



Course Description

College/Institute: Maritime Postgraduate Studies Institute

Program: M.Sc in Hydrographic Surveying

1- Course Data		
Course Code: MPI 711	Geodetic Surveying	Academic Year:2015-2016
Specialization:	Hydrographic Surveying	

2- Course Aim	The course enables students to learn principles, theories and uses of geodetic surveying. Geometric, gravimetric, astronomic topics are presented and discussed in relation to geodetic surveying are examined. Computational techniques and mathematical modeling are presented, including least squares adjustment. However, this course aims at enabling students to Master fundamentals and methods of research in order to produce their thesis in accordance to the academic final degree research requirements.
3- Intended Learning Outcome:	
a- Knowledge and Understanding, students will be able to:	<ol style="list-style-type: none"> 1. Learn principles, theories and uses of geodetic surveying. 2. examined Geometric, gravimetric, astronomic topics 3. in relation to geodetic surveying 4. Use Computational techniques and mathematical modeling including least squares adjustment. 5. Geodetic sciences and the geosciences 6. Branches and uses of geodetic sciences 7. Applications of geodetic surveying 8. Geodetic Datum and Coordinate Systems: <ul style="list-style-type: none"> • The figure of the Earth and geodetic surfaces • Global and local datum and coordinate systems 9. Geometric Topics in Geodetic Surveying: <ul style="list-style-type: none"> • Geodetic control networks • Triangulation and trilateration networks • Three dimensional satellite networks • Geodetic computations on the sphere
b- Intellectual Skills, students will be able to:	Identify and critically analyze issues involved in Geodetic Surveying uses and other Branches



<p>c- Professional Skills, students will be able to:</p>	<p>and uses of geodetic sciences</p> <ul style="list-style-type: none"> • 1. Transformation between different datum and coordinates systems 2. Height system definitions and height measurements 3. Earth gravity field determination and representation 4. Geodetic leveling 5. Astronomic Topics in Geodetic Surveying: <ul style="list-style-type: none"> • The celestial sphere • Astronomic measurements and coordinate determination • Transformation between astronomic and geodetic coordinates. 6. Using GPS for surveying including the basics of GPS technology: <ul style="list-style-type: none"> • Understand the error sources in GPS measurements • Be familiar with the different types of measurements, • Proper RTK field procedures • Be able to design a static network and be able to plan a GPS field survey • Be able to site calibrate in the field and using office software • common hardware, surveying methods, survey design, planning and observing, real-time kinematics and • DGPS. Prerequisites 7. Geodetic Surveying for Deformation Monitoring: <ul style="list-style-type: none"> • Geodetic considerations in monitoring deformation • Monitoring vertical deformation • Monitoring horizontal deformation • Advances and trends in deformation monitoring 8. GIS in Surveying <ul style="list-style-type: none"> • Understand computer file structures and practice proper data storage techniques. • Understand the importance of properly projecting geographic data. • Proficiently navigate GIS software. • Use basic geoprocessing tools to manipulate and analyze geographic data. • Understand where geographic data comes from and how to create your own
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<p>d- General Skills, students will be able to:</p>	<ol style="list-style-type: none"> 1. Least Squares Adjustment in Geodetic Surveying: 2. Theory of errors and error propagation 3. Mathematical modeling of observations and parameters 4. Assessment of least squares solutions 5. Refinements in least squares algorithms.
<p>4- Course Content</p>	<p>WEEK (1) Introduction to Geodetic Surveying: Geodetic sciences and the geosciences Branches and uses of geodetic sciences Applications of geodetic surveying</p> <p>WEEK (2) Geodetic Datum and Coordinate Systems: The figure of the Earth and geodetic surfaces Global and local datum and coordinate systems</p> <p>WEEK (3) Geometric Topics in Geodetic Surveying: Geodetic control networks Triangulation and trilateration networks Three dimensional satellite networks Geodetic computations on the sphere</p> <p>WEEK (4) Geometric Topics in Geodetic Surveying (continued): Transformation between different datum and coordinates systems</p> <p>WEEK (5) GIS in Surveying - Proficiently navigate GIS software. - Use basic geo-processing tools to manipulate and analyze geographic data.</p> <p>WEEK (6) Gravimetric Topics in Geodetic Surveying: Height system definitions and height measurements Earth gravity field determination and representation</p> <p>WEEK (7) 7th week exam Gravimetric Topics in Geodetic Surveying (continued): Geodetic leveling</p> <p>WEEK (8) Astronomic Topics in Geodetic Surveying: The celestial sphere - Astronomic measurements and coordinate determination - Transformation between astronomic and geodetic coordinates</p>



	<p>WEEK (9) Using GPS for surveying including the basics of GPS technology:</p> <ul style="list-style-type: none"> - Be able to design a static network and be able to plan a GPS field survey - Be able to site calibrate in the field and using office software <p>WEEK (10) Geodetic Surveying for Deformation Monitoring: Geodetic considerations in monitoring deformation Monitoring vertical deformation</p> <p>WEEK (11) Geodetic Surveying for Deformation Monitoring (continued): Monitoring horizontal deformation Advances and trends in deformation monitoring</p> <p>WEEK (12) 12th week exam Least Squares Adjustment in Geodetic Surveying: Theory of errors and error propagation</p> <p>WEEK (13) Least Squares Adjustment in Geodetic Surveying (continued): Mathematical modeling of observations and parameters Assessment of least squares solutions Refinements in least squares algorithms</p> <p>WEEK (14) Using Software in geodetic surveying such as: HYPACK MAX – GEOGRAPHIC CALCULATOR</p> <p>WEEK (15): Using Software in geodetic surveying (continued): GLOBAL MAPER – AUTOCAD - EXCELL</p> <p>WEEK (16) Final exam</p>
5- Teaching and Learning Methods	A mixture of lectures, tutorials, exercises, and case studies are used to deliver the various topics in this subject, some of which are covered in a problem-based format, thereby enhancing the learning objectives by using Office hours and Additional Follow up.
6- Teaching and Learning Methods for Students with Special Needs	
7- Student Assessment:	<ol style="list-style-type: none"> 1.Participation 2.Assignments 3.Presentations 4.Case Study 5.Quiz 6.Written Exams 7.Workshop



a- Procedures used:	
b- Schedule:	Assessment(1) Mid Assessment(2) 12 th Assessment(3) 15 th .
c- Weighing of Assessment:	7 th Week Examination , 12 th Week Examination , Final-term Report Writing , Oral seminar exam , Practical Examination , Semester Work , Total 100%
8- List of References:	WIJAYRATNE D. INDRAJITH, (1998). INTRODUCTION TO GEODESY. SCHOOL OF TECHNOLOGY, MICHIGAN TECHNOLOGICAL UNIVERSITY. HOUGHTON, MICHIGAN 49931-1295
a- Course Notes	
b- Required Books (Textbooks)	Rockville, Md. (1977). Basic Geodesy. u.s. DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration National Ocean Survey. USA
c- Recommended Books	
d- Periodicals, Web Sites, ..., etc.	

Vice Dean for Educational Affairs
Affairs Name & Signature:
Date:

College/Institute Dean
Name & Signature:
Date: