



# AFRICAN REGIONAL CENTRE FOR SPACE SCIENCE AND TECHNOLOGY EDUCATION-ENGLISH (ARCSSTE-E)



## 2020 SHORT COURSES

### REMOTE SENSING & GEOGRAPHIC INFORMATION SYSTEM

BASIC CERTIFICATE COURSE IN GIS				
SN	MODULE TITLE	COURSE DESCRIPTION	ADMISSION REQUIREMENTS	DURATION
1.	GEOGRAPHIC INFORMATION SYSTEMS (GIS) – Certificate Course for Beginners and Intermediate Professionals	<ul style="list-style-type: none"> <li>• Principal concepts and techniques of Geographic Information Systems;</li> <li>• Spatial Data Types;</li> <li>• Fundamentals of Data Structures;</li> <li>• Data Processing Systems;</li> <li>• Data Quality;</li> <li>• Geo-referencing;</li> <li>• Cartography;</li> <li>• Spatial Data Entry and Preparation;</li> <li>• Basic Spatial Data Analysis and Spatial Data Visualization.</li> </ul>	<ul style="list-style-type: none"> <li>○ WASC,</li> <li>○ ND/HND,</li> <li>○ NCE,</li> <li>○ Undergraduate and</li> <li>○ Graduate Applicants</li> </ul>	4 Weeks
2.	SPATIAL ANALYSIS WITH GIS – CERTIFICATE COURSE FOR INTERMEDIATE PROFESSIONALS	<ul style="list-style-type: none"> <li>• Site Suitability Analysis;</li> <li>• Line of Sight (visibility) Analysis;</li> <li>• Network Analysis;</li> <li>• Geo-Statistical Analysis;</li> <li>• Spatial Interpolation;</li> <li>• Spatial Querying;</li> <li>• Principles of Spatial Statistics;</li> <li>• GIS Applications in business, urban, public safety, public health, transportation and natural sciences</li> </ul>	<ul style="list-style-type: none"> <li>○ Possess GIS Certificate Course for Beginners and Intermediate Professionals;</li> <li>○ Previous experience of GIS at ND/ HND, NCE, Undergraduate, Postgraduate and Graduate levels;</li> </ul>	4 Weeks
3.	GEO-SPATIAL INTELLIGENCE AND CRIME ANALYSIS – CERTIFICATE COURSE FOR INTERMEDIATE PROFESSIONALS	<ul style="list-style-type: none"> <li>• Overview of typical security and defence issues;</li> <li>• Surveillance and Intelligence data gathering;</li> </ul>	<ul style="list-style-type: none"> <li>○ Possess GIS Certificate Course for Beginners and Intermediate Professionals;</li> <li>○ Previous experience of GIS at ND/ HND, NCE, Undergraduate,</li> </ul>	4 Weeks

		<ul style="list-style-type: none"> <li>• Disaster Risk Analysis Management;</li> <li>• Spatial Analysis Operations of Defense-related data;</li> <li>• Decision making process in security operations;</li> <li>• Confidentiality, Integrity and Availability (CIA);</li> <li>• Principles of Information Security;</li> <li>• Uses of GIS in Law Enforcement;</li> <li>• Crime Mapping and Analysis Concepts;</li> <li>• Human Behaviour Mapping and Analysis for Strategic Deployment Purposes</li> </ul>	<p>Postgraduate and Graduate levels;</p> <ul style="list-style-type: none"> <li>○ Security Personnel/ Experts</li> </ul>	
<b>3-MONTHS ADVANCED DIPLOMA COURSE IN REMOTE SENSING AND GIS</b>				
4.	<p>REMOTE SENSING: EARTH OBSERVING SYSTEMS AND APPLICATIONS</p>	<ul style="list-style-type: none"> <li>• Introduction to types of Remote Sensing <ul style="list-style-type: none"> <li>- EM Energy</li> <li>- Sensors</li> <li>- Platforms</li> <li>- Multi-Spectral Scanners</li> <li>- Geometric Aspects</li> <li>- Geo-coding</li> <li>- Radiometric Correction,</li> <li>- Image Enhancement</li> <li>- Visual Image Interpretation</li> <li>- Change Detection</li> <li>- Image Classification</li> </ul> </li> <li>• Application Areas in: <ul style="list-style-type: none"> <li>- Land Cover/ Land Use</li> <li>- Mapping and Analysis of Natural Resources</li> <li>- Weather and climate Studies</li> <li>- Pollution Detection and Monitoring</li> <li>- Disaster Monitoring and identification of Oceanographic features</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Possess GIS Certificate Course for Beginners and Intermediate Professionals;</li> <li>○ Previous experience of GIS at ND/ HND, NCE, Undergraduate, Postgraduate and Graduate levels</li> </ul>	3 WEEKS

