

BÜLENT ECEVİT UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF GEODESY AND PHOTOGRAMMETRY ENGINEERING

COURSE LIST FOR PROGRAMME CODE: 6102

1ST YEAR – FALL SEMESTER

JDF105 Introduction to Engineering (2-0)-5

General concepts definition and historical background of engineering. The general concept and definition of surveying engineering. History of national mapping and geodetical studies in Turkey. Historical development of surveying engineering education in Turkey. National foundations related with surveying engineering and their functions the national and international professional foundations and their function.

JDF113 Use of Basic Computer Techniques (1-2)-4

Introduction to computer technology (Definition, historical development, types of computers, computer hardware (motherboard, processor, memory, hard disk, video card, sound card, network card, modem, cd/dvd drive/writer, floppy disk, keyboard, mouse, monitor, speakers, microphone, printer, scanner, plotter)), Software (software types, operating systems, application software, programming languages), Operating systems, Windows 2000 operating system, Office programs and applications, word processors (Microsoft Word, and applications), data and graphics processors (Microsoft Excel, and applications)

JDF115 Surveying I (2-2)-6

SI Measurement units, frequently used geodetic units. Reference surfaces. Ground control points and ground monuments, booking the details. Simple measurement tools and simple measurement methods. Concept of error: gross, systematic and random errors, basic error propagation law. Linear measurements, measuring objects. Simple Planimetric measurement techniques. Conducting and recording surveys. Geodetic rectangular coordinates systems. Basic geodetic tasks. Area computations.

MAT181 Mathematics I (4-0)-6

Numbers, Lines, Circles and parabols, Functions and their Graphs, Trigonometric Functions, Limit and Limit Rules, Continuity, Derivate and derivate Rules, The Chain Rule and Parametric Equations, Derivates of Trigonometric Functions, Inverse Functions and their derivate, Derivates of Logarithmic and exponential Functions, Implicit Differentiation, Monotonic Functions and the First Derivate Test, Extreme values of Functions, The Mean Value Theorem, Concavity, Curve Sketching, Indetermine Formas and L'Hospital Rule, Differentials, System of Linear Equations and determinants.

FİZ181 Physics I (3-0)-4

Physics and measurement, motion in one dimension, vectors, motion in two dimensions, the laws of motion, circular motion and other applications of Newton's laws, work and kinetic energy, potential energy and conservation of energy, linear momentum

and collisions, rotation of a rigid body around a fixed axis, Rolling motion and angular momentum, static equilibrium and its properties.

FİZ191 Physics Laboratory I (0-3)-1

Measurement. Vector addition of forces. Balance of parallel forces. Moment principle. Motion on an inclined plane. Analysis of potential energy changes and simple vibration movement in a helical spring. Collision in two-dimensional space. Moment of inertia. Center of mass. Angular velocity and acceleration.

1ST YEAR – SPRING SEMESTER

JDF120 Surveying II (3-2)-7

Principles of traversing, reconnaissance surveys, construction of permanent stations, monumenting, booking and recording surveys. Types of traverses and traverse computations. Intersection and resection surveys and computations. Free station computation. Linear (Helmert) transformation of coordinates. Principles of electromagnetic distance measurement and electromagnetic wave propagation. Systematic and random errors in electromagnetic distance measurements. Reduction of electromagnetically measured distances to reference surfaces (geoid and ellipsoid surfaces) and corrections to the distance measurements. Checking and calibrating electromagnetic distance measurement instruments. Designing, surveying, constructing and computation of a calibration baseline.

JDF122 Computer Programming (2-2)-8

Concept of the programming, development of the programming language. Programming languages. Programming applications of the professional problems.

MAT182 Mathematics II (4-0)-6

Definition of definite integral and basic theorems of integral calculus. Indefinite integral and basic integration formulas. Several integration methods. Application of definite integrals. Convolution. Basic properties of Laplace transform. Definitions of sequences and infinite series and research of convergence by aid of related tests. Areas of surfaces of revolution. Power series and convergence of functions. Taylor's formula, calculations of the largest error.

