Basic GIS — 3 months

- Introduction to GIS
- Hardware and software requirements of GIS
- Database structures and formats
- Vector data structures
- Raster data structures
- Data inputting, editing and topology in GIS

Advanced GIS — 6 months

- Integration of spatial and non-spatial data
- Map Projections and data transformation in GIS
- Spatial data analysis (vector-based)
- Spatial data analysis (raster-based)

Advanced Skills in GIS — 9 months

- Digital Elevation Model (DEM) and its applications
- Remote sensing and GIS data integration
- Errors and accuracy evaluation in GIS (data quality and source of errors)
- Network analysis in GIS
- Characteristics of large area database, global and regional
- Decision support system
- Overview of current GIS packages
- Trend of geo-informatics
- Fundamental concepts of the Global Positioning System (GPS)
- Types of GPS, GPS satellites, constellation of GPS satellites
- Applications of GPS in resource surveys, mapping and navigation

Photogrammetry — 6 months

- Fundamentals of aerial photogrammetry
- Aerial cameras
- Film Processing (black/white, colour, black/white infrared, colour infrared films) film density and characteristic curves
- Aerial flight planning
- Basic geometric characteristics of aerial photographs
- Scale, ground coverage and resolution of aerial photo, tilt and relief displacement
- Stereo vision, stereomodel and stereoscopes
- Measurement of height from aerial photos, parallax and parallax measurement
- Satellite sensors for stereo coverage, along track/across track stereo scanning
- Principles of stereo photogrammetry
- Principles of satellite photogrammetry
- Principles of radargrammetry and synthetic aperture radar interferometry
- Plotting instruments (stereoplotters)
- Aerial triangulation, control and mapping
- Principles of digital photogrammetry
- Principles of cartography and map making
- Project

Space Geodesy — 4 months

- Introduction to Geodesy
- Spherical Earth
- Natural coordinates system
- Gravity field
- Ellipsoidal Earth (Ellipsoidal Geometry)
- Coordinate transformations
- Celestial coordinate systems
- Time systems
- Introduction to satellite positioning system, the basic idea, position of satellites, from distance satellite to the point

Space Geodesy and Satellite Positioning — 6 months

- Introduction to Geodesy and basic concepts of satellite geodesy
- Fundamentals of reference coordinate systems
- Introduction of satellite positioning system
- Satellite motion (1)
- Satellite motion (2)
- Satellites signals
- GPS System with satellite position

Global Positioning System (GPS) — 3 months

- Introduction to GPS
- GPS details
- GPS errors and biases
- Datums, coordinate systems, and map projection
- GPS positioning modes
- GPS data and correction services
- GPS standard formats
- Other satellite navigation systems
- GPS applications (GPS project training)

Fundamentals of Surveying — 1 month

- Definition of surveying science
- Measuring
- Orientation
- Obstacles
- Area calculation
- Maps
- Compass
- Topographic maps
- Plans
- Cadastral surveying
- Leveling
- Project

Advanced Surveying — 1 month

Credit Hours	
24	Theodolite
8	Traverse
4	Areas
8	Curves
4	Ticometric Method
32	Project

Total Station — 1 month

Credit Hours	
8	Instrument configuration
6	Observations
16	Programs
4	Surveying by codes method
8	Data processing
4	General review
34	Project

Astronomy and Space Science — Short Term Course

Duration		Course No
4 weeks	Fundamentals of Astronomy I	1201801
4 weeks	Fundamentals of Astronomy II	1201802
4 weeks	Fundamentals of Astronomy III	1201803
4 weeks	Fundamentals of Space Physics I	1202801
4 weeks	Fundamentals of Space Physics II	1202802
4 weeks	Fundamentals of Space Physics III	1202803

Astronomy and Space Science — Long Term Course

Credit Hours		Course No
3	Fundamentals of Astronomy and Space Science	1201711
3	Mathematical Physics	1202702
3	Techniques of Astronomy and Space Science	1201774
3	Astrophysics	1201702
3	Stellar Structure	1201737
3	Space Physics	1202751
3	Remote Sensing and Applications	1202774
3	Modern Scientific Methodology (in Astronomy and Space Science)	1121702
3	Galactic and Extragalactic Astronomy	1201738
3	Cosmology	1201726
3	Radio Astronomy	1201773
3	High-Energy Astrophysics	1201775
3	Satellite Geodesy	1202775
3	Satellite Meteorology	1202776
3	Space Telecommunications	1202777

Hashemite Kingdom of Jordan

**Royal Jordanian Geographic Centre
Regional Center for Space Science
and Technology Education
for Western Asia
(Affiliated to the United Nations)
Amman-Jordan**

General Background

In 1998, the UN requested the Western Asia countries to indicate whether they were interested in hosting the Regional Centre. Two Western Asia countries replied positively, the Hashemite Kingdom of Jordan and the Syrian Arab Republic. Later the UN has organized an evaluation mission to the Western Asia countries that offered to host the centre.

In 2000, the UN General Assembly's Report of the Scientific and Technical Subcommittee on its 37 Session, held in Vienna from 7-18 Feb. 2000 (Document, A/AC.105/736), in Section E. 'Regional and interregional cooperation', Paragraph 65 stated that,

'The Subcommittee noted with satisfaction that, following the review of a report on an evaluation mission and of offers and commitments made by interested countries, Jordan had been identified as the country that would host the Regional Centre for Space Science and Technology Education in Western Asia. The OOSA had announced the establishment and location of the Centre.'

In 2011, the Director General of the RJGC during his attendance of the 54 Meeting Session of the United Nation Committee on the Peaceful Uses of Outer Space (UNCOPUOS) has announced officially the acceptance of the Government of Jordan to host the Regional Center for Space Science and Technology Education for Western Asia.

There are five regional centers established in the world,

- India for Asia-Pacific region.
- Morocco and Nigeria for Africa region.
- Brazil and Mexico for Latin America and the Caribbean.

Vision

To utilize the capabilities of space science and technology for the benefit of humanity, for national socio-technological development through education, advanced research and training.

Objectives of the UN Regional Centre

- Develop the skills and knowledge of university educators, environmental research scientists and project personnel in the design, development and application of remote sensing and related technologies for subsequent application in national and regional development and environment management programs including bio-diversity protection;
- Assist educators to develop environment and atmospheric sciences curricula that they can use to advance the knowledge of their students in their respective institutions/countries;
- Develop skills for satellite communications including those associated with rural development, disaster mitigation, and network/linkage of the region's professionals and scientists, Government establishments and industries in order to facilitate the exchange of new ideas, data and experiences;
- Enhance regional and international cooperation in space science, technology and applications programmes;
- Assist in disseminating to the general public the value of space sciences and technology in improving their everyday quality of life.

Regional Member States

Jordan (the hosting country)

Egypt ✹ Iraq ✹ Kuwait ✹ Lebanon

Libya ✹ Sudan ✹ Syria ✹ Yemen

National Contributing Institutions

- The Royal Jordanian Geographic Centre (RJGC)
- Al al-Bayt University (AABU)
- Jordan Meteorological Department (JMD)
- Mutah University
- The World Islamic Sciences and Education University (WISE)

Postgraduate Curriculum

In cooperation with UNOOSA, the following courses will be taught at the Postgraduate Diploma level,
- Remote Sensing & GIS
- Satellite Communication
- Satellite Meteorology & Global Climate
- Space and Atmospheric Sciences

Facilities and Services at RIGC

- Classrooms equipped with appropriate training aids and data show devices for instructors.
- Remote sensing and GIS laboratories equipped with workstations with GIS and satellite image processing software.
- Auditorium accommodating over 100 people, equipped with audio-video systems, designed for conferences and workshops.
- Library containing scientific references in addition to the specialized periodicals.
- A mosque located inside the Royal Jordanian Geographic Center campus.
- A cafeteria that provides beverages and sandwiches for students.
- External spaces and parking.

In addition to the facilities and services provided by the national institutions.

