Syllabus of courses in the department of Geology – Faculty of science – Damascus University
– Applied Geology-

Syllabus of courses in the Branch of Geology	Hour / Week		Subject	Semester	Year
	Practical	Theoretical			
Matrix- Algebra operations of matrix- Determinants- Numerical methods: Finding the roots of algebra equation, Calculation of numerical integration- Analytical geometry: Straight equations in a plane, Plane equation in a vacuum, Two equations of straight in a vacuum- Common chapter of two planes- Curves of second class- Probability: Methods of numbering ,Conditional probability, Probable distributions	2	2	Mathematics (1)	1.st	**First**
Physics quantities & measurement- Vectors- Movement on a straight line- movement on a curved path- Newton's laws of motion - force moment -work & Energy& power – momentum and impulse movement quantity – circular motion – Surface tension	3	2	Physics (1)		
Introduction-Basic laws in chemistry-Thermal chemistry & chemical thermodynamics-Atomic structures & atomic synthetics- Modern quantum theory & the atomic structure-Periodical table & periodical properties of elements-Chemical bonds & supportive elements-Crystallography-Nuclear chemistry& radioactivity	3	2	General chemistry (1)		
Introduction to geology – Study of the earth – origin and physics properties of the earth; structure and composition of earth's envelops-gravitational equilibrium of the earth's crust- history of the earth and stratigraphic column. Materials of the earth: introduction to crystallography and mineralogy (crystal and crystal properties; crystal symmetry; minerals and physical properties - main minerals of rock). Igneous rocks, sedimentary rocks, Metamorphic rocks.	2	3	Physical Geology (1)		
food: fuel or pleasure ? - if you really want to win, cheat - we are family - Ka-ching changing your life - race to the sun - in the office - modern manners - judging by appearances - if at first you don't succeed - renting a flat	-	4	Foreign language (1)		
Index of Grammatical Subject: The sentence structure – Different type of Arabic verb – Interrogation – Exclamation – Number and composition – The Subject – Oath – Nominal sentence – Call and Negative	-	2	Arabic language		

Syllabus of courses in the Branch of Geology	Hour / Week		Subject	Semester	Year
	Practical	Theoretical			
Numerical sequences- Finite & continuation-Continuation, Status of non-definition-un limited integrations- Properties of limited integration- area calculation-Calculation of curve length-Calculation of size	2	2	Mathematics (2)	2.nd	***First***
Introduction of Vectors Analyses -Electric Field - Electric Field lines – Electric Dipole - Gauss's Law – Electric Potential - Conductors in Electrostatic Equilibrium – Capacitance and Capacitors-Capacitance of isolated conductor – Electric capacitor – Parallel plate Capacitor - The magnetism – The Magnetic Field- Magnetic flux and magnetic field lines – Magnetic Induction	3	2	Physics (2)		
Introduction-Oxidation & reduction – electrical chemistry-Materials status-Chemical equilibrium-Solutions & properties-Kinetics chemistry-Chemistry of elements(Hydrogen -0xygene – water –basic elements of group 1 - basic elements of group 2- basic elements of group 3- basic elements of group 4- basic elements of group 5- basic elements of group 6- basic elements of group 7- transition elements	2	3	General chemistry (2)		
The External Geodynamical Actions-Wearing Away of The Land By Weathering-Mass Wasting-The Wind Geological Action and Deserts-Streams & Drainage System-The Ground Water Geological Action-Glaciers & Glaciations And their Geological Actions-The Oceans and Their Margins-The Lakes and Bogs -The Internal Geodynamical Actions-Volcanoes-The Earth Crust Deformation-Earthquakes	2	3	Physical geology (2)		
Solids - Projection systems used in geodesy Systems of geodesy coordinates - Surveying measures - Polygon & triangles - Clearance Longitude sectors - GPS system for measuring coordinates - GIS systems - Elevation & surveying modeling though using surveying apparatuses	2	2	geodesy		
Back to school, aged 35 - in an ideal world - still friends ? - a visit from a pop star slow down, you move too fast - same planet, different worlds - jop swap – meetings love in the supermarket - see the film….get on a plane - I need a hero - breaking news.	-	4	Foreign language (2)		

