

UNIVERSITY OF NIGERIA, NSUKKA
SCHOOL OF POSTGRADUATE STUDIES

PGD, M.Sc AND Ph.D

PROGRAMMES FOR INSTITUTE
OF CLIMATE CHANGE STUDIES

2017

UNIVERSITY OF NIGERIA, NSUKKA

PGD, M.Sc AND Ph.D PROGRAMMES OF THE INSTITUTE OF CLIMATE CHANGE STUDIES

1.1 PHILOSOPHY

The programme is designed to encourage intra-disciplinary research, team work, capacity building. The primary aim is to study/understand the impact of climate change, causes, mitigation and adaptation. Hence, it aims at building local, national and regional involvement through mounted courses, capacity building, innovative action oriented research and training. In other words, it responds to education, training and research needs for tackling climate change impacts, mitigation and adaptation. The programme, thus hopes to bring about a critical mass of knowledge, skilled and competent specialists for improving the policy and management of Climate Change Studies. Finally, it will lead to a creation of knowledge based evidence, as well as inculcating trans-disciplinary research methods and approaches on climate issues/challenges.

1.2 SCOPE

The programme shall run at PGD, Masters and Doctorate levels as follows:

1. Science of Climate Change
2. Ground Based Measurement and Indigenous Technology Application to Climate Change
3. Environmental Literacy and Policy Studies on Climate Change
4. Sustainability Studies
5. Studies on Environmental and Climate Change Laws

1.3 OBJECTIVES

The entire postgraduate programme is aimed to:

- (i) Establish an Institute of Climate Change Studies that considers causes, mitigation and adaptation of Climate
- (ii) Develop through teaching, action-oriented research methodologies that focus on solving climate change oriented problems.

- (iii) Provide an organized platform that could be operated for trans-disciplinary research work in climate change, that could contribute to the solution of current climate change problems.
- (iv) Create awareness for community participation of the imminent problems posed by the current impact of climate change on the planet Earth.
- (v) Develop local, national and regional platform channeled towards capacity building, training climate change policy, law and management.

The courses will:

- Equip students with a higher level of thinking such as an understanding of climate science, climate impacts, climate politics, climate change laws and policies, climate ethics and equity;
- Equip students with the skill to analyze, evaluate and model the various Climate Change impacts ranging from global to local levels to solve societal problems; and
- Equip students with skills and capacities for trans-disciplinary studies of Climate Change issues, develop policy approaches and assess vulnerability to Climate Change.

1.4 EMPLOYMENT OPPORTUNITIES

Graduates of these courses have good prospects of employment (either salaried or self employment) in the public sector, private sector and development community.

- Within the public sector, the graduates can find employment in federal, state and local government ministries, departments and agencies cutting across the energy, agriculture, urban development, water resources, forestry, transportation and environment sectors. Government agencies in these sectors are in need of better skills, knowledge and competencies in conceptualizing, planning, implementing and monitoring projects, programmes and schemes for climate change adaptation.
- With regards to private sector, the graduates can get employed in companies and establishments.
- Graduates can also become self-employed by taking advantage of investment and entrepreneurship opportunities in the fledging national, regional and global enterprise of climate change adaptation.

Criteria for admission into the Postgraduate programmes in Climate Change Studies will be as follows:

1.5 ADMISSION REQUIREMENTS: PGD, M.Sc. and Ph.D

A. Postgraduate Diploma programme:

Admission Requirements:

- i. Candidates with the Bachelors Degree (with a minimum of Third Class Honours Degree) from an approved University;
- ii. Candidates with HND from a recognized institution with not less than upper credit, and;
- iii. In addition, candidates must have at least five "O" level credits pass including English Language and Mathematics.

➤ **Duration of the Programme:**

- | | |
|------------|--|
| Full time: | A minimum of two (2) semesters
A maximum of four (4) semesters. |
| Part-time: | A minimum of five (4) semesters and
A maximum of eight (6) semesters. |

B. Masters of Science (M.Sc) Degree Programme in Climate Change Studies:

Admission Requirements:

The following shall qualify for the Master's Degree admission:

- i. Candidates must satisfy the matriculation requirements of the University of Nigeria including credit pass in English and Mathematics
- ii. Candidates with a Bachelors Degree from the University of Nigeria or other approved universities whose programme is accredited by the NUC.
- iii. Candidates with a minimum of Second Class Lower Degree and a CGPA not less than 3.00 on a five-point scale.

12 credit units to be taken by the candidate. A Doctoral (Ph.D) Thesis of 12 credit units must be defended before a panel of examiners.

1.6 NUMBERING OF STRESS AREAS

- 0 Fundamentals
- 1 Physical Sciences
- 2 Social Sciences
- 3 Engineering
- 4 Agriculture
- 5 Arts and Humanities
- 6 Bio Sciences
- 7 Law and Policy
- 8 Seminar
- 9 Project Report/Thesis

2.0 PGD Courses:

First semester courses		
Compulsory courses		
Courses	Title	Unit
CCS 0501	Fundamental Basic Theory of Science of Climate Change	2
CCS 0515	Contributions of Physical Sciences to Climate Change	2
CCS 0573	Environmental Law and Policy of Climate Change	2
CCS 0501	Conceptual and Policy Issues in Sustainability Studies of Climate Change	2
	Sub total	8

Elective Courses (Choose any Three)		
CCS 0541	Climate Change, Agriculture and Water Resources	2
CCS 0561	Climate Change, Health and Biosciences	2
CCS 0511	Climate Change and Energy Technologies	2
CCS 0555	Environmental Problems and Management of Climate Change	2

CCS 0553	Fundamentals of Remote Sensing and Geo-Informatics	2
	Total Units for Electives	6
	Subtotal (First Semester)	14
Second semester		
Compulsory courses		
Course	Title	Units
CCS 0506	Climate Change Effects on Infrastructures	2
CCS 0522	Introduction to Economics of Climate Change	2
CCS 0534	Contribution of Other Fields to Climate Change Studies	2
CCS 0582	Seminar (topic from one of the stress areas)	2
CCS 0590	Project	6
	Sub-total	14

Elective courses (choose one)		
CCS 0552	Entrepreneurship for Climate Change Adaptation	2
CCS 0532	Climate Change and Engineering Infrastructure	2
CCS 0572	Legal and Policy issues in Climate Change	2
	Subtotal (Second Semester)	16
	Total	30

DESCRIPTION OF PGD COURSES

CCS 0501. Fundamental Basic Theory of Science of Climate Change (3 units)

Structure of the atmosphere, composition and dynamics of the atmosphere. Global climate system. Climatic parameters and variables. Key concepts in climate change. Atmosphere-ocean interactions. Major driving systems of African climate, Inter tropical Convergent Zone (ITCZ), West African Monsoon, (WAM), El Nino Southern Oscillation (ENSO). Anthropogenic cause.

CCS 0515: Contributions of Physical Sciences to Climate Change (2 Units)

Factors of climate of change. Solid earth; volcanic eruption, Ozone layer depletion, aerosols effects on climate change, plate tectonics. Role of earth's magnetic field as

contributor to climate change. Solar radiation contribution to climate; effects of cosmic rays on climatic parameters.

CCS 0573: Environmental Law and Policy of Climate Change (2 Units)

Introduction to Contemporary Environmental Regulations and Basic Problems and Approaches that characterize them. The Ecological, Economic, Social, Public Health and Human Rights. Justifications for Government Regulations to Protect the Environmental Legal Strategies and Tools for Protecting the Environment (the NESREA Act and Regulations; the National Policy on Climate Change; the Polluter-Pay Principle; Precautionary Principle, Intergenerational Equity etc.). Pollution Control (air pollution and waste management, extended producer responsibility, recycling etc.) and Climate Change International Environmental Law and Climate Change

CCS 0501: Conceptual and Policy Issues in Sustainability Studies (2 Units)

The concept of sustainability in Climate Change Studies (CCS). The three context axis of sustainability. The basics of sustainable development. Laws and Policies in sustainability Studies.