Code No.	Basics Remote Sensing — 3 months
RS 1	Definition and overview of remote sensing and remote sensing system
RS 2	History and evolution of remote sensing
RS 3	Electromagnetic radiation, terms and definitions, laws of radiation, electromagnetic spectrum sources of electromagnetic radiation
RS 4	Interaction between electromagnetic radiation and matter, reflection absorption and transmission
RS 5	Interactions between electromagnetic radiation and atmosphere, atmospheric windows
RS 6	Remote sensing systems, active and passive systems, imaging and non-imaging systems, resolution, spatial, spectral and temporal
RS 7	Orbits and platforms for Earth observation
RS 8	Earth observation satellites (Landsat, SPOT, IRS)
RS 9	Sensors used in Earth observation satellites and their geometric and other characteristics
RS 10	Data reception, processing and generation of data products
RS 11	Geometric and radiometric corrections and sources of errors in satellite data
RS 12	Ground truth data collection - use of radiometers and spectrophotometers etc
RS 13	Spectral reflectance and spectral signature for water, land and vegetation
	Practical Exercises and Field Work
EX.RS 1	Study of satellite image annotation (information) Landsat, SPOT and IRS
EX.RS 2	Study of satellite data, tracing of drainage
EX.RS 3	Study of satellite data, identification and mapping of different surface features
EX.RS 4	Study of ground data collection

Code	Advanced Remote Sensing — 6 months
IA1	Principles of visual interpretation of aerial photos and satellite imagery
IA2	Recognition elements and interpretation keys for visual interpretation
IA3	Techniques of visual interpretation
IA4	Basic interpretation equipment
IA5	Interpretation of aerial photos
IA6	Interpretation of multispectral imagery
IA7	Interpretation of thermal imagery
IA8	Principles of data transfer and assessment of interpretation accuracy
IA9	Introduction to digital image processing
IA10	Fundamentals of computers and image processing systems
	Practical Exercises and Field Work
EX.IA1	Identification of features on single vertical aerial photographs
EX.IA2	Tracing of details from stereopairs
EX.IA3	Study of given area in black/white, black/white infrared, colour infrared photographs
EX.IA4	Study of multispectral photographs using an additive colour viewer
EX.IA5	Study of satellite imagery (black/white) in different bands and visual interpretation

Code	Advanced Skills of Remote Sensing — 9 months
IA11	Fundamentals of image rectification and registration
IA12	Image enhancement techniques
IA13	Contrast stretching, edge enhancements and filtering
IA14	Principal component analysis
IA15	Principles of image classification and supervised classification
IA16	Supervised classification
IA17	Unsupervised classification
IA18	Digital elevation model
IA19	Satellite stereo image generation
	Practical Exercises and Field Work
EX.IA 6	Interpretation of cultural details from different satellite image data (IRS, SPOT, Landsat)
EX.IA 7	Familiarization with image processing systems, start-up procedures
EX.IA 8	Loading image data and display, identification of objects on video displays
EX.IA 9	Image enhancement techniques, contrast, enhancement, band rationing, edgeenhancement, filtering, density slicing and transfer functions
EX.IA10	Image registration, image to map, image to image, image to user
EX.IA11	Image classification techniques, supervised and unsupervised
EX.IA12	Ground data collection for training sets in image processing systems for classification of image
	Project

Credit Hours	Meteorology — Weather Observation — Short Term Course
32	Earth Science
48	General Meteorology
32	Meteorological Instruments
32	Aeronautical Meteorology
48	Observation Methods
64	Weather Charts Plotting
32	SYNOP Code
16	Upper Code
32	Metar Code
16	Agricultural Meteorology
16	Climate Science

Credit Hours	Meteorology — Initial Weather Forecasting — Long Term Course
96	Dynamical Meteorology
64	Thermodynamics
96	Synoptic Meteorology
96	Aeronautical Meteorology
32	Satellite Meteorology
96	Weather Charts Analysis
48	Forecasting Methods
32	Climate and Climate Change
32	Cloud Physics
32	Agricultural Meteorology
32	Numerical Weather Prediction