FİZ182 Physics II (3-0)-4

Load, materials and electric field. Coulomb's law, Gauss's law, electric potential. Capacitance and capacitors. Current and resistance. Alternating current. Electromotive force, electromagnetic induction and magnetic field. Ampere's law and Faraday's law. Introduction to electromagnetic waves. Maxwell's theorem. Optics.

FİZ 192 Physics Laboratory II (0-3)-1

Ohm's Law. Kirchoff's Laws. Method of resistance measurement and Wheatstone Bridge. Measurement of current and voltage. Electrolysis. AC circuits. Exponential and electric field lines. Magnetic field. Resistor-capacitor circuits. Relation between the diameter and maximum current of conductors

2ND YEAR – FALL SEMESTER

JDF209 Numerical Analysis (3-0)-4

Numerical systems. Errors in numerical calculations. Matrices, matrix types and matrix properties. Inverse matrix and types of computing inverse matrices: Partitioning method, Gauss method, Pivoting method, Gauss-Jordan method, Cholesky decomposition. Eigen value and matrices, generalized minverse matrix and pseudo inverse matrix. Matrix conditions. Resolving linear equation systems. Symmetrical linear equation systems. Non-linear equation systems and resolving techniques. Interpolation.

JDF217 Height Measurements (1-2)-4

Heights, geoid and other physical height concepts, heighting systems and scientific heights. Methods of determining of heights: Geometric, trigonometric and barometric levellings, modern and classical equipments in levelling, errors in surveying and precision, determining effects of refraction and spherical lines of sight. Tachymetry, postprocessing and plotting in tachymetry. Surface levelling, surveying of alignments and cross sections of roads, postprocessing and plotting in surface levelling. Surveying techniques of measuring heights of buildings.

JDF219 Cartography (2-2)-6

Definition of Cartography; Map concept and classification of maps; Map scale and scale representation; Plot description and segmentation; Map bases; Drawing tools and supplies; Custom Signs; Map writings and standards; Map data drawing standards; Heights on the map display methods; Reduction and generalization of the maps; Maps replication techniques; Thematic map making principles; Computer-aided mapping principles; Map use and the measurement and calculations on the map; Applications for the drawing of the map. The concept and classification of map projection, Shape and dimensions of the earth, Earth's surface for about definition and usage limits of these surfaces, Geographical and global polar coordinate systems, Special curves and areas defined on the earth definition, related to these basic relations. Deformations of the mathematical principles of map projection. Cone, plane, cylindrical and other types of projection. Issues related to numerical applications.

JDF223 Probability and Statistics (2-0)-3

Definition of probability, axioms and features. Conditional probability. Independency, random variants, discrete and continuous distributions. Kinds of distribution. Discrete and continuous compound distributions. Expected values of random vectors. Covariance. Random samples and sample distribution. Estimation of point and interval. Test distribution and hypothesis tests. Linear regression and correlation.

JDF225 Realty Laws (2-0)-3

The basic concepts of law, The concept of Rights. People, Family, Liabilities and Business jura. Land Registry and Land Registry. Law of Succession.

MAT281 Mathematics III (3-0)-4

Definition, types and classification of differential equations. Solution concept. General, special and singular solutions of differential equations. 1st degree differential

equations. Some special solution methods (factoring, alteration of variables, transformation to polar coordinates, degree upgrading). 2nd degree differential equations. Initial value problems with fixed and flexible parameter and Delta-Dirac and solution of differential equations including translatory functions by Laplace methods. Differential equation systems. Partial differential equations. Numerical solution methods for differential equations. (Euler and Runge-Kutta methods).

2ND YEAR – SPRING SEMESTER

JDF220 Summer Practice I (0-0)-4

Course is done in accordance with the regulation by students in order to improve and apply their occupational knowledge and experience which they gain until this semester and perceive the implementations and method differences which are carried on by various corporations.

JDF232 Computer Aided Design (2-2)-3

Mathematical foundations of computer graphics, coordinate systems, 3 and 2-dimensional transformations, point, line and areal objects, various CAD and mapping software and their applications, structure of the graphics formats and conversions between formats, LISP programming.