5.	GEOSPATIAL DATA MODELING	<ul style="list-style-type: none"> <li>• Review of current research in RS/GIS</li> <li>• Modelling Techniques</li> <li>• Use of Advanced Software for Analysis</li> <li>• Spatial Data Management</li> <li>• Data integration, manipulation, and presentation using GIS Models</li> </ul>	<ul style="list-style-type: none"> <li>○ Possess GIS Certificate Course for Beginners and Intermediate Professionals;</li> <li>○ Previous experience of GIS at ND/ HND, NCE, Undergraduate, Postgraduate and Graduate levels</li> <li>○ Industry-based Professionals</li> </ul>	3 WEEKS
6.	DEVELOPMENT AND MANAGEMENT OF GIS PROJECTS	<ul style="list-style-type: none"> <li>• Application of core project management principles</li> <li>• Guidelines to real project scenarios</li> <li>• Managing GIS projects throughout their entire lifecycle</li> <li>• Return on investment (ROI) of a GIS project</li> <li>• Risk management,</li> <li>• Critical path, Network optimization, quality control, and contract management skills</li> </ul>	<ul style="list-style-type: none"> <li>○ Possess GIS Certificate Course for Beginners and Intermediate Professionals;</li> <li>○ Previous experience of GIS at ND/ HND, NCE, Undergraduate, Postgraduate and Graduate levels</li> <li>○ Industry-based Professionals</li> </ul>	3 WEEKS
7.	PROJECT DESIGN, IMPLEMENTATION AND PRESENTATION	<ul style="list-style-type: none"> <li>• Students would be expected to undertake project work in their field of specialization or any other areas of interest.</li> </ul>	<ul style="list-style-type: none"> <li>○ Possess GIS Certificate Course for Beginners and Intermediate Professionals;</li> <li>○ Previous experience of GIS at ND/ HND, NCE, Undergraduate, Postgraduate and Graduate levels</li> <li>○ Industry-based Professionals</li> </ul>	3 WEEKS

## SHORT COURSES: SATELLITE COMMUNICATION

S/N	Title	Course Description	Admission requirements	Duration
1	Satellite Network Planning, Operation and Management	Technical considerations for network planning Planning for space segment Planning for ground segment Network operations and control Management of communication satellite operations Intra-system/inter-system interference coordination Space law Financial aspects of satellite communication	Working experience	2 weeks
2	Satellite Communication Systems	Introduction to satellite communications Satellite orbits Satellite configurations Reliability Satellite bus subsystems Communication payload (transparent and on-board processing (OBP)) Satellite communications links Frequency bands for satellite communications Electromagnetic interference (EMI) Electromagnetic compatibility (EMC) Propagation effects on satellite communication links Link parameter calculations, including real propagation models Orbit and footprint simulations Demonstration with satellite simulator	WASC, ND/HND, Undergraduate and Graduate Applicants	4 weeks
3	Satellite Broadcasting	Analog and digital broadcasting system standards Digital television Satellite TV and access systems Internet protocol (IP) broadcasting Selected applications, for example: Satellite News Gathering (SNG) for radio and TV; Radio networking Digital audio broadcasting; Outdoor broadcasting van; TV studio and its operations; TV coverage of sports; Multicasting; Videoconferencing via satellite; Multimedia (video presentation); Video on demand. Practical experiments with TV and IP terminals	Working experience	2 weeks

# SHORT COURSES: GLOBAL NAVIAGATION SATELLITE SYSTEMS

<b>BASIC CERTIFICATE COURSE IN GNSS</b>				
SN	MODULE TITLE	COURSE DESCRIPTION	ADMISSION REQUIREMENTS	DURATION
1.	FUNDAMENTALS OF GNSS	<ul style="list-style-type: none"> <li>• Introduction, background and concepts of GNSS:</li> <li>• Conventional Navigation, GNSS Biases,</li> <li>• Evolution of GNSS,</li> <li>• Regional Navigation Satellite Systems,</li> <li>• GNSS Augmentation Systems.</li> <li>• Satellites Orbits: Orbital parameters, Orbital motion, determination of satellite position, visibility and ground tracks.</li> </ul>	<ul style="list-style-type: none"> <li>○ WASC,</li> <li>○ ND/HND,</li> <li>○ NCE,</li> <li>○ Undergraduate and</li> <li>○ Graduate Applicants</li> </ul>	4 Weeks
2.	GNSS APPLICATIONS	<ul style="list-style-type: none"> <li>• Fundamental of GNSS</li> <li>• Reference Systems</li> <li>• Position Determination techniques</li> <li>• Geospatial databases: Open Source Databases and My SQL</li> <li>• GNSS Navigation: professional and personal, GIS/mapping, surveying, natural hazards management and Earth Sciences.</li> <li>• Integrated applications: Navigation and communication, Communication, navigation and surveillance.</li> <li>• GNSS applications for remote sensing of the atmosphere and space weather.</li> </ul>	<ul style="list-style-type: none"> <li>○ Possess GNSS Certificate Course for Beginners and Intermediate Professionals;</li> <li>○ Previous experience of GNSS at ND/HND, NCE, Undergraduate, Postgraduate and Graduate levels;</li> <li>○ Engineers, Scientist in both public and private organization</li> </ul>	12 Weeks
3.	Satellite-Based Positioning for Surveyors	<ul style="list-style-type: none"> <li>• Fundamentals of GNSS</li> <li>• Reference systems: Terrestrial, celestial and orbit coordinate reference system. Height Systems. Geoid.</li> <li>• Transformations between coordinate reference systems. International Terrestrial Reference Frame (ITRF)</li> <li>• Position determination techniques</li> </ul>	<ul style="list-style-type: none"> <li>○ Working Experience</li> </ul>	3 Weeks