Syllabus of Geophysical courses	Hour / Week		Subject	Semester	Year
	Practical	Theoretical			
Structure of material-Growth of crystals-Measurement of angles-The projection-Symmetry elements-Combination of symmetry elements-Symbols of symmetry elements-Crystal notation-Orientation of crystals and choosing the unit_face-Main lines of studying the crystal structure-Simples crystal forms-Internal symmetry of crystal and lattice structure-X_ray radiation-Structure of typical crystals	2	2	Crystallography	1.st	Second
General Mineralogy, crystallochemistry of minerals, Physical properties of minerals, Genesis of minerals, Descriptive mineralogy, Classification of minerals, The (native elements, sulfides, halide, oxides and hydroxides, silicates, borate, carbonates, nitrates, phosphates, molibdates and tungsten, organic mineral)class, gemstones .	2	3	Mineralogy		
Time in geology-Stratigraphic (unites- events-and gaps)-physical methods in Stratigraphy-sedimentologic methods-Chemical methods-biostratigraphic methods	2	2	Stratigraphy (1)		
Radial analysis-Fundamental definitions-Operations of radiation- Decimal analysis: Basic definitions-Operations of decimal numbers-Deferential equations-Basic definitions-Study of some types of differential equations- Linear programming-Basic definitions-Finding out ideal solutions for the linear programs (Simplex method)	2	2	Mathematics (3)		
The structure of earth -Magma - forms of the rock deposition (surface –subsurface –deep) – Classification of igneous rock (origin – minerals) - Kinds of igneous rocks –Structure\matrix of igneous rocks – metamorphic rocks(classification – facies)	2	3	Petrography of igneous and metamorphic rocks		
Introduction, Fossilization, Methodes of collecting fossils, Determination and nomenclture of fossils, Systematic paleontology, Paleontology and evolution; Paleontology and stratigraphy, Paleontology and ecology, Groups of fossils having stratigraphical significance, Invertebrate fossils .	2	2	Paleontology (1)		
The subject “English for Science” consists of 12 lessons; each lesson talks about one of natural scientific topics, such as, The Solar System- what makes a Hurricane? – How Sedimentary Rock forms.	-	4	Foreign language (3)		

Syllabus of Geophysical courses	Hour / Week		Subject	Semester	Year
	Practical	Theoretical			
Basic of hydrogeology and hydrogeological studies, Formation of ground-water deposits and occurence forms in the earth's crust, Hydrogeological properties of rock, Physical propeties of ground-water,Geochemistry of ground-water, Ground- water flow, Classification of ground-water.	2	2	General hydrogeology	2.nd	Second
Introduction 1- Cosmology and solar system 2- Gravitational field and shape of the earth 3- physical characteristic of the earth 4-geomagnetic field 5- Geothermal field 6- Geoelectric field	2	2	General geophysics		
Principles of stratigraphy – Lithological and sedimentological principles – methods of stratigraphy	2	2	Stratigraphy (2)		
General definitions-calculation systems-representation of data in cumputer-algorithms and programming languages-symbols used in computer-input and output instuctions of data-instructions of transition-circles-functions and procedures-files-plotting-fundamental concepts of statistics- single field experimental distribution- multiple fields experimental distribution-applications in geo_statistic	2	2	Programmig & geostatistics		
General properties of sedimentary rocks – (structure ,formation stages, changing stages ,classification) of Sedimentary rocks – Descriptive study of sedimentary rocks – group of clastic and shale rocks – group of bio_chemical rocks – combustible materials	2	3	Petrography of sedimentary rocks		
Invertebrate fossils : phylum prof.fer; phylum coelenterate ; phylum brachiopod ; phylum annelid ; phylum mollusce ; phylum protocordata ; graptolithina ; conodonts. Vertebrate fossils : plant fossils ; examples of vertebrate fossils.	2	2	Paleontology (2)		
The subject "English for Science"consists of 13 lessons, each lesson talks about one of natural scientific topics. Such as, Exploring the Undersea World –What is Sound? – Climate and the Change of Seasons – Recycling reduces Pollution.	-	4	Foreign language (4)		

Syllabus of Geophysical courses	Hour / Week		Subject	Semester	Year
	Practical	Theoretical			
Introduction: nature of light -Refrecation of light in crystals -Polarizid light in crystals - Polarizing microscope -Study of crystals by polarizing microscope: optical indicatrix in crystals -comparision of refractiveindices in microscopic thin section by beck line - interference colours in crystals - determination of indicatix axes and crystal elongation - study of crystals in convergent light: optical anomaly in crystals -Various optical studies by Feodrove universal stage	2	2	1-OPTICAL Crystallography	1.st	Third
1-Part1:The Soil Engineering: 1-The physical and Chemicalproperties of the Rocks. 2- the Soil and Rocks Meachanic: The physical and mechanical of the Rocks properties .The stress distribution into the Rock masses 2-Part2: The Geo-engineering studies: 1-The Geo-engineering Investigation.2- The Engineering Construction& theGeo-engineering studies. 3-Part3: The Enviromental Geology: 1-The Enviromental Geology Principles. 2-The Pollution rescores.3-The Enviromenal Geology Role in the land usefor the Different purposes	2	3	2-The Engineering Geology&Geo-environmental		
Introuduction - Structural geology -basics in rock mechanics (stress and strain joints) - faults- folds	2	3	3-Structural Geology(1)		
Relative date: Stratiform principle ,Lateralcountiniut ,Paleontology indentity - Absolute date: Geological aras :Pre-Cambrian (characteristics, divisione and distribution). Mesozoicera characteristics, divisione and distribution), Cenozoic era characteristics, divisione and distribution)	2	3	4-Historical Geology		
Introduction –Rigional Geology of Syria in mediterranian region -morphology,Tectonic of Syria stratigraphy: stable zone APZ, unstable zone of APZ.	2	3	5- Regional Geology(1)		

General introduction - Physical and Geololgical principlse in the seismic methods -Seismic waves types and spread -Geometry principle for refrection and relection wave energy in Geological mediums -Sources of seismic energy on the land and in the Marine -seismic equipements and recording – field seismic measurments 2d,3d -analysis of curves time - distance for reflection wave and refrection waves -Mathmatics and physical principles for seismic data processing -seismic data processing sequence -seismic data interpretation -theoretical principles of Magntic theory -equipements and recording and interpretation methods –radioactivty methods principles –equipement and recording and interpretation of radioactivity methods	2	2	6-Applied Geophysics (1)		
-Origin of sediments – sedimentary texture –Texturas and structures of sedimentary rocks –factors and feauture of sedimentary Enviroment – transportation of sediments –sedimentary Enviroments –facies and facies changes –sedimentation and Tectonic –References – geological terms	2	2	7-Sedimentology		

Syllabus of Geophysical courses	Hour / Week		Subject	Semester	Year
	Practical	Theoretical			
Properties and shape –location –structure –measurement – function and ability –action and sequence –quanity –cause and effect –proportion –frequency –probability –igneous rocks –sedimentary rocks – metamorphic rocks -electrical Methods –gravity methods –magnatic methods –seismic methods	-	4	1-Modern Applied Geology (1) in Foreign	2.st	Third
Introduction –Earth structure –seismic waves –Earthquake Instrumentation –Principle of seismogram reading –Earthquake location – Earthquake size – Geograhical Earthquake distribution –Earthquake mechanism –Earthquake prediction –volcanic Earthquake ,Moonquakes and Neacluar Explosion –Earthquake Geoengineering Effect –Earthquake activity in Syria	2	3	2-Seismology		
Vertical Movements –Plate Tectonic –Orgeny and Mountain Chains –Microtectonics –Foliation and Lineation	2	3	3-Structural Geology(2)		
Introduction –Field equipments –Types of geological maps – Representation on geological map: horizontalformation ,monoclonal formations ,fold structures and unconfomities ,method and faults representation –field work (method and means) –Appendiex (maps and diagrams).	2	2	4-Geological Mapping and Geological Camp		
Stratigraphy –Aleppo uplift –west Asian zone of basement of Proterozoic age &Alpine sedimentary cover - mesopotamian forelape –Geologicalevoliution of Syria –New Tectonic movements and releife formation –meneral resources of Syria	2	3	5- Regional Geology(2)		
-The electrical properties of rocks --The equipment and tools are used in electrical prospecting - -General information about the resistivity methods - Horizontal scanning electrode -Interpretation of measurements of the horizontal scanning -Vertical electrode sounding VES -Qualitative interpretation of VES -Quantitative Interpretation of the Vertical electrode sounding VES curves. -Interpretation of the quantitative interpretation of computer programs using. -Build section geo- electric section -geo- electric Survey 2D- 3D body charged method -Natural electric field- SP method -IP polarization method -telluric method. -Magneto-telluric method -Electromagnetic method. -Gravity method Gravity measuring devices. - Principles of the theory of gravity and acceleration of gravity Gravity corrections	2	2	7- Applied Giophysic(2)		

Syllabuse of courses in the Branch of applied Geology	Hours/week		subject	semester	year
	Theoretical	Practical			
The relation between the earth and the universe- Planets, Meteorite and Comets -The moon and its different rock ages-The earth- Structural chemistry- The chemical development of the earth and its element immigration- Periodic classification- Geochemical classification according to elements- Geochemistry of elements- Isotopes	3	2	**Geochemistry (1)**	**1.st**	**Fourth**
General principles on the geological - processes leading to the formation of .useful ore deposits The geological processes leading to - the formation of the useful ore deposits of the hydrothermal .endogenous The geological processes leading to - the formation of the useful ore deposits of the sedimentary .exogenous The geological processes leading to - the formation of the useful ore deposits of the metamorphogenic .endogenous Factors that help the distribution - and placement of the reservoirs of .useful ore deposits Exploration and excavation of the - .reservoirs of useful ore deposits Studying and testing of useful ore - .deposits Excavation and different treatments - for the extraction of useful ore .deposits	3	2	**Economic Geology (1)**		
-Composition of sedimentary rock: Mineralogical and ecological component (microscopic texture and structure, Fossilisation, Diagenetic process. - Role of sedimentary factors on mineralogical and ecological components -Diagenetic phenomena and principal sedimentary series. -Petrological studies in relationship with other geological studies - Determination of sedimentological and paleogeographical evolutions of sedimentary areas -.Examples and regional application	3	2	**Petrology of sedimentary rock**		

This unit concerne the following subjects: The Hydrocarbons: introduction- chemical and isotopic composition- principal family of hydrocarbons(crude oil and natural gases)- origin of petroleum hydrocarbon- hydrocarbon genesis- mother's rock(source rocks)- organic matter composition- sedimentary environment and kerogen- primary migration. Reservoir and seal rocks: introduction- petrophysical characteristics- effects of geological factors of reservoir properties.-principal family of reservoir rocks: detrital reservoir rock, carbonate reservoir rock. -seals: petrophysical and geological characteristics. Migrations, trapping and traps of oil and gas (principal types of hydrocarbon accumulation)- petroleum provinces -petroleum fields in Syria -Drilling and drillholes Pertroleum exploration- Production-reserves and methods of calculation.	3	2	**Petroleum Geology**		
-introduction to microfossils study- Collecting and preparation methods of microfossils and methods of fossils study- The most important microfossils group: microfossils of protozoa kingdom and metazoa kingdom – microscopic skeltal elements of larger animals of doubtful taxanomical affinities- Microfossils skelton or fragments of some animal and plants	2	2	**Micropaleontology**		

The Geomorphology course Description: -The main concepts of Geomorphology- The Principles of landform development - Cartography and Mapping - Endogenic processes and Planetary geomorphology (Volcano landforms and processes, Tectonic Interactions with Landscapes). -The exogenic processes and Planetary geomorphology (Mass wasting, Mass movement and weathering processes Landforms, Fluvial processes -Landforms, Ground water processes - Karst Landforms, Glacial Landforms, Eolian (Wind) Landforms, The Shoreline shifts landscapes & the coastal/marine interface). --The role of geomorphic process studies in environmental planning, Effect of landform processes upon human activity . Geohydrology, Economic Geology, The civil engineering erections ; and identification of mitigation of natural hazards)	2	2	**Geomorphology**		
Geological time scale-Sedimentary , igneous and metamorphic rocks Mineral deposits-Theoretical geophysics-Exploration geophysics Surface water and rainfall, underground water and the water cycle	4	-	**Modern Applied Geology in Foreign**		

Syllabuse of courses in the Branch of applied Geology	Hours/week		Subject	Semester	Year
	Theoretical	Practical			
Historical Geochemistry - of the Earth - Differentiation and Fractional Crystallization - Formulation of the Phase Rule Crystallization in Silicate - .Systems Geochemical Prospecting: Introduction in Geochemical Prospecting - The Role of Geochemistry in Solving Origin Questions - The objectives of Geochemical prospecting Samples of Geochemical - Prospecting - Chemical Weathering and Rocks .Decomposition Analytical Methods In :Geochemical Prospecting X-Ray Diffraction The general Method of - Silicate rocks Analysis. In :Petroleum Geochemistry Origin of Source Rocks - Petroleum-Mother Rocks -	3	2	**Geochemistry (2)**	**2.d**	**Fourth**
Physical basics of Remote sensing- Methods of Remote sensing to surface earth study- Aerial Cameras- Earth Resources Technology Satellite- Aerial photography and images interpretation- Remote sensing applications of various geological fields- Geographic Information Systems- Global Positioning System- Images Processing- Remote Sensing in Syria.	2	2	**Remote Sensing**		

Introduction to Petroleum Geochemistry and organic matter An introduction -- The most important characteristics of carbon ato- Distribution of carbon and compounds in nature - Primary life on earth - Origin of organic matter in sediments - Geochemistry of organic matter concentrated and scattered in sedimentary rocks - Total distribution of organic matter in sedimentary rocks - Petroleum and its derivatives - Transformations of organic matter - Petroleum hydrocarbons - Organic matter transformations - Hydrocarbon leakage and surface geochemical exploration - Oil fields water and their effect on hydrocarbons Correlation.	2	2	**Geochemistry of Oil and organic matter**		
Conditions of formation and of the metallic useful ore deposits: Black metals group and spacers - Colored metals group – Precious metals group - Radioactive metals group - Rare and scattered metal elements - Rare earth minerals. Conditions of formation and patterns of the reservoirs of useful non-metallic ore deposits: -Raw materials for industrial, chemical and agricultural -Raw materials for building. Reservoirs ore deposits in Syria: Distribution of useful ore deposits in Syria– The useful metalic reservoirs of the ore deposits in Syria- The useful Non- metalic reservoirs of the ore deposits in Syria- The reservoirs row materials for building in Syria	3	2	**Economic Geology (2)**		

-Magma and igneous operations – Experimental works on basalts – Fractional crystallization of basaltic magma – Volcanic Rocks (Plutonic Rocks, Ultramafic rocks, The igneous basic rocks, The acidic igneous rocks, Feldspathoidic alkali and subalkali rocks) – Carbonatite Rocks –Petrochemical igneous rocks (Petrochemical igneous rocks, Petrochemical trace elements in igneous rocks, The use of isotopic in petrology) – Metamorphism and Metamorphic Rocks (Metamorphism, Metamorphic conditions, The facies classification of metamorphic rocks	3	3	**Petrology of igneous and metamorphic rocks**		