338 Principles and Applications of Satellite Positioning(Bilingual) has some overlap with ENGO 465 as does 01342 GNSS data processing for surveying. We recommend UPC students take ENGO 465 in Calgary to replace 01342.
6. UPC initially proposed ENGO 451 as a replacement for 01376 GIS application development. We believe that their course 01308 Theory of Geographic Information System covers most of the content of ENGO 451 in term 4 and thus recommend ENGO 551.

The course-based MEng (to be completed in the 5th year) will consist of ten courses:

ENGG 601 Professional Development I

ENGG 602 Professional Development II

ENGO 601 Graduate Project

7 additional courses choose from a list of available courses of which at least 3 must be 600 level.

Available 500 level courses not used for year four include:

ENGO 531 Advanced Photogrammetric and Ranging Techniques

ENGO 563 Data Analysis in Engineering

ENGO 579 Survey Law and Professional Practice (see note 2)

ENGO 581 Land Use Planning (see note 2)

ENGO 583 Environmental Modelling (see note 3)

ENGO 585 Wireless Location

ENGO 573 Digital Terrain Modelling (if not used in 4th year)

ENGO 545 Hydrographic Surveying (if not used in 4th year)