# SHORT COURSES IN SPACE LAW AND POLICY

## Space Law and Policy

### Overview

Space law is the body of law governing space-related activities. Space law addresses so many issues, such as, the preservation of the space and Earth environment, liability for damages caused by space object, the settlement of disputes, the rescue of astronauts, the sharing of information about potential dangers in outer space, the use of space-related technologies, and international cooperation.

Similarly, space law also contains series of legal systems, just as liability system and registration system. In order to regulate national space activities, some countries have promulgated domestic laws to regulate and guide their space activities.

It is important to add that, capacity-building, training and education in space law helps to promote international development and cooperation in space activities and provides the means for a deeper understanding of the interdependent roles of science, technology and law in this area.

In view of this, under space technology applications, space law plays an important role in space technology applications.

### Objectives

1. Develop the skills and knowledge of participants, through training program on space law and policy related to space technology application that can contribute to the exploration and peaceful uses of outer space and sustainable development in each country.
2. Enhance the implementation of the United Nations Programme on Space Application better, through the training program on space law and policy

**BASIC CERTIFICATE COURSE IN SPACE LAW AND POLICY**

SN	MODULE TITLE	COURSE DESCRIPTION	ADMISSION REQUIREMENTS	DURATION
1.	BASIC CONCEPT OF INTERNATIONAL LAW AND SPACE LAW	<ul style="list-style-type: none"> <li>• International law;</li> <li>• The legal regime governing the conduct of space activities;</li> <li>• Settlement of disputes and enforcement of International Space Law.;</li> </ul>	<ul style="list-style-type: none"> <li>○ Undergraduate and</li> <li>○ Graduate Applicants in Law, International Relation, Public Administration etc</li> </ul>	2 Weeks
2.	APPLICABLE INTERNATIONAL LAW AND OTHER REGULATIONS	<ul style="list-style-type: none"> <li>• International and National Regulatory Regimes relating to Remote Sensing and GIS, Meteorology and Global Climate activities;</li> <li>• Global, Bilateral and Multilateral Agreements relating to Remote Sensing and GIS, Meteorology and Global Climate activities;</li> <li>• Legal issues regarding Sources of Data;</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>○ Undergraduate and Graduate Applicants in Law, International Relation, Public Administration etc</li> </ul>	2 Weeks
3.	SATELLITE COMMUNICATIONS AND APPLICABLE INTERNATIONAL LAW AND OTHER REGULATIONS	<ul style="list-style-type: none"> <li>• General International and National Regulatory Regimes relating to Satellite Communications and Satellite Broadcasting activities.;</li> <li>• National Licensing for and International Coordination of use of Radio Frequencies and Orbital positions, necessity of use of technical standards, and resolution of interference disputes Disaster Risk Analysis Management;</li> <li>• Legal issues regarding operation of, and international trade in, Satellite Communication services</li> </ul>	<ul style="list-style-type: none"> <li>○ Undergraduate and Graduate Applicants in Law, International Relation, Public Administration etc</li> </ul>	2 Weeks

4.	GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) AND APPLICABLE INTERNATIONAL LAW AND REGULATIONS	<ul style="list-style-type: none"> <li>• Overview of the basic legal context, the key legal concepts and terminology of satellite navigation and time positioning;</li> <li>• Regulatory Systems for Satellite Navigation;</li> <li>• Legal terminology and problem resolution approaches for Satellite Navigation Systems</li> </ul>	<ul style="list-style-type: none"> <li>○ Undergraduate and Graduate Applicants in Law, International Relation, Public Administration etc</li> </ul>	2 Weeks
5.	SPACE COMMERCIALIZATION AND THE DEVELOPMENT OF SPACE LAW	<ul style="list-style-type: none"> <li>• Rules relating to Space Commercialization and the development of new rules to tackle new legal issues;</li> <li>• Application of Space Treaties to new circumstances and the loopholes in the current legal regime;</li> <li>• Study of several important types of Space commercial activities;</li> <li>• Seminar</li> </ul>	<ul style="list-style-type: none"> <li>○ Undergraduate and Graduate Applicants in Law, International Relation, Public Administration etc</li> </ul>	2 Weeks