CCS 0541: Climate Change, Agriculture and Water Resources (2units)

Impact of climate change on water resources, management of water resources under climate change, underground and surface water management within the context of climate change, climate change and soil characteristics, processing of animal and crop production. Basic concept of food security, food production, distribution, preservation and storage. Biodiversity management and climate change.

CCS 0561: Climate Change, Health and Biosciences (2 Units)

Climate change and environmental disturbances. Environment, disease pathogen interactions. Epidemics and Epizootics and Epifora in relation to climate change. Emerging diseases of man, animals and plants. Climate, habitat perturbations and diseases. Climate change, disease surveillance and epidemiology of human, animal and plant diseases and plant productivity. Climate- related vector and water-borne

infections. Adaptation mechanism in man, animals, and plants to climate change induced emerging diseases. Practical demonstration/ field work

CCS 0511: Climate Change and Energy Technologies (2 Units)

Basic understanding of the key concept – Climate change, adaptation, mitigation, engineering factors (contributors), etc. Production technologies for heat, electricity, food, transportation. Solar energy, wind energy, hydropower, biomass energy, geothermal energy, tidal/wave energy. The role of different energy technologies in generating and reducing greenhouse gas emissions. Traditional engineering approaches to climate change adaptation.

CCS 0555: Environmental Problems and Management of Climate Change (2 units)

Environmental history of Nigeria, Management of Noise pollution, Environmental and human health, Introduction to ecology crises and disaster. Introduction to environmental management and processes involved in studying the environment, Nigerian environment, Causes of environmental problems, Tackling environmental problems, management of our environment. Long-term environmental changes, Our ecosystem and its importance , Solutions to our environmental problems,

CCS 0551: Basic Environmental Literacy of Climate Change (2 Units)

The meaning of climate. Elements of climate. Definition of climate Change. Environmental indicators of climate change. Differences between climate change and climate variability. Public perception of and sensitization to climate change. Public awareness of climate change through the media, literature, drama, workshops, town hall meetings, climate change clubs at schools, etc.

CCS 0553: Fundamentals of Remote Sensing and Geo-Informatics (GIS) (2 Units)

The nature and scope of GIS: - definition and concepts in GIS; -components of GIS; GIS software – history of mapping and GIS; -Relevance of GIS compared to other data gathering and analysis techniques. Questions that GIS can answer. Application of GIS in

other disciplines such as; agriculture, economics, politics, engineering, health science, management and law. GIS as a technique in accessing environmental degradation such as: flood, drought, desertification, deforestation, erosion, earthquakes, and volcanic eruptions among others. Issues in and criticisms of GIS

SECOND SEMESTER COURSES

CCS 0506: Climate Change Effects on Infrastructures (2units)

Identification of climate change effects. Vulnerabilities in the energy infrastructure caused by climate change. Flooding effects on power stations, sea level rising, extreme rainfall, storm surge, drought effect on power station, ecological problem, soil shrinkage. Communications, ICT. Transportation; road and rail vulnerable to flood. Water; for cooling/pumping and other services.

CCS 0522: Introduction to Economics of Climate Change (2 Units)

Economic impact of climate change. Cost of climate change mitigation. Cost of adaptation to climate change impact on the various sectors such as water supply, crop and animal production, forestry and fisheries; natural ecosystems, transportation and health. Theory and Practice of economic analysis of environmental problems (efficiency, externalities, and public goods). Environmental policy instruments (carbon trading, tax incentives; revenue recycling). Management of renewable and non-renewable resources. Rationale decision making techniques. Analysis of risk and uncertainty. Cost benefit analysis. Discounting of future and distant effects choice on climate.