JDF234 Field Work I (0-4)-4

Establishment of polygon in the field, survey and computation, prismatic and tacheometric survey, plot in office environment.

JDF242 Geodetic Surveys (1-2)-2

Definition of Geodetic Survey. Definitions and varieties of triangulation and triangulation network. Preparation, establishing and description of triangulation points. Angle surveying and methods on triangulation networks. Out center angle surveying and demoting to ground. Determining datum parameters on triangulation networks. Horizontal positioning methods on triangulation networks. Establishing principles of national classic and modern triangulation networks. Defining and applying level by precisional and digital leveling on triangulation networks.

JDF244 Cadastral Foundations (3-0)-3

The historical development of the Cadastral, Cadastral of real estate-property relationship. Cadastral social and economic functions, Cadastral work in Turkey, Cadastral preserve and change processes, Cadastral renovation. Forest cadaster. Pasture Cadastral. Information systems and cadastral. Cadastral archiving. Cadastral work in Europe.

JDF246 Engineering Ethics (1-0)-1

Emphasizing of universal and individual ethic rules, the knowledge about the universal ethic principles, learning of engineering ethic rules and on this base the research, investigation and evaluation of problems about work disciplines,

MAT282 Mathematics IV (3-0)-5

Differential equations and their use in engineering. First and higher degree differential equations in engineering (especially in geomatics) projects. Linear differential equations and their applications. Solving differential equations using series. Numerical solutions of differential equations. Partial differential equations. Initial and boundary value problems.

3RD YEAR – FALL SEMESTER

JDF327 Adjustment I (3-0)-4

Concepts of error and correction. Precision criteria. Correlation. Error propagation law. Weighting and reverse weighting. Principles of adjustment theory. Types of adjustment computations and comparison and transformation of adjustment computation types

JDF329 Photogrammetry I (2-2)-4

Contains, definitions, historical development, application sides, classification of photogrammetry. Photogrammetrical foundations, optical foundations, geometrical foundations, Photogrammetrical foundations, Monoscopy stereoscopic and its mathematical investigation, stereoscopy, parallax, and parallax survey. 3D/stereoscopic view. Introduction to aerial photos.

JDF333 Database Management Systems (3-0)-4

Data base and base concepts, Database management systems and models; hierarchical model, network model, relational model, object-based model and sample applications, Assets from the association techniques. Graphic non-data search and query techniques. The concept of object-orientation and object-oriented data base, Sample applications. The database and object-oriented database software and applications.

JDF335 Global Navi. Satellite Sys. (GNSS) (2-2)-4

GNSS segments, principles of GNSS. GNSS signals and signal processing. GPS observations and observables, data formats (RINEX). GPS measuring and positioning techniques. Planning, observing and evaluating GPS measurements. Coordinate systems used in GPS: Earth-centered earth-fixed coordinate system and inertial coordinate system. World Geodetic System-1984 (WGS84). Local coordinate systems. Transformations between coordinate systems.

JDF337 Geodesy I (2-0)-3

Shape of earth and rotational ellipsoid. Properties of rotational ellipsoid. Latitude types in ellipsoid. Curvature in ellipsoid and radii of curves. Computation of distances and areas on ellipsoid. Geodetic curvature and geodetic curve. Utilizing sphere in lieu of ellipsoid in geodesy. Spherical triangle solutions. Legendre and Soldner Adding methods. Spherical coordinate systems. Geographic coordinate systems. Rectangular coordinate systems in spheres and computations. Transformation between spherical rectangular and geographical coordinates. Geodetic computation with spherical geographical coordinates.

Vocational Elective I Courses:

JDF345 Basic Image Information (2-0)-4

Optics, microwave and laser imaging, 2D-3D image, image coordinate systems, 3D imaging/display techniques.

JDF347 Surveying Applications for Local Governments (2-0)-4

Municipalities. Municipal Law No. 5272, distributed authority and responsibility local authorities, judgement bodies and duties, determined and become final municipal border, prepared strategic and performance plans, determined urban transformation and development areas, planning current maps, zone plans implementations, legislation and application relations.

JDF349 Cadastral Data and Applications (2-0)-4

City and outside, inside or outside of the contiguous area, places with or without the development plan, cadastral registration in the fields after the fields and villages built-in applications subject to change depending on demand operations (allotment, allotment, leaving the road, the road established, et al.) the initial stage up to the stage of the process of registration as a practical expression of and project work make for it.

JDF351 Mine Surveying (2-0)-4

Scopes of mine surveying are; getting mine rights, mine surveying services in steps of mine searching, reserve evaluation and preparing project. Definition about geological knowledge, measurement, calculation and graphical showings which given in maps and plans; measurement, map and plan services in open pit and underground mine projects appliance and management; mine plans and relevant arrangements. Slope stability observations and processing in open pits, mine subsidences measurement and calculation.

JDF353 Infrastructure Cadastre (2-0)-4

The scope and historical development of Infrastructure cadastre. Issue of infrastructure facilities registered in a cadastre. the legal and administrative arrangements related to Cadastral infrastructure. Infrastructure cadastre stages. surveying and mapping work related to Seen and unseen infrastructure lie and facilities. Infrastructure kadastrsunda automation.

JDF355 Urban and Regional Planning (2-0)-4

Introduction. Historical development. Basic components. Settling, progression of the settling. Explaining of the urban construction since the old period, areas of the basic function areas and its intensity. Plans for the developments, constituting of the development parcels, arrangement of the development. Effects of the arrival, cases of the becoming a center, types of the urbans. Contemporary planning. Basic features and criterions at planning of the urban and the region.

JDF357 Cartographic Map Production (2-0)-4

Cartographic Expression and Design Theory, Map Compilation, Generalization, Marketing, cartography ergonomics.

JDF359 Geodetic Astronomy (2-0)-4

Basics in geodetic astronomy. Fundamental definitions. Celestial coordinate system, hour angle and right-ascension systems. Ecliptic coordinate system. Astronomical triangle. Relations in coordinate systems. Special positions of stars. Solar movements and their problems. Changes in star coordinates. Time definitions and transformations. Star catalogues and almanacs. Celestial maps, definitions of azimuth, latitude and longitude.

JDF361 Equipment Handling (2-0)-4

Geometric optic. Optic laws. Lenses and prisms Binocular and theodolites. General structure of conventional theodolites. Axes requirements, control of axes requirements and elimination of axis errors. Optical levels. General structure of levels, control of axes requirements and elimination of axes errors. Digital levels, laser levels and equipment. Principles of electromagnetic distance measurements (EDM) General structure of EDM. Electronic angle measurement methods. Corrections to measured distances. Calibration of EDM's. Applications with EDM. Data transfer between PC and EDM. Digital leveling.

JDF363 Error Theory and Estimation (2-0)-4

Geodetic surveys, observation errors and probability theories and relationship between them. Hope value, variance, covariance, correlation and normal distribution concepts. Accuracy and precision criteria, cofactor and weight concepts. Error propagation laws. Parameter estimation. Linear models for parameter estimation. Least squares method, application of this method to direct and indirect observations.

3RD YEAR – SPRING SEMESTER

JDF314 Adjustment II (3-0)-3

Reduction of correction equations. Station adjustment. Adjustment of horizontal, vertical and three dimensional networks using indirect observations method. Coordinate transformations. Adjustment of unconstrained networks. Testing and interpreting adjustment results.

JDF320 Summer Practice II (0-0)-4

Course is done in accordance with the regulation by students in order to improve and apply their occupational knowledge and experience which they gain until this semester and perceive the implementations and method differences which are carried on by various corporations.

JDF332 Geodesy II (3-0)-3

General concept of map projections. Projecting spheres into planes. Deformations in projections. Concept of conform projections. Gauss-Krüger Conform Projection of

spheres into planes. Isometric parameters. Basic conditions of conform projection, Cauchy-Riemann differential equations. Gauss-Krüger Projection of ellipsoids into planes. Geodetic reductions and computations for projection deformations. Zones and zonal transformational in Gauss-Krüger Projection.

JDF334 Geographical Information Systems (2-2)-3

The concept of GIS, history, application areas and purposes. GIS and map, The importance of the map in GIS, used map types and model theories. GIS functions, components, data sources, hardware and software features. data types in GIS. Techniques of acquiring data, storage methods, numerical applications. Fundamental and mathematical approaches to recognize the shape of raster images. The concept of topology in GIS, topological operations, Sample applications. Generalization and generalization algorithms in GIS. data standards in GIS. Location-based analysis in GIS.

JDF336 Photogrammetry II (2-1)-2

Aerial Photogrammetry. Taking of aerial photographs. Mono image evaluation. Stereo image evaluation. Analogue, and Analytic evaluation. Photogrammetric triangulation. Orthophoto and DEM generation. Introduction to digital photogrammetry.

JDF338 Digital Image Processing (2-0)-2

Introduction, contents, basic terms, references, principles of digital image, image geometry, image digitization, resampling, characteristics of digital image, elements of visual perception, data structures in image processing, image pre-processing, pixel radiance transformations, geometric transformation, contrast enhancement, linear contrast enhancement, image thresholding, histogram, gray-value histogram, non-linear enhancement (histogram thresholding), spatial enhancement, spatial filtering, noise removal, image enhancement in frequency domain, low-pass filters, high-pass filters, morphological algorithms in image processing, image segmentation, geometric transformations, image classification, object display and recognize.

Vocational Elective II Courses:

JDF342 Rural Land Evaluation (2-0)-5

Fundamental principles in Rural Land Arrangement, The methods of rural land arrangement, rural land arrangement and implementations in Turkey, implementations of rural land arrangement, land consolidation in rural land arrangement, surveying phases in land arrangement, surveying and interpretation, organization in rural land arrangement, General Technical and Juridical Problems of rural land arrangement, Conclusion and Suggestions.

JDF344 Coordinate Systems (2-0)-5

Celestial coordinate systems: Horizon coordinates system, hour angle coordinate system, right ascension coordinate system, ecliptic coordinate system. Terrestrial coordinate systems: Astronomical systems, geodetic (ellipsoidal) systems.

JDF346 Terrestrial Photogrammetry (2-0)-5

Basic concepts and definitions, Application areas of Terrestrial photogrammetry, Classification of terrestrial photogrammetry, Mathematical Geometric equations, Terrestrial photogrammetry cameras, Planning of Terrestrial photogrammetry, Imaging at field. Image Coordinate Systems. Optical and Laser Imaging. 3D model generation. Image Overlapping Techniques

JDF348 Programming in Database Man. Sys. (2-0)-5

Data base and base concepts, Database management systems and models; hierarchical model, network model, relational model, object-based model and sample applications, Assets from the association techniques. Graphic non-data search and query techniques. The concept of object-orientation and object-oriented data base, Sample applications. The database and object-oriented database software and applications.

JDF350 Hydrographic Surveys (2-0)-5

General information about making hydrographic maps. Pre-studies for hydrographic surveys. Vertical control datum, tide-gauge measurements, Depth measurements: sounding rods, sounding leads, echo sounders, photogrammetric and remote sensing methods. Errors in depth measurements, recovery of the errors, Horizontal control, Methods of the horizontal positioning: Positioning with conventional and GPS techniques. Determination of effect of the sea wave. Hydrographic mapping.

JDF352 Cartographical Database Man. Sys. (2-0)-5

Cartographical DBMS presentation. Maps used in cartography and relations with the DBMS. Design and application of cartographic DBMS

JDF354 Underground Surveying Techniques (2-0)-5

The definition and theory of underground surveying. Applications and projections of measurement techniques in the underground. Methods of special geodetic measurements in the underground. Introduction of underground surveying techniques in the world

JDF356 Photogrammetric Project Management (2-0)-5

Definition of Photogrammetric Project; planning and actualization of the projects, exercise, control, supervision and management of actualization of the projects. Map projects and management of them. Expectations from projects and drafting technical specifications. Using new techniques in projects.

4TH YEAR – FALL SEMESTER

JDF427 Land Management (2-2)-4

Introduction to Land Management. The concept of Property. The concept of Sustainable Land Management. Local authorities and their duties. Revision of large scale topographic maps. Kinds of plans, environmental, regional and zoning. Kinds of zoning

plans and their implementation. Regulation for urbanization and the concept of urbanization. Roles of surveyors in preparing zoning plans. Methods of implementing zoning plans. Land compensation. Land Readjustment. Application of zoning plan reforms (articles 10-b/c of related regulation) . Evaluation of alternative land parcel allocation methods. An overview of land valuation. Application of condominium rights. Coastal law. The use of Geographical/Urban/Land Information Systems in Land Management.

JDF437 Public Surveys (1-2)-3

Engineering projects which includes land and Surveying Engineering Services in these projects feasibility, designing, appliance and administration; Knowledge and documents about project and tender file; Horizontal, vertical, location, section and dimension applications about projects; Measurements and calculations about income and final accounts. Special measurement equipments and systems which use in project surveying.

JDF439 Remote Sensing (2-1)-3

Description, function, fields of application, classification and history of Remote Sensing. Electromagnetic energy, Electromagnetic spectrum, effect of atmosphere, interaction with the surface mass, spectral reflection, attitude of the mass in microwave area, optical sensors, microwave sensors, optical-mechanical scanners, digital image, record formats of data, resolution, natural and artificial colored images, 3D vision, images with distortion, thermal images, image enrichment, filtration, introduction to classification, pixel-based classification, object-based classification, accuracy of classification, 3D satellite images, orthorectification, using of satellite images in geographical information system

JDF463 Academic Writing & Presentation (2-0)-2

Origins and types of scientific writing. IMRAD format. Preparing titles and short abstracts. Rules of writing satisfactorily introduction, materials and method, results and discussion. Citing and listing references and citation types. Preparing effective tables, figures and graphs. Writing thesis, technical reports, posters. Utilizing computer aids for writing and presentation of manuscripts. Short and long effective presentations.

JDF441 Summer Practice (0-0)-2

Course is done in accordance with the regulation by students in order to improve and apply their occupational knowledge and experience which they gain until this semester and perceive the implementations and method differences which are carried on by various corporations.

JDF499 Dissertation Study (0-6)-5

A study which includes a subject on vocational research and application will be performed.

Vocational Elective III Courses:

JDF433 Physical Geodesy (3-0)-5

Theory of potential. Gravity field of earth. Coordinate systems used in physical geodesy. Gravimetric systems. Astrogeodetic methods. Geodetic reductions in leveling. Extra-terrestrial gravity field. Modern methods in determination of earth shape. Utilizing satellites in physical geodesy.

JDF443 Realty Valuation (3-0)-5

Concepts of value and real value. Urban and rural real estate assessment. To evaluate the parameters affecting the and the relationships between them. In terms of immovable legislation and the expropriation property assessment. Real estate evaluation methods. Statistical analysis for the assessment of immovable anketsel basis.

JDF451 Land Info Systems (3-0)-5

Introduction to the management of land information. Conceptual development of land information system. The concept of Ownership. Land use and policies. Approaches regarding the management of the Property. Concepts of multi-purpose cadastre. Cadastral systems and applications. Land Information Systems functions, the requirements for establishing and maintaining. Information control and the production of. Economic evaluation of land information system, problems.

JDF459 GNSS Applications (3-0)-5

GPS surveys. GPS surveying and positioning techniques and their types. GPS observations and observables, data formats. Planning field work and evaluating observations.

JDF465 Expropriation (3-0)-5

Expropriation law. Purpose and scope of the expropriation of doing. Expropriation throwing hand. Quick expropriation. The expropriation process applications.

JDF467 Forestal Cadastre (3-0)-5

The Importance of Forestry and Forest cadastre, Definition of Forest and Terms of forest legislation. Implementation of Forest Cadastral Maps.

JDF469 Digital Photogrammetry (3-0)-5

Definition of digital photogrammetry, digital photogrammetric processing techniques, analog and digital cameras, digital data acquisition techniques, high-precision scanners and video digitizers, raster and vector scanning techniques, digital image resolution criteria, digital image types, digital image matching techniques, digital image tracking methods.

JDF471 Photogrammetric Info Systems (3-0)-5

Introduction and concepts. Photogrammetric products: digital maps and orthophotos. Integration of photogrammetry and GIS. Stereo digitizing. Image rectification. Structure

and symbology of photogrammetric data. Accuracy and application field. Usage of photogrammetric products in GIS.

JDF473 Laser Scanner Techniques (3-0)-5

Definition, history and classification of laser scanning. Comparison with other methods. Basic theory, components, equations, system requirements, synchronization of time and rates of measurement, reference frames and conversion between frames, accuracy analysis of laser scanning technique. Application fields of laser scanning. Used measurement equipments, technical characteristics. Acquired data and contribution to map production.

JDF475 Photogrammetric Applications (3-0)-5

Introduction of photogrammetric applications, mathematical principals. Digital workstation, image processing softwares, Terrestrial photogrammetric applications. Mono and stereo orientation, 3D view applications and using in applications. 3D modelling applications. Image digitization, automatic feature extraction, photogrammetric data acquisition and evaluation via UAV.

JDF477 Geoid and Vertical Datum (3-0)-5

Definition and importance of geoid. Geoid as a fundamental shape for earth and as an equipotential surface. Geoid and vertical datum. Heights and geoid models. Geoid determination methods: Astrogeodetic, gravimetric, geopotential and satellite methods.

4TH YEAR – SPRING SEMESTER

JDF414 Dissertation Study (0-6)-5

A study which includes a subject on vocational research and application will be performed.

JDF430 Field Work II (0-4)-5

Establishing a triangulation network in a chosen region. Measuring all horizontal and vertical angles and distances in a triangle network, performing observation and computation controls and applying corrections to these measurements. Checking and calibrating all the instruments involved. Determining the heights of triangulation points by trigonometric leveling with the aid of all known heights in the vicinity of the network. Computing the orthometric height of appoint using precise leveling measurements and performing geodetic corrections to these. Presenting all the observations and computations in a thesis format.

JDF432 Road Management (2-1)-3

Historical development of highways in Turkey and in the world, classification of roads, terms about roads. Definitions and calculations about geometric elements of roads, vertical and horizontal arcs, transition curves. Design, design methods and design map. Making plans of roads horizontal and vertical positions and section geometries, cubic and Brückner calculation. Art buildings and planning basis. Road ground structure and planning. Application of road projects, excavation works.

JDF434 Project Management Information (2-0)-2

Occupation of mapping-cadastrate, regulation and historical development of the sector, structure of the sector, publications, works and working areas of the sector. Municipality, pasture, mine, forest, nationalization, arrangement and analysing other regulation about content of land related with mapping-cadastrate and ownership. Project planning and applications of CPM-Pert diagrams.

Vocational Elective IV Courses:

JDF446 Urban Info Systems (3-0)-5

General definitions. Urban Information System (CIS) 's organizational planning. Categories contained in KBS: Planning, infrastructure, transport, environment, building permits and inspection, reconstruction, etc. data collection. Applications on CIS.

JDF460 Deformation Measurement (3-0)-5

Concept and definition of deformation. Various techniques in determining deformations. Geodetic and geotechnique methods of deformation determination. Conventional deformation analyses. Various application solutions.

JDF464 Zoning Applications (3-0)-5

Defining the urban or zoning plan and plan's variety, relations between environmental development and urbanization, investigating development in Turkish Civilization Law and comparison old and new law, effects of Zoning plan, land ownership and zoning plan implementation, generally evaluation and suggestions about zoning plan implementation, how is Land readjustment done, how is calculated participation rate. Zoning Law 3194 and applications.

JDF468 Geospatial Applications in Remote Sensing (3-0)-5

Imaging and image geometry, coordinate transformation between image and ground coordinate systems, parametric and non-parametric transformation models, term of georeferencing accuracy, term of information content, orthoimage generation, DEM generation, vector data generation, 3D terrain model, data acquisition into GIS.

JDF470 Cartographical Info Systems (3-0)-5

Digitization, Scan, Editing Chart Data, Topological Functions based object, Topological Functions based layer, Geographic Raster Data Display, Vector-raster and raster-vector conversions, Planar Map Transformations, Digital Terrain Data Sampling Approaches, Grid Interpolation, Line Simplification Algorithms.

JDF472 Cadastral Info Systems (3-0)-5

Land Registry and Cadastral Systems in the world and our country. Cadastral Information Systems presentation. Cadastral Information System Design and Implementation. Cadastral Information Systems's samples of Introduction.

JDF474 Zoning Apps. in Urban Areas (3-0)-5

Usage and development of urban areas in Turkey and in the world. Spoiled areas and historical structure relations in built up areas. Arrangement methods and legislation in built up areas. General criterias for choosing urban transformation arrangement areas. Preparing urban transformation projects. Duities of Geodesy and Photogrammetry engineer in urban transformation. Urban transformation aplications in Turkey and interpretations.

JDF476 Microwave Sensing Systems (3-0)-5

Definition, history, systems and classification of microwave sensing. Microwave systems, technological development, professional importance. Basic and advanced microwave sensing systems, basic components and characteristics. Quality assessment of acquired data and contribution to map production.

JDF478 Digital Terrain Models (3-0)-5

Concept of Digital Terrain Models (DTM). Definitions and basic background. Fitting curves and surfaces. Regular and irregular DTM. Data structures in DTM, data formats. Establishing a DTM. Interpolation techniques used DTM. DTP applications. Analyses of perspective view of terrain, slope, exposure, visibility etc.

JDF480 Evaluation of Satellite Data (3-0)-5

Introduction to GPS abd comparing with conventional method. Positioning with code observations. Space geodetic techniques. Positioning with carrier phase observations. Error sources in GPS. Interpreting GPS results. GPS heighting. Baseline solutions, analyzing GPS networks. International standards and organizations. Commercially available GPS softwares.

JDF482 Satellite Geodesy (3-0)-5

Coordinate systems used in satellite geodesy: Earth-centered earth-fixed coordinate system and inertial coordinate system. World Geodetic System-1984 (WEGS84). Local coordinate systems. Transformation between coordinate systems. Time systems used in satellite geodesy. Kepplerian satellite orbits and teir movements. GPS satellite orbits. Computation of satellite's position and speed by broadcat and precise ephemerids.

JDF484 Geodetic Network Design (3-0)-5

Introduction to geodetic networks design. Classification of geodetic netwroks. Turkish National Geodetic Networks and Datum. Test statistics and hypothesis tests. Global and local precision and reliability criteria in geodetic networks. Methods for designing geodetic networks and concepts for design and optimization. Optimization for purpose functions: Precision Optimization, Reliability Optimization and Cost Optimization. Optimization for design parameters: Zero degree datum optimization, 1st degree position optimization, 2nd degree survey plan and weighing optimization, 3rd degree improvement optimization.

Free Elective Course for Other Departments

JDF History of Surveying Science (2-0)-3

General information about historical improvement and emergence of mapping. Concept of mapping and the presentation of information and equations which were occurred around it. The scientists who supported the science history and the determination of their supports.

JDF Scientists in Surveying History (2-0)-3

Names and biographies of scientists who contributed to geodesy. Their scientific achievements and contributions to scientific community of geodesy in chronological order.

JDF Mining Subsidence and Problems Caused By (2-0)-3

Underground Mining causes ground movements (subsidence) in ground and surface. These subsidences create problems and damages natural and cultural structures which are within the domain. This formation and problems caused by Mining Subsidence will be covered in this course.

JDF Satellite Images and Usage Areas (2-0)-3

Remote Sensing Satellites and Images, History of development, Usage Areas, Visual Globe Applications (Google Earth, Nasa World Wind etc.) and Samples.