Minutes of the Graduate Faculty Council Meeting

Tuesday, September 10, 2013

**Members** (16): Keat Ghee Ong (Biomed), Craig Friedrich (MEEM), Zhenlin Wang (CompSci), Simon Carn (Geo), Kari Henquinet (PCorps), Shane Mueller (CogSci), John Durocher (BioSci), Judith Perlinder (Atmos), Ashutosh Tiwari (Chem), Eugene Levin (SOT), Audrey Mayer (SocSci), Patty Sotirin (Rhet), Veronica Griffis (Civil), Andrew Storer (SFRES), Jiguang Sun (Math), Noel Urban (Non-Dept.Env),

**Guests** (7): Jacqueline Huntoon (Grad Sch), Debra Charlesworth (Grad Sch), Nancy Byers-Sprague (Grad Sch), Amberlee Haselhuhn (GSG), Jim Frendewey (SOT), Beatrice Smith (ESL), Ron Strickland (HU), Sarah Lucchesi (Lib), Jacque Smith (Grad Sch)

1) Meeting called to order at 4:05 pm.

2) Moment of Silence in Honor of Dr. Tom Drummer.

3) Elect a Chair:
   a. Dean Huntoon verbally called for nominations. There were no responses. An email call for nominations went out prior to the meeting which resulted in the nomination of Dr. Andrew Storer. With a unanimous vote A. Storer accepted the chair position.

4) Review and approval of 04/02/13 meeting minutes.

5) Old Business:
   a. Proposal to Modify (revenue-neutral modification) Research Only Mode (Dean Huntoon): Dean Huntoon calls for an ad hoc committee to pursue options in the modification of Research Only Mode. Amberlee Haselhuhn, Noel Urban, Nancy Byers Sprague volunteered. The committee is tasked with addressing possible alternatives to our current Research Only Mode with the consideration that any modifications should remain revenue-neutral as well as benefit students and faculty. One of the issues discussed in past meetings was that after a student enters Research Only Mode they are unable to take additional courses. Possibly there should be a mechanism by which they can take additional courses - possibly allowing them to take a limited amount of credits. P. Moran originally brought this to the GFC. A. Storer will ask him to serve on this committee.

   - (Q): Was P. Moran’s proposal not revenue-neutral?
   - (A): Dean Huntoon answers that it was not. The current policy says that a student can come out of Research Only Mode entirely and take classes or they could stay in Research Only Mode (registered full-time - nine credits but a student only pays for three credits) and pay regular tuition to take additional courses. P. Moran wanted to make it less expensive for students to take additional courses.
   - (C): If a student is supported for nine credits in Research Only Mode, the department is only paying for three credits. A suggestion is that departments could loosen the departmental requirements and fund the student for three or six more credits which would be the same as paying for nine credits normally.
   - (C): The proposal brought forth by P. Moran proposed that all graduate students pay a small amount so that those in Research Only Mode could take additional credits.
   - (C): Most of the objection to the original proposal was not the idea it was more about how to handle the revenue.

   b. Proposal for Determining When International Students Need ESL Services (Dean Huntoon/B. Smith): A proposal that Dean Huntoon crafted based on last year's discussions was that students
with TOEFL scores below 79 iBT should be evaluated upon arrival. Based on this evaluation the ESL program will recommend appropriate support services. Over the summer IGTAAP (International Graduate Teaching Assistance Program) services have been expanded (with funding from the Provost and Graduate School). The SPEAK test will no longer be administered. Taking its place is the Language Skills Assessment. ESL requests that departments contact them thirty days in advance of the student’s arrival because ESL will be administering a paper based TOEFL test to the student when they arrive on campus and the tests need to be ordered and delivered in advance. In the fall ESL administers TOEFL free of charge to Michigan Tech students the first Monday of orientation week. After the test there is a second layer of interviewing. ESL can then provide an advisor or department chair (whichever is preferred) with the assessment and recommendation.

- (Q): Is this in reference to students who have not taken the TOEFL before arriving on campus?
- (A): No, this is in reference to students who may have a need for additional language assistance. In the past a department would determine that an accepted student was not at an English speaking level that was indicated by their TOEFL scores. By the time the determination is made (typically 6-8 weeks into the semester) it is too late for ESL to assist the student.
- (Q): What if a student has a score higher than 79 and then it is determined that the performance is not matching the score and the semester has already begun?
- (A): IGTAAP should help in this situation.
- (C): A recommendation is if there is a concern before the student arrives on campus, Skype with them.
- (D): Motion to approve the proposal passed. The Graduate School will work on a process to identify the students and see about evaluating the process as it goes.

**c. Accelerated Master’s Recruiting, Including Research Scholars Model (J. Smith):** There are currently 14 accelerated master's programs which include three new programs – Forestry, Geographic Information Science, and Civil & Environmental. In addition a proposal from Physics is in review. The Graduate School will be introducing a marketing campaign targeting students for accelerated master's programs. J. Smith met with John Lehman who is now overseeing Marketing and Communications. J. Lehman is very interested in this project. If anybody is interested in providing ideas you are welcome to contact J. Smith or you are welcome to join the meetings. J. Smith has also been building a bridge with undergraduate admissions. They see this as an opportunity to recruit undergrads as well. Including a piece on accelerated master’s programs in undergraduate orientation is also in the works. This would also be added to the undergrad admission campus tour. J. Smith asks that members please look at their websites to ensure that all information is up-to-date and correct because as the accelerated master's centralized website (housed in the Graduate School) becomes live, it will pull the information off of the department's websites. If you are interested in proposing an accelerated master's program there are sample proposals that the Graduate School can provide for you. J. Smith would like to start running lists for the departments that have accelerated master's programs to identify sophomores/juniors who meet the criteria (GPA) for being admitted into an accelerated master's program. The hope would be to personally invite these students to apply to an accelerated master’s program. The question is would departments prefer to invite the students or would they want the Graduate School to do it? J. Smith is also interested in setting up some information sessions for students that could be conducted departmentally or by the Graduate School.

- (Q): What if a department uses more than GPA to determine a student’s eligibility?
- (A): The Graduate School could run the list with the initial GPA requirement and then somebody in the department could further review the students based on their additional requirements.
• (Q): Can the Graduate School send the list that they generate to graduate program directors and ask at that point which students they would like the Graduate School to invite to apply.
• (A): Yes, that can be done.
• (Q): Can a list of points be made and then distributed to each program so that they can determine which will work and which will not work and include a space for the department to make additional suggestions?
• (A): Yes, that can be done.

6) New Business:
   a. Rhetoric and Technical Communications Program Name Change (R. Strickland): The department would like to change the name of the PhD program to Rhetoric, Theory, and Culture. This name better describes what the program has been doing all along and is geared towards a wider audience. This will be brought back to GFC (as old business) when it is ready for Senate introduction.
   b. SOT: Dual Degree Program (J. Frendewey/E. Levin): This is a proposal for an agreement for a dual degree master program in Geodesy and Remote Sensing or Cadastre at the Siberian State Academy of Geodesy (SSGA) and in Integrated Geospatial Technology at Michigan Tech. There are a few students who are already interested. SSGA is a very reputable university. E. Levin has visited the university and found they have quality students, especially in mathematics. This agreement would bring capable students from Russia to Michigan Tech and provide Michigan Tech students the opportunity to study in Russia.
      • (Q): Who has reviewed this proposal?
      • (A): Dean Huntoon (Graduate School) and Jim Baker (Innovation & Industry Engagement). The Dean's council is currently reviewing. This will need final approval from the Curricular Policy Committee.
      • (Q): Looking at the courses listed in the proposal, it appears that there may be more appropriate courses that should be listed.
      • (A): The courses listed carried over from the existing master's program. All suggestions are welcome.
      • (Q): What about related costs, such as international travel?
      • (A): Students pay for the cost of travel.
      • TO DO: Please take the proposal (find on handouts section of the GFC website) back to your departments and bring feedback to the next GFC meeting. Please be prepared to vote.
   c. Publishing Agreement – Additional Approval Signature (D. Charleworth): D. Charlesworth was contacted by a faculty member regarding the required signatures on the publishing agreement (the agreement that the student submits at the end of the thesis, report, or dissertation stage). Currently the advisor or the graduate program director signs off on the form. They are approving whether or not the document is released globally or strictly to a Michigan Tech audience and whether or not the document has an embargo. An issue arose where the faculty advisor of the student was not the principal investigator (PI) on the grant that the student was working on and there was no communication in terms of what the PI's requirements were. The faculty member asked that D. Charlesworth bring to GFC a question as to whether a signature line for a PI can be added to the form.
• **TO DO:** Please take the suggestion back to your departments and bring feedback to the next GFC meeting.

7) Motion to adjourn at 5:01 pm.
September 10, 2013
(Last update: 08/29/13)

Handouts of the Graduate Faculty Council

Michigan Tech
Proposal

Some graduate students admitted with relatively low language test scores have difficulty understanding and communicating in English in their academic environments, and many have difficulty writing in English according to the standards and conventions of graduate work in US universities.

In order to address these problems:

- new graduate students admitted with scores below 79 TOEFL iBT should be evaluated upon arrival

- based on this evaluation and needs assessment, the ESL program should recommend appropriate support services.
AGREEMENT FOR A DUAL DEGREE MASTER PROGRAM IN GEODESY AND REMOTE SENSING OR CADASTRE AT THE SIBERIAN STATE ACADEMY OF GEODESY AND INTEGRATED GEOSPATIAL TECHNOLOGY AT MICHIGAN TECHNOLOGICAL UNIVERSITY

BETWEEN
SIBERIAN STATE ACADEMY OF GEODESY
Novosibirsk, Russian Federation

AND
MICHIGAN TECHNOLOGICAL UNIVERSITY
Houghton, Michigan, U.S.A.

The Siberian State Academy of Geodesy (SSGA) and Michigan Technological University (Michigan Tech) share a commitment to international cooperation among universities and mutual commitment to promote academic exchanges. This Agreement is intended to promote progress toward shared goals.

1. **Purpose and Objectives**

The objective of this Agreement is to set forth definitions and regulations related to the implementation of a Dual Degree Master Program (hereinafter referred as “dual degree” or “dual program”) in Geodesy and Remote Sensing or Cadastre from SSGA and in Integrated Geospatial Technology from Michigan Tech.

In implementing the dual degree program the parties seek

- to educate graduate students from the Russian Federation and the United States of America in geospatial sciences and technology;
- to contribute to sustainable geospatial management in the Russian Federation, North America and globally;
- to enhance the global competitiveness of geospatial technology experts;
• to prepare graduates who have a thorough understanding of current and future global challenges in advanced geospatial technologies and management and possess the knowledge and skills adequate to address them;
• to enhance teaching practices and the quality of higher education in geospatial sciences in Russia and the United States.

2. **Main Actions**

1. Mobility of students.
2. Offering of Master’s courses, tailored to international students in content and comparative perspective.
3. Annual seminars that, among other things, will address innovative approaches to pedagogy. The pedagogical issues will be addressed with reference to the latest developments of the Bologna process, emphasizing graduates’ employability and learning outcomes.
4. Exchange of faculty for visits (up to 8 weeks) to take part in courses at a host university as teachers and evaluators.
5. Joint supervision of Master’s theses by professors from the partner university.

3. **Definitions**

Within the framework of this exchange, the following definitions apply:

• “Home university” shall mean the university in which a student first enrolled as a degree candidate or at which a participating faculty has his or her primary affiliation.
• “Host university” shall mean the university that has agreed to receive students of faculty from the home university for a period of time.
• “Dual degree” shall mean the conferring of two degrees and issuance of two Master of Science diplomas, one of which will be issued by each party to this Agreement.
• “ECTS” is the European Credit Transfer System and is a standard for comparing the study attainment and performance of students of higher education. The duration of the program will be two academic years with a full workload corresponding to 120 ECTS.
• For the purposes of this Agreement, and for students pursuing graduate degrees, 1 US credit is assumed to be equal to 3.3 ECTS.
• “Full-time enrollment at Michigan Tech” is assumed to be 9 credits per academic year semester (fall or spring) and 1 credit during the summer session.
• “Full-time enrollment at SSGA” is assumed to be 30 ECTS credits per academic year semester (fall or spring).
• Program Liaison Officers are appointed by the administrations of the parties to be responsible for all the needed academic procedures between the two universities.

4. Mobility Eligibility
Eligible Russian students and faculty must be citizens of the Russian Federation or third country nationals who have been legal residents in the Russian Federation for at least three years before the start of outgoing mobility. Eligible US students and faculty must be US citizens or permanent residents.

5. Dual Degree Criteria

5.1. Participation Criteria
To obtain a dual degree, the participating students must meet the following academic criteria:

• An dual degree student whose home university is SSGA and who is admitted to Michigan Tech during his/her graduate program must have attended SSGA as a graduate student for at least one semester and acquired at least 30 graduate ECTS prior to enrolling at the host university (Michigan Tech). During the course of the dual degree program, students must earn at least 15 US graduate credit hours at Michigan Tech.

• A dual degree student whose home university is Michigan Tech and who is admitted to SSGA must have earned at least 15 US credit hours in at least two semesters while enrolled as a graduate student at Michigan Tech prior to enrolling in the host university (SSGA). The student must also attend SSGA for at least one semester and acquire at least 50 graduate ECTS.
The Dual Degree is expected to be completed in two years. Any extension to this must be agreed upon by Program Liaison Officers.

5.2. Credit Transfer
A mechanism of conversion of the US credits into the ECTS credits and ECTS credits into US credits will be implemented and approved by the parties of this Agreement. It is agreed that 1 US credit hour equals 3.3 ECTS for graduate students involved in the dual degree program. This equivalence is based on the assumption that full-time enrollment at each university requires a similar amount of effort. Full time enrollment per academic year semester at SSGA is 30 ECTS and is 9 credits per academic year semester at Michigan Tech. This equivalence results in the Agreement that 1 US credit hour equals 3.3 ECTS. Students participating in the program will be advised by the Program Liaison Officer at their home university who will collaborate with the Program Liaison Officer at the host university to pre-approve courses and credits for students involved in this program. It is the responsibility of the Program Liaison Officers to be aware of all rules and regulations regarding the awarding of graduate degrees at the home and host universities and to advise students accordingly. The parties reserve the right to make the final decision regarding students’ ability to apply courses and credits toward a graduate degree in compliance with their standard polices and guidelines.

5.3. Master Thesis and Degree Requirements
The master’s thesis is a strict prerequisite for being awarded a Master of Science degree from each party of this Agreement. Thus, for a dual degree, students must comply with the thesis requirements of both awarding universities. Joint supervision of the thesis work by Russian-US faculty advisors is required. The thesis will be defended on-site at either the home or host university and members of the students’ committee will attend in person or via video-conferencing. Whenever possible, students will be strongly encouraged to adopt a comparative Russian-US perspective in their theses.

Michigan Tech policies require that at least six and no more than ten of the credits applied toward a master’s degree can be earned through research credits, at least 12 of the credits applied toward a master’s degree must be at the graduate (5000-6000) level,
and no more than 12 of the credits applied toward a master’s degree can be at the junior or senior undergraduate level (3000-4000). A minimum of 30 credits (or equivalent) must be completed in order to earn a master’s degree at Michigan Tech. For the purposes of this dual degree Agreement, the master’s thesis is assumed to be a shared body of work (co-advised by faculty at both the home and host universities and defended in front of faculty from both the home and host universities) that can be used to satisfy degree requirements at each institution.

SSGA policies require that 30 ECTS applied toward a master’s degree can be earned through research credits, at least 27 ECTS of the credits applied toward a master’s degree must be from the list of state standard courses (graduate level), and 63 ECTS of the credits applied toward a master’s degree should be taken as elective courses in a students’ specialization. A minimum of 120 ECTS (or equivalent) must be completed in order to earn a master’s degree at SSGA. For the purposes of this dual degree Agreement, the master’s thesis is assumed to be a shared body of work (co-advised by faculty at both the home and host universities and defended in front of faculty from both the home and host universities) that can be used to satisfy degree requirements at each institution.

5.4. Graduation and Diploma
The students participating in this program must satisfy the degree requirements of both home and host universities in order to graduate with the dual degree. At the completion of the dual degree program as set forth in this Agreement, both universities will confer the degrees and issue diplomas for students. SSGA offers a Master Science degree in Geodesy and Remote Sensing; Cadastre. Michigan Tech offers Master Science degree in Integrated Geospatial Technology.

The diplomas issued by the host university shall be enclosed and posted to the Program Liaison Officers.

5.5. Graduation with Extenuating Circumstances
In the event that a dual degree participant encounters extenuating circumstances which make it impossible for them to complete the requirements of the dual degree, it is the home university’s discretion to allow their respective student to complete the requirements of a non-dual degree, conferring its own degree and awarding of its own diploma.

6. Student Mobility
Students from SSGA, completing their dual degree at Michigan Tech, will be received as degree seeking students at Michigan Tech. Students from Michigan Tech, completing their dual degree at SSGA, will be received as degree seeking students at SSGA.

6.1. Courses at the Host University
The purpose of student mobility will be to enable students to take classes and to pursue a dual degree from both the home and host universities. Courses preapproved by the Program Liaison Officers and passed at the host university will be accepted for credit towards the degree at the student’s home university. Courses preapproved by the Program Liaison Officers and passed at the home university will similarly be accepted for credit towards the degree at the student’s host university. It will be the responsibility of each student participant in the dual degree program to obtain pre-approval from his/her home and host Program Liaison Officers for courses taken at the host university to assure proper credit transfer recognition. It will be the responsibility of each Program Liaison Officer to ensure that a students’ degree program will satisfy the requirements for a master’s degree at both the home and host universities.

6.2. Eligibility and Admission
Each home university will pre-screen and nominate qualified students for the dual degree program and forward relevant data concerning those students to the host university. Such nomination shall be accompanied by appropriate application materials, including, at a minimum the candidate’s official academic transcripts. Letters of recommendation and test scores (e.g., GRE and TOEFL) may be required as well. Each university shall respect the admission requirements and enrollment constraints of the host university. Program participants will be subject to the standard rules and
regulations, and enrollment constraints of the host university for the purposes of enrolling in courses. The host university shall have final authority on admission decisions to the dual degree program. Students participating in the dual degree program must be admitted to both the home and the host university before enrolling in any courses at the host university. It is expected that the host university will accept qualified nominations except in extraordinary circumstances while maintaining a balance of outgoing and incoming students at each university.

6.3. Language
The language of instruction for the dual degree at SSGA and Michigan Tech is English. Language courses or assistance will be offered for students at each campus as is possible given each university’s resources. Michigan Tech students participating in the dual degree program are encouraged to pursue some pre-mobility expertise in Russian in order to fully realize the potential of their time abroad.

6.4. Academic Year
“Academic Year” in the context of this Agreement is defined as an autumn (or fall) and spring semester/term and may include the summer session that follows the spring term. At SSGA the autumn term begins in September and the spring term in January. At Michigan Tech autumn term begins in August/September, the spring term in January, and the summer session in May.

6.5. Full-time Enrollment Status
Each year during the term of this Agreement, the parties will exchange students enrolled full time. The measure of exchange will be that one student-term/semester at SSGA equals one student-term/semester at Michigan Tech.

Full time for SSGA is defined thus: graduate students = 30 ECTS each term. Students may take research credits during summer (up to 20 ECTS), or enroll in online courses.

Full time for Michigan Tech is defined thus: graduate students = 9 academic credits during fall and spring semesters. Students may take research or project credits during summer semester (up to 6 US credits), or enroll in online courses.
6.6. Balance
A maximum of four students each way will be exchanged per academic year. The maximum number of students for exchange may be amended by mutual Agreement. Every effort will be made to maintain an evenly balanced exchange from year to year. It is recognized, however, that circumstances may preclude an even exchange of students in a particular year. In the event that balance is not maintained over a period of three years, exchanges from one party may be limited or eliminated until balance is achieved.

6.7. Academic Advising
Departments/divisions participating in the dual degree program at the home university will provide academic counseling to ensure that the academic courses taken at the host university are acceptable to the home university. The Program Liaison Officer at the home university will collaborate with the Program Liaison Officer at the host university to ensure that courses taken at the home university will be acceptable to the host university. The host university will provide and regularly update course descriptions and syllabi (see appendixes A, B) to aid in course equivalency evaluation.

6.8. Academic Performance
Participants in the dual degree program will be governed by the same regulations and performance standards that pertain to other students at the host university. In addition the host university reserves the right to require the withdrawal of any program participant whose academic standing of conduct warrants such action. The host university will consult with the home university before finalizing such action. The host university will notify the home university of the student’s last date of attendance.

If a participating student voluntarily withdraws or is dismissed for disciplinary reasons before the end of the term, that student’s participation will be considered completed by the home and host universities as it pertains to maintaining the balance of exchanges between the universities.

6.9. Access to Academic and Social Facilities
Students shall be entitled or required to participate in any introductory or orientation courses or programs that may customarily be arranged for or required of students at the host university respectively. Students shall have the same rights of access to academic and social facilities provided by the host university as do host university students. Students participating in the dual degree program shall be subject to the rules, regulations, and discipline of the host university in which they are enrolled.

6.10. Transcripts
Due to privacy laws, students must request that the host university release a copy of their transcript to the home university at the conclusion of each semester, generally within one, but no case later than three weeks after the last day of the semester. This request will be done in accordance with standard university policies and procedures. Students must also request that their home university share transcripts with the host university in order to allow for awarding of the dual degree.

6.11. Financial Aid
Financial aid will be processed (awarded, dispersed, reported, and records kept) and satisfactory academic progress will be monitored by the home university. To facilitate the awarding of financial aid, the designated office at the host university will convey to the home university details about cost of education at the host university, including tuition, fees, room and board, books, etc., as well as the applicable refund and repayment policies of the host university. In addition, when requested by the home university, the designated office at the host university will provide confirmation of enrolment status to verify eligibility for financial aid. If refund and/or repayment involving financial aid funds become necessary, the home university will calculate the refund and repayment amounts.

6.12. Visa Support Services
The host university will assist participating students, to the fullest extent possible, in obtaining visa and other documents required by the government of the host country. In order to comply with US government regulations, participants who are not US citizens will be required to provide a guarantee that they have the financial resources to meet all
expenses. Upon submission of a satisfactory completed financial form, Michigan Tech’s designated office will provide the student with an I20 form to apply for an F-1 Student Visa. The SSGA designated office will provide adequate acceptance and invitation letters and necessary information on how to apply for a Visa from the appropriate authorities to dual degree students from Michigan Tech.

7. **Student Responsibilities and Expenses**

7.1. **Registration and Payment of Tuition**
Participating students will enroll at the host university and be registered at their home university for each semester of exchange. SSGA and Michigan Tech will require participating students to pay tuition and any required fees to their home university, if applicable. Both universities are willing to seek funding to assist in covering students’ educational costs. Participants will be exempted from paying tuition to the host university as long as balance is maintained in terms of the number of incoming and outgoing students at each university.

7.2. **Payment of other Educational and Living Expenses**
Neither SSGA nor Michigan Tech will be responsible for the costs of books, fees, equipment, room, board, travel, transportation or other personal expenses. Host university fees for which the student is responsible, if any, vary by university. The host university will inform students, at the time of their acceptance, about approximate costs they will be responsible for at the host university.

7.3. **Housing**
Each university will assist participating students in securing housing for the period of time that they will be on the host campus; however, the cost of room and board will be paid by the student.

7.4. **Health Insurance and Medical Expenses**
Student participants will be personally responsible for purchasing the host university’s and/or the host country’s required health/medical insurance for the time period of their
exchange. The host university will assist incoming student participants in identifying available health insurance options.

Each participant student shall provide emergency contact information. In the event that a participant is involved in a serious accident or other circumstance of grave nature, or is subject to disciplinary action, the host university will immediately notify the home university. If necessary, the immediate notification of serious incidents or actions may be limited to a statement of a problem and a brief outline of intended plans of action. Detailed information should be forwarded to the home university in a timely manner.


8.1. Program Liaison Officer
The academic units of the parties creating this Agreement shall each identify a Program Liaison Officer who shall be responsible for all matters relevant to the specific program Agreement.

8.2. Legal Indemnities and Policies
8.2.1. Ownership of inventions, discoveries, and works of authorship which are discovered, conceived, and/or created directly pursuant to any activity under this Agreement (Intellectual Property) shall be with the university(s) where such intellectual property was discovered, conceived, and/or created. Both universities agree to acknowledge any participation of the other in any publications resulting from activities under this Agreement and, subject to any conflicting rights of third parties, agree that both parties may use the results obtained from the activities conducted under this Agreement for internal education and research purposes.
8.2.2. No monetary consideration will be exchanged between the two universities, nor will there be any indemnities, reimbursements for expenses, or sharing of fees or profits arising from a dual degree program.
8.2.3. The relationship of SSGA and Michigan Tech under this Agreement shall be of independent contractors, and a party should be not deemed, nor hold itself out as being, a partner or agent of the other party. Neither SSGA nor Michigan Tech shall be liable for
acts of the other, nor shall they be liable for the acts of students participating in the dual degree program.

8.2.4. Both universities subscribe to a policy of equal opportunity and will not discriminate against a participating student on the basis of race, gender, age, marital status, ethnicity, religion, national origin, sexual orientation, handicap, or any other basis prohibited by the laws of that university’s home country.

8.2.5. The obligations of the two universities under this Agreement are limited to student participants and faculty members only and do not extend to spouses, partners and dependents.

8.2.6. Specific details not included in this program Agreement will be developed jointly and spelled out in a separate addendum to the present Agreement and approved by the appropriate university officials.

8.3. Limitations of Resources Committed
The agreement does not create an obligation to either party to provide resources necessary to carry out any part of the Agreement except as approved by the party responsible for providing these resources.

8.4. Additional Implementing Agreements
The parties may explore the possibility of the creation of additional joint programs or other collaborations between various units of the two universities. Such additions will be covered by developing a new Agreement between parties.

8.5. Contacts for the Agreement (Program Liaison Officers)

For SSGA
Name: Igor Musikhin
Address: Siberian State Academy of Geodesy, 10, Plakhotnogo Str.,
Novosibirsk, 630108, Russia
Phone: +7  913  790 09 18
Fax:     +7 (383) 343 25 39
e-mail: igor_musihin@mail.ru

For Michigan Tech
Name: Eugene Levin
Address: Michigan Technological University, 1400 Townsend Drive,
Houghton, Michigan 49431, U.S.A.
Phone: (906) 487 24 46
Fax:       (906) 487 25 83
e-mail: elevin@mtu.edu
8.6. Review, Contacts, Signatories

The Agreement is subject to review at the end of the fifth year and shall be effective upon full execution and end on December 31, 2018. It shall be subject to revision, modification or renewal by mutual written agreement. Either party may terminate the Agreement by a written notice submitted at least 90 days in advance of the next academic semester. Termination would not affect students already engaged in the Agreement. If the Agreement is not renewed by mutual consent or earlier terminated, the Agreement will conclude at the end of the specified time period, or after activities in progress have concluded.

In witness thereof, the parties have caused this Agreement to be duly executed.

Signing for Siberian State Academy of Geodesy

_______________________________
Aleksandr Karpik
Rector

_______________________________
Date

Signing for Michigan Technological University

_______________________________
Glen Mroz
President

_______________________________
Date

_______________________________
Max Seel
Provost and Vice-President for Academic Affairs

_______________________________
Date
<table>
<thead>
<tr>
<th>No.</th>
<th>Course code</th>
<th>Course</th>
<th>Course description</th>
<th>Credits</th>
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<tr>
<td>1</td>
<td>SU5010</td>
<td>Geospatial Concepts, Technologies and Data</td>
<td>High-level review of geospatial data acquisition systems, sensors and associated processing technologies. Course considers geospatial metadata generation principles, interoperability, and major tools for manipulation with geospatial data. Course may help in transition of non-geospatial majors to geospatial field.</td>
<td>3</td>
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<tr>
<td>2</td>
<td>FW5810</td>
<td>Research Methods in Natural Resources</td>
<td>Overview of science and scientific research. The process of graduate education including choosing an advisor, selecting a research problem, writing a thesis proposal, scientific hypothesis testing, analysing data, and communicating results through various media.</td>
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<td>3</td>
<td>SU5800</td>
<td>Geospatial Master’s Graduate Seminar</td>
<td>Student presentation of current geospatial research in a traditional seminar setting.</td>
<td>1</td>
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<td>4</td>
<td>SU5998</td>
<td>Graduate Practicum</td>
<td>Advanced independent study for students in the Integrated Geospatial Technology Master’s program. In consultation with student's advisor, develop and execute a project demonstrating capabilities in problem solving, communications, and decision making. The practicum can be done on campus or at the site of a Michigan Tech corporate partner.</td>
<td>6</td>
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<td>5</td>
<td>SU5999</td>
<td>Master’s Graduate Research</td>
<td>Research of an acceptable geospatial related problem and preparation of a thesis.</td>
<td>10</td>
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<td>6</td>
<td>SU5002</td>
<td>Infrared Technology, Sensors, and Applications</td>
<td>Infrared remote sensing fundamentals, current and future technologies, and applications are considered. Remote sensing for both civilian applications such as environmental resource mapping</td>
<td>1</td>
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</table>
and military applications will be included.

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SU 5003</td>
<td>Geographic Information Systems (GIS) Technology Fundamentals</td>
<td>Course provides review of Geographic Information Systems applications and analysis and is intended for students who are not specializing in GIS. Includes core concepts such as data acquisition and management, topology, accuracy, metadata, output, quality control, analysis methods, new and traditional software options, web mapping, and GIS implementation/management for research and production.</td>
<td>1</td>
</tr>
<tr>
<td>SU 5004</td>
<td>Introduction to Geospatial Image Processing</td>
<td>Introduction to the basic concepts of image processing and understanding. Applications focus on pre-processing of satellite and aerial images, remote sensing, and image/video enhancement. This course will provide mathematical foundations and explore modern practical algorithms and methods.</td>
<td>3</td>
</tr>
<tr>
<td>SU 5020</td>
<td>Data Analysis and Adjustments</td>
<td>Course explores fundamentals of mathematical error propagation theory including various equations of observation, least squares adjustments, and Kalman filter methods. Blunder detection, decorrelation, and inversion of patterned and large matrices processes are considered. Involves analysis of position estimation deploying geospatial measurements.</td>
<td>3</td>
</tr>
<tr>
<td>SU 5021</td>
<td>Geodetic Models</td>
<td>Course provides solid geospatial background in geodetic reference frames: datum; geoids; and reference ellipsoids. 2D and 3D geodetic network adjustments are considered based on 3D spherical models.</td>
<td>3</td>
</tr>
<tr>
<td>SU 5022</td>
<td>Positioning with GNSS</td>
<td>In depth study of GPS, GLONASS, Galileo, COMPASS satellite systems, theory, and processing of global positioning measurements. Strongly recommended for geospatial practitioners.</td>
<td>3</td>
</tr>
<tr>
<td>SU 5023</td>
<td>Geospatial Positioning</td>
<td>High-level summary of GPS-GAP courses. This course is intended for interdisciplinary graduate students who seek just ONE combination course in adjustments, geodesy and</td>
<td>3</td>
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</table>
GPS (with emphasis on GPS/GNSS). Not available to students who have taken SU5020, SU5021, SU5022.

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<th>Course Code</th>
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<tbody>
<tr>
<td>SU5041</td>
<td>Geospatial Data Processing</td>
<td>Advanced data collection techniques; raster to vector; data conversion and map projections; topology; principles and application via advanced spatial analysis; advanced database structure; geo-database; georelational data model versus object-component data model; advanced 3D applications; vector and raster data model application; network analysis; linear referencing and conflation; geo[coding, GIS-CAD integration; Web-based GIS innovations.</td>
<td>3</td>
</tr>
<tr>
<td>SU5042</td>
<td>Digital Cartography</td>
<td>Spatial relations – topology, relations and relationships, directions and distances; hierarchy; generalization – vector (linear, polygonal, fractals) and raster; labelling – automatic name placement, text arrangement and deletion text; computational geometric algorithms – line intersection, polygonal relationships, grid model, route analysis.</td>
<td>3</td>
</tr>
<tr>
<td>SU5043</td>
<td>Topographic Analysis</td>
<td>LiDAR measurements; DSM - data sources, accuracy analysis, quality control, vector data analysis; terrain representation and TIN; grid analysis - interpolation, visibility, filers (smoothing, edges, median); shading; merging overlapping DSMs; spatial analysis - spectral analysis shape analysis; automatic feature extraction from DSM.</td>
<td>3</td>
</tr>
<tr>
<td>SU 5540</td>
<td>Advanced Photogrammetry – Satellite Photogrammetry</td>
<td>Fundamentals of space borne imaging systems relevant to topographic mapping. Imagery products: pre-processing levels and metadata. Specific methods of space photogrammetry. Review of contemporary space borne imaging systems and imagery products available. Airborne non-frame sensors and photogrammetric processing of the imagery.</td>
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<tr>
<td>SU5930</td>
<td>Synthetic Aperture Radar (SAR) Fundamentals and Applications</td>
<td>Review of radar concepts, applications of SAR (InSAR) data, types of available satellite/airborne systems, and data processing methods. Applications for creating topographic data, recognizing targets, classifying ice and vegetation, and oceans/large lakes will be presented based on real-world examples.</td>
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</tr>
<tr>
<td>FW5560</td>
<td>Digital Image Processing: Remote Sensing Perspective</td>
<td>Presents the theory and quantitative procedures of digital image processing using remotely sensed data. Emphasizes image acquisition, pre-processing, enhancement, transformation classification techniques, accuracy assessment, and out-products. Discusses linkages to GIS. Also covers evaluating applications of the technology to current resource management problems via peer-reviewed literature.</td>
<td></td>
</tr>
<tr>
<td>SU3540</td>
<td>Geospatial Information Technology with Elements of Field Cartography</td>
<td>Application of GIS technology methods for processing surveying data obtained in the field. Concepts of interoperability and metadata organization are considered. Includes map projection review and 2D and 3D cartographic data visualization.</td>
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<tr>
<td>SU5044</td>
<td>Cartographic Remote Sensing</td>
<td>The course offers analytical and descriptive instruments useful to understand metric and semantic contents of the cartographic products. The expected skills of the course and the principal topics are: knowledge of the reference and coordinate systems used in modern and historic cartography, knowledge of the most used numerical cartographic products (e.g. digital cartography, orthophotomaps, digital terrain models, etc.), knowledge of the digital cartography production technologies, understanding of the cartographic products used for the spatial planning, management of cartographic products based on different reference and coordinate systems, validation of the contents of the cartographic products, communication of spatial themes on different cartographic products. Moreover a part of the course will be focused on the available Very High Resolution satellite systems that acquire remote sensing data for cartographic production.</td>
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<tr>
<td>SU5045</td>
<td>Geospatial Data Fusion</td>
<td>Course challenge is to provide students with how to combine and fuse different sensory data to extract useful information for their application. Some data are supporting other data, while some are complimenting. It is important to understand the characteristics of each type of data and the techniques that are being used in their field. Theories, review of current papers focusing on this idea, and a term-project will help to perform the researches of their own. Presentation on how the idea is developed and how the conclusion is made is also a focus.</td>
<td>3</td>
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</table>
| SU5541| Close-range photogrammetry                       | Course comprises following main topics:  
- Math fundamentals, Imaging technology,  
- Photogrammetric process, Image acquisition planning, Interior orientation, Bundle block adjustment, 3D plotting, Orthoprojection, Image-matching techniques, Close Range photogrammetry applications, Lab component included. | 3       |
<p>| SU5480| Cadastre                                         | Land rights - an introduction, Land ownership, land lease, land access, traditional rights, Mortgaging and Land as Capital, Description of land rights, Boundary description, Cadastre 2014 by FIG, Different examples for cadastre types over the globe, Modern technical approaches. | 3       |
| EE 5725| Mobile Robotics &amp; Multi-Robot Systems           | Introduction to mobile robotics and multi-robot systems. Introduce spatial description, mobile robot locomotion, kinematics, localization and mapping, motion planning and navigation. Topics in multi-robot systems include biological inspirations, control structure, inter-robot communication, learning in multi-robot systems, and modelling | 3       |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>EE 5522</td>
<td>Digital Image Processing</td>
<td>Image formation, enhancement, and reconstruction. Applications in medical imaging, computer vision, and pattern recognition.</td>
<td>3</td>
</tr>
<tr>
<td>FW 5540</td>
<td>Advanced Terrestrial Remote Sensing</td>
<td>Remote sensing principles and concepts at the graduate level. Topics include camera and digital sensor arrays, types of imagery, digital data structures, spectral reflectance curves, applications and introductory digital image processing.</td>
<td>4</td>
</tr>
<tr>
<td>FW 5550</td>
<td>Geographic Information Systems for Resource Management</td>
<td>Use of geographic information systems (GIS) in resource management. Studies various components of GIS in detail, as well as costs and benefits. Laboratory exercises use ArcGIS software package to solve resource management problems.</td>
<td>4</td>
</tr>
<tr>
<td>FW5560</td>
<td>Digital Image Processing: A Remote Sensing Perspective</td>
<td>Presents the theory and quantitative procedures of digital image processing using remotely sensed data. Emphasizes image acquisition, pre-processing, enhancement, transformation classification techniques, accuracy assessment, and out-products. Discusses linkages to GIS. Also covers evaluating applications of the technology to current resource management problems via peer-reviewed literature.</td>
<td>4</td>
</tr>
<tr>
<td>GE 4100</td>
<td>Geomorphology and Glacial Geology</td>
<td>The study of the processes, including fluvial, glacial, wind, mass movement, and wave action, shaping the earth's surface by erosion and deposition of geologic materials. Emphasizes the role of past and present climate. Field trips are a major component.</td>
<td>4</td>
</tr>
<tr>
<td>GE 4250</td>
<td>Fundamentals of Remote Sensing</td>
<td>This course focuses on the basic physics behind above surface remote sensing and remote sensing systems. Topics covered include: properties of the atmosphere, absorption and scattering of</td>
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<tr>
<td>SS 5300</td>
<td>Environmental &amp; Energy Policy</td>
<td>An overview of environmental policymaking and politics in the U.S. Emphasizes policies regarding air and water pollution, toxics and hazardous waste. Discussion of rulemaking, enforcement, and administration of laws by EPA. Investigation of environmental politics on national and community levels, with focus on social movements and citizen participation.</td>
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<tr>
<td>SS 5350</td>
<td>Environmental Policy Analysis</td>
<td>The role of economic analysis in environmental policy, including a detailed review of the major tools that are used at the federal, state, regional, and local levels. Special emphasis on benefit-cost analysis and comparative risk analysis.</td>
<td></td>
</tr>
<tr>
<td>SU 4100</td>
<td>Geodetic Positioning</td>
<td>Introduces the instruments and procedures used in surveying projects that require a high order of accuracy. Discusses some conventional instruments and techniques but the greater emphasis is on GPS techniques.</td>
<td></td>
</tr>
<tr>
<td>SU 4140</td>
<td>Photogrammetry</td>
<td>Basic principles of photogrammetry and its role as a technology for spatial data collection. Use of Photogrammetry in the fields of surveying, engineering, and geographic information.</td>
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</table>
### Description of a Dual Degree master program courses delivered at the Siberian State Academy of Geodesy

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<thead>
<tr>
<th>№</th>
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<th>Course</th>
<th>Course description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>1</td>
<td>ОЦВ.М.1.1</td>
<td>Foreign Language</td>
<td>The course is aiming at a practical grasp of both everyday speech and specialty language for the achievement of the level of proficiency in the foreign language, allowing a student to continue training at PhD courses, fulfill scientific and professional activities in the foreign-language environment.</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>ПЦВ.М.2.1</td>
<td>3D Laser Scanning and Object Modelling</td>
<td>Theoretical basis of laser scanning; practical skills of work with terrestrial laser scanners; data processing for engineering and geodetic tasks; introduction to methods of automated surveying, characteristics of field and office phases and laser scanning data processing. Application of laser scanning products.</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>ОЦБ.М.1.1</td>
<td>Advanced Computer and Information Technologies</td>
<td>Methodology of data storage development, use of multidimensional cube theory based on OLAP methodology; large data base development with the help of DBMS; technologies of efficient data analysis, advanced IT methods of measurements and geospatial data processing; methods of mathematical processing and assessment of geospatial data’s analysis.</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>ПЦБ.М.2.1</td>
<td>IT in Surveying and Remote Sensing</td>
<td>Overview of the integral knowledge system in the field of geodetic science and practice; new methods of geospatial data measurements and processing; analysis of digital modelling and mapping methods based on the terrestrial surveying and remote sensing data; analysis of mathematical processing and spatial data estimation.</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>ПЦБ.М.2.2</td>
<td>Automated Systems of Collecting and Remote Sensing Data Processing</td>
<td>Overview of the integral understanding of the advanced level of remote sensing and photogrammetry automated systems of data acquisition and processing. Introduction to main trends in the development of remote sensing systems and perspectives of their application, photogrammetric methods of heterogeneous data processing.</td>
<td>2</td>
</tr>
<tr>
<td>Term</td>
<td>Course Code</td>
<td>Course Title</td>
<td>Description</td>
<td>Credits</td>
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<tr>
<td>6</td>
<td>ПЦВ.М.2.2</td>
<td>Intellectual Property Objects Valuation</td>
<td>Understanding of significance of intellectual property as an object of economy. Nature of creating and introduction of different kinds of intellectual property, approaches and methods of its valuation. Introduction to the theory of intellectual property generation; practical skills of knowledge implementation.</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>ПЦВ.М.2.3</td>
<td>Geographic and Informational Technologies in Management of Territorial Forms of Government</td>
<td>Skills of different software tools application for land management and cadastral problems solving. Production and planning activities in the field of project development with usage of advanced aids of information acquisition and processing; automatization of data acquisition and processing processes; search and analysis of scientific information for solving engineering problems.</td>
<td>2</td>
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<tr>
<td>8</td>
<td>ПЦВ.М.2.3</td>
<td>Mathematical Processing and Analysis of Geodetic Measurements</td>
<td>The course gives principles of contemporary algorithms of geospatial data processing and analysis. Additional parts of matrix algebra and statistics, synthesized algorithms of the results of geodetic measurements optimisation by least-squares method are given.</td>
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</tr>
<tr>
<td>9</td>
<td>ПЦВ.М.2.4</td>
<td>Principles of Creating and Spreading of State Geodetic Networks</td>
<td>Review of traditional and satellite geodesy methods to develop state geodetic networks. When planning the creation/development geodetic networks students fulfil research work, complex experiments with satellite equipment; mathematical processing and analysis of the results, planning as well as research and methodological program planning for satellite equipment.</td>
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</tr>
<tr>
<td>10</td>
<td>ПЦВ.М.2.4</td>
<td>Geodetic Monitoring of Engineering Structures</td>
<td>The theory of common principles, methods and technologies of geodetic control of geometric parameters in the process of construction and buildings maintenance.</td>
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</tr>
<tr>
<td>11</td>
<td>ОЦБ.М.1.2</td>
<td>Philosophical Problems in Science and Technology</td>
<td>Within the course philosophy and methodology of science and technics is studied; students are given understanding of science as a system of knowledge about technics and man. Students are given skills and knowledge of scientific, research and professional activities.</td>
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</tr>
<tr>
<td>12</td>
<td>ПЦВ.М.2.5</td>
<td>Substantial and Applied Spatial and Time Support of Surveying and Remote Sensing Tasks</td>
<td>Modelling of the processes in geodesy, geodynamics and remote sensing; mathematical interpretation of models and processes; delimitation of applied models and assumptions; algorithms and technics in the field of geodesy and geodynamics development; experiments, processing and analysis of the results; project and research work reviewing; expertise of technics and documentation of topographic and remote</td>
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<td>Course Title</td>
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<tr>
<td>ПЦВ.М.2.5</td>
<td>Analysis and Performance Evaluation of Scientific Activities</td>
<td>Principles of research methods, planning, financing, and management; analysis of research activities’ efficiency; applied management systems improvement; practical skills and knowledge of research work, analysis, assessment, and prediction of the situations.</td>
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</tr>
<tr>
<td>ПЦВ.М.2.6</td>
<td>Study of Management Systems</td>
<td>Principles, methodologies and technics of management systems; analysis of their efficiency; decision making; development of the management system. Practical skills and knowledge in management, analysis of situations, prediction and understanding of their impact in future.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ОЦВ.М.1.2</td>
<td>Human Resources Management</td>
<td>Introduction to management and development of human resources in the market, skill of efficient cooperation with human resources specialists. Role of the staff in management; existing technics of human resources management; manpower reserves; principles of human resources management.</td>
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</tr>
<tr>
<td>ПЦВ.М.2.7</td>
<td>Investment Management</td>
<td>Investments as a system and continuous process. Trends, potentials, and forecasts of investment processes development; technics of investment management; approaches of investment management in research works.</td>
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</tr>
<tr>
<td>ОЦВ.М.1.3</td>
<td>Ethics of Business Communication</td>
<td>Knowledge and skills of communication in the field of professional activities. Enhancement of professional communication; skills of people understanding; relations among people; skills of efficient listening and public presentation; processes of self-knowledge and self-actualization; development of creativity.</td>
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</tr>
<tr>
<td>ПЦВ.М.2.8</td>
<td>Geodetic Methods of Geodynamic Processes Examination (additional to ПЦВ.М.2.9)</td>
<td>Modelling of geodynamic processes; algorithms and technics of geodynamic processes analysis; processing and analysis of surveying works; reviewing and expertise of projects, inventions, researches, new technics, and documentation; geodynamic monitoring of natural and anthropogenic situations; GPS and telecommunication systems in surveying and monitoring.</td>
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</tr>
<tr>
<td>ПЦВ.М.2.9</td>
<td>Applied Gravimetry</td>
<td>Modelling of geodetic, geodynamic and remote sensing processes; mathematical</td>
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</table>
interpretation of relationship in models and processes; delimiting of the applied models and assumptions; experiments, processing and analysis of results; Earth and planets’ physical fields study; high precision measurements in surveying, geodynamics and remote sensing; synthesis of geodetic, aerial and space information, etc. for the needs of cartography, research and industrial activities; natural resources and nature management monitoring.

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<tr>
<th>№</th>
<th>ПЦВ.М.2.10</th>
<th>Advanced Automated Geodetic Systems (additional to ПЦБ.М.2.2)</th>
<th>Devices and technologies of advanced automated geodetic complexes application. Characteristics of advanced geodetic complexes in different fields of geodesy. Execution of research activities with high precision automated geodetic equipment.</th>
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<tbody>
<tr>
<td>20</td>
<td>ПЦВ.М.2.10</td>
<td>Advanced Automated Geodetic Systems (additional to ПЦБ.М.2.2)</td>
<td>Devices and technologies of advanced automated geodetic complexes application. Characteristics of advanced geodetic complexes in different fields of geodesy. Execution of research activities with high precision automated geodetic equipment.</td>
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</table>
September 10, 2013

NOTE: (all handouts connected to a single pdf file)

1. Moment of Silence in Honor of Dr. Tom Drummer
   a. A memorial service will be held for Tom on Thursday, September 12, from 4:30 pm to 5:30 pm, in the Atrium of the U.J. Noblet Forestry Building. The service will feature an "open-mic" format. Please come prepared to share your memories of Tom and how he touched your life, professionally and/or personally. Following the service on campus, all are invited to the Keweenaw Brewing Company in downtown Houghton, where food will be provided by the department.

2. Review minutes of 04/02/13

3. Elect a Chair

4. Old Business
   a. Proposal to Modify (revenue-neutral modification) Research Only Mode (Dean Huntoon)
   b. Proposal for Determining When International Students Need ESL Services (Dean Huntoon)
   c. Accelerated Master's Recruiting, Including Research Scholars Model (Dean Huntoon/J. Smith)
   d. Coursework vs Research Accelerated Master's and Banner Coding (Dean Huntoon/J. Smith)

5. New Business
   a. Rhetoric and Technical Communications Program Name Change (R. Strickland)
   b. SOT: Dual Degree Program (J. Frendewey/E. Levin)
   c. Publishing Agreement - Additional Approval Signature (D. Charlesworth)
   d. Announcement: Independent Study Credits and Unacceptable Practices (Dean Huntoon)
   e. PhD in Engineering (Dean Huntoon)
   f. Coursework Master's Degree Programs - Merge plans C & D (Dean Huntoon)