CCS 0534: Contribution of Other Fields to Climate Change Studies (2 Units)

Climate change and soil characteristics, crop and animal production practices, and processing. Basic concepts and definitions of food security, nutrition security, Conceptual frame work of food security, and Climate change. Changing climate and food production, description, and accessibility. Methods of ameliorating. Climate change, social conflict and food security, climate change and biodiversity management

CCS 0582: Seminar (Topics from any of the stress areas) (2units)**CCS 0590: Project /Field Work (6units)****ELECTIVE COURSES:****CCS 0552: Entrepreneurship for Climate Change (3Units)**

climate change and climate change adaptation as a development opportunity; Business opportunity in climate adaptation – agriculture, energy (clean energy renewable energy and energy efficiency), housing, transport, water, cities and sanitation, health, climate information; preparing fundable business proposal for climate change adaptation; Enterprise development for climate change adaptation; entrepreneurship networking for climate change adaptation; Innovative enterprise management and technological approaches for climate change adaptation

CCS 0532: Climate Change and Engineering Infrastructure (3 Units)

Design criteria of safety as climate change adaptation mechanism. Impacts of climate change on durability and safety of engineering infrastructure. Materials selection, construction methods, operational and maintenance considerations required to adapt to climate change.

CCS 0572: Legal and Policy Issues in Climate Change (3 Units)

introduction to climate change law and policy. Applicable international Environmental Law principles on climate change, precautionary principle, principle of prevention, inter – generational principle, sustainable development; establishment of inter-governmental panel on climate change (IPCC); critical theories in climate change law, Policy. Policies aimed at reducing the impact of climate change. The legal framework for climate change mitigation and control: UNFCCC (1992) and the Kyoto protocol (1997). National environmental standards Enforcement Agency (NESREA) (Establishment) Act 2007; Nigeria – Gas Flaring / Economic Development and Climate Change Public Private Partnership (PPP) for 'Alternative Climate Change Preventive Plan'.

3.0 M.Sc Courses

First Year (Master's Programme)		
First Semester Courses		
Course	Title	Units
Compulsory Courses		
PGC 601	Research Methodology and Application of ICT in Research	3
CCS 611	Theory of Science of Climate Change	2
CCS 613	Role of Physical Sciences in Climate Change	2
CCS 621	Conceptual and Policy Issues in Sustainability Studies	2
CCS 661	Climate Change, Health and Biosciences	2
	Sub-Total	11
Elective Courses (any two)		
CCS 665	Climate Change, Biodiversity and Wild life Management	2
CCS 615	Climate Change Effects on Infrastructures (Energy, Transports, Communications, etc.)	2
CCS 675	Legal and Institutional Framework for Climate Change Regulation in Nigeria	2
CCS 653	Environmental Policy Issues on Climate Change	2
CCS 625	Mitigation, Adaptation and Management Issues in Climate Change Sustainability studies	2
CCS 629	Political Economy of Climate Change	2
CCS 673	Climate Change Law and Policy	2
CCS 631	Energy Management Principles	2
	Sub-Total (Electives)	4
	Sub-Total (First Semester, First Year)	14

Second Semester Courses		
Compulsory Courses		
Courses	Title	Unit
CCS 652	Environmental Literacy of Climate Change	2
CCS 642	Field Studies, Theories and Approaches to Sustainability Studies in Climate Change	2
CCS 632	Climate Change and Engineering Infrastructure	2
CCS 682	Seminar Presented From The Master's Project Report	3

CCS 690	Project Reports	6
	Sub-Total	15
Elective Courses (any two)		
CCS 612	Practical Course on Indigenous Application to Climate Change	2
CCS 614	Indigenous Instrumentation Development for Climate Change Research	2
CCS 672	Interrelationship Between Human Rights Law, Public Health, Environmental Justice and Climate Change	2
CCS 652	Human Behaviour, Social Environment and Climate Change	2
CCS 628	Climate Change and Agricultural Production	2
CCS 616	Indigenous Design Development of Instruments for Climate Change Research	2
CCS 654	Entrepreneurship for Climate Change Adaptation	2
CCS 648	Water Resource Management and Climate Change Adaptation	2
	Sub-total (electives)	4
	Sub-Total (Second Semester, first year)	20
	Total	34

Description of M.Sc Courses

PGC 601: Research Methodology and Application of ICT in Research

In-depth research work aimed at acquiring full knowledge and presentations in scholarly writing of the concepts, issues, trends in the definition and development of the study area from African and Western perspectives. Major steps in research: Selection of problem, Literature review, Design, Data collection, Analysis and Interpretation, Conclusions. Study of various Research designs, Historical, Case Studies, Surveys, Descriptive, Cross-sectional, Experimental, etc. Analysis, Surveys and Synthesis of conceptual and philosophical foundations of different disciplines. Identification of research problems and development of research questions and/or hypotheses. Detailed treatment of methods of collecting relevant research data and the format for presenting research results (from designing the table of contents to referencing, bibliography and appendix). Data analysis and result presentation in different disciplines using

appropriate analytical tools. Methods of project/dissertation writing. Application of appropriate advanced ICT tools relevant in every discipline for data gathering, analysis and result presentation. Essentials of Spreadsheets, Internet Technology and Internet search engines. All registered Master's Degree students must attend a solution-based interactive workshop to be organized by the School of Postgraduate Studies for a practical demonstration and application of the knowledge acquired from the course, conducted by selected experts.

CCS 611: Theory of Science of Climate Change (2 Units)

Theory and composition of the atmosphere, structure and dynamics of the atmosphere. Global climate system, parameters of atmosphere, climate variables. Constitution of the atmosphere. Weather and concepts of climate change. Atmosphere-ocean interactions, momentum, major driving systems of African climate, Inter tropical Convergent Zone (ITCZ), West African Monsoon, (WAM), El Nino Southern Oscillation (ENSO). Anthropogenic causes. Phenomena in the atmosphere that affect climate change.

CCS 613: Role of Physical Sciences in Climate Change (2 Units)

Dynamics of earth's atmosphere, chemistry of the atmosphere, study of earth interior; volcanic eruption, good and bad ozone layer, ozone depletion, aerosols effects on climate change, plate tectonics. Effects of earth's magnetic field to climate change. Earth's rotation effects on climate change. Solar radiation effects on climate change, cosmic rays effects on climatic parameters.

CCS 621: Conceptual and Policy Issues in Sustainability Studies (2 Units)

The concept of sustainability in Climate Change (CC) studies. The three context axis of sustainability. The basics of sustainable development. Laws and Policies in sustainability Studies.

CCS 661: Climate Change, Health and Biosciences (2 Units)

Climate change and environmental disturbances. Environment, disease pathogen interactions. Epidemics and Epizootics in relation to climate change. Emerging diseases of man, animals and plants. Climate, habitat perturbations and diseases. Climate

change, disease surveillance and epidemiology of human, animal and plant diseases and plant productivity. Climate- related vector and water-borne infections. Adaptation mechanism in man, animals, and plants to climate change induced emerging diseases. Practical demonstration/ field work

CCS 651: Environmental Literacy of Climate Change (2 Units)

The meaning of climate. Elements of climate. Definition of climate Change. Environmental indicators of climate change. Differences between climate change and climate variability. Public perception of and sensitization to climate change. Public awareness of climate change through the media, literature, drama, workshops, town hall meetings, climate change clubs at schools, etc.

Elective Courses

CCS 665: Climate Change, Biodiversity and Wild life Management (2 Units)

Concepts and definitions in wildlife and animal biodiversity. Terrestrial and aquatic wildlife. Effects of Climate Change on wildlife diseases including history of species extinctions. Climate Change and ecological perturbations; flood, famine, hyperthermia, impacts on wildlife and biodiversity. Climate Change, wildlife conservation and park management. Wildlife farming, development and preservation of coastal wet lands, establishment of zoological gardens and preservation of endangered species. Climate Change and threats to natural populations, and communities, introduction of exotic species and ecological portfolios. Climate Change, Public education and legislation in wildlife, conservation and park management.

CCS 615: Climate Change Effects on Infrastructures (Energy, Transports, Communications, etc.) (2 Units)

Understanding vulnerable sector infrastructures, Energy, Transport, Communications, Water, Agriculture, Health, etc. Vulnerabilities and effects of climate change on each sector infrastructures. National infrastructural adaptation mechanisms.

Interdependencies of sector infrastructures. Flooding effects on power stations, sea

level rising, extreme rainfall, storm surge, drought effect on power station, ecological problem, soil shrinkage.

CCS 675: Legal and Institutional Framework for Climate Change Regulation in Nigeria (2 Units)

Historical Perspective on the Development of Legal and Institutional Framework for Environmental and Climate Change Regulation in Nigeria. Institutions for Climate Change Regulation and their Challenges in Nigeria: Federal/State Ministry of Environment, Statutory Agencies/Authorities, the Judiciary, etc. A Review of the National and International Environmental Laws, Conventions and Treaties Applicable to and Enforceable in Nigeria as well as the Legal and Constitutional Backing for them. Impact of Private Initiatives and Non-Governmental Organizations on Conservation Programmes and Climate Change in Nigeria. The Politics of Climate Change.

CCS 653: Environmental Policy Issues on Climate Change (2 Units)

Introduction to Environmental Control and Policies; Technology and the Environment; Globalization and the Nigerian Environment; Understanding the Nigerian Ecosystems; Environmental Regulation and Policy in Africa, Introduction to Climate Change Policy and Legislation, Value of Natural Ecosystem, Long Term Environmental Changes, amongst others.

CCS 625: Mitigation, Adaptation and Management Issues in CC Sustainability Studies (2 Units)

Sustainable mitigation and adaptation to climate change; Strategies for sustainable adaptation to climate change; Management for sustainable mitigation and adaptation to climate change; Case studies in sustainable climate change Adaptation.

CCS 629: Political Economy of Climate Change (2 Units)

Nature of politics and politicking; Critical theories in climate change politics; The globalization theory; The international political process; Political economy of climate change; Problems of delimitation; The politics an reality of global perception of issues of

global commons; Trans-boundary nature of adverse consequences of climate change; Negotiation and implementation of multilateral agreements/treaties on climate change; Negotiation and implementation of multi-lateral agreements on climate change; International engagements in the politics of climate change; The North-South divide in climate change politics; Politics of conflict and compromise.

CCS 673: Climate Change Law and Policy (2 Units)

An Overview of Climate Change: Causes and Impacts; The Legal Tools Available for Combating Global Climate Change and for Adapting to its Impact (UNFCCC, Kyoto Protocol, IPCC, PPP, NESREA Act, EIA, etc; Impact of Oil & Gas Law, Gas Flaring, Coal, Forestry and Land Use, Energy Efficiency, Renewable Energy Sources, etc., on Climate Change; Challenges in Implementing Climate Change Laws; Special Challenges Posed by China; Common but Differentiated Responsibility, and the North/South Tension on the Funding of Climate Change Adaptation and Mitigation.; Analysis and the implementation of the Paris Agreement (2015) on Climate Change and Proposals for the Adaptation and Mitigation of Climate Change in Nigeria.

CCS 631. Energy Management Principles (2 Units)

Carbon footprint of energy production and consumption, fossil fuels, global warming potential and Climate Change. Elements of heat transfer – conduction, convection and radiation. Sources of waste in buildings and industrial systems. Energy efficiency and security – indicators in the main energy use sectors. Measurements of energy loss (energy analysis and sustainability). Energy conversion measures. Insulation used for waste heat and cold.

Temperature control – the thermostat in heating and cooling applications. Scaling up production and utilization of low carbon and climate resilient energy technologies – hydrocarbon energy, cogeneration, Photovoltaic, Biomass, fuel cells.

SECOND SEMESTER

CCS 642 Climate Change and Agricultural Production (2 Units)

Basic concepts and definitions of food security, nutrition security and gender. Conceptual framework of food security, gender and climate change. Poverty and food security situations in Africa. Changing climate and food production, distribution and accessibility. Methods of ameliorating climate change impact on soils, crop farming, livestock, fisheries, forestry. Farm housing design in relation to climate change. Aquatic, land flora and fauna in a changing climate and food security. The institutional settings for addressing food security.

CCS 632: Climate Change and Engineering Infrastructure (2 Units)

Production technologies for heat, electricity, food and transportation. Renewable energy resources. The role of different energy technologies in generating and reducing greenhouse gas emissions. Energy efficient systems. Climate change assessment, monitoring and prediction. Vulnerability, response capability and adaptation to climate change. Climate change prediction models. Concept of natural disasters and hazards. Disasters, hazards and early warning systems. Early warning methodologies and analyses. Intervention phases of early warning systems. Early warning programmes of different countries. The costs of adapting engineering infrastructure to climate change. Impacts of climate change on durability and safety of engineering infrastructure. Design factors of safety as adaptation mechanism. Materials, construction methods, operational and maintenance considerations required to adapt to climate change.

CCS 682: Seminar Presentation from the Master's Project Report (3 Units)

The seminar should be based on the report from student's project. The introductions should reflect the background study of student's research work. Literature review should highlight the previous related works in the area of the study. The sources, theory and method of data analysis must be fully explored. The analysis should be critically carried out, explaining the software, statistical analysis, mathematical analysis used in carrying out in the work in order to achieve results. Then, the discussion of results and conclusion should follow. Recommendation for future work should be

incorporated and references listed appropriately, according to the cited works in the text.

CCS 609: Project Report (6 Units)

The project title should be taken by the student and should be properly supervised by an approved supervisor in the area of research field. The supervisor should continually monitor the progress of the project work to ensure student's mastery of the work. The student will be made to present a seminar from his/her project, thereafter he or she should be ready for the final defence before the external examiner and other constituted members of the PG examination board.

Elective Courses

CCS 612: Practical Course on Indigenous Application to Climate Change (2 Units)

Installation of ground based instrument network for climate change research. Practical instrument design works. Comparison of results obtained from ground based instruments with those of satellites. Ground based measurements. Seminar on design implementation.

CCS 614: Indigenous Instrumentation Development for Climate Change Research (2 Units).

Understanding parameters that define our climate. Instrumentation for climate change studies. Procedures for data acquisition, analysis and interpretation. Design and development of indigenous instruments for data acquisition. Installation of ground based instrument network for climate change research. Modeling and Simulation of technical designs. Data format, data storage and data presentation. Instrument calibration and Data validation. Science and Engineering considerations in instrument design. Comparison of results obtained from ground based instruments with those of satellites.

CCS 672: Interrelationship between Human Rights Law, Public Health, Environmental Justice and Climate Change (2 Units)

Evaluation of the International Legal Regime for Addressing Climate Change; Human Rights Law and Climate Change; Public Health and Climate Change; Environmental Justice and Climate Change.

CCS 652: Human Behaviour, Social Environment and Climate Change (2 Units)

Gender and the Environment; Literature, Creative Writing and the Environment; Arts, Tourism and the Environment; Social Perspectives on the Environment and Climate Change; Social Science methodologies in the Study of Environment and Climate Change; Humanities, the Environment and Climate Change; Climate Change and Human Settlements.

CCS 628: Field Studies, Theories and Approaches to Sustainability Studies in Climate Change (2 Units).

The Theories of sustainability; Approaches and methods of sustainability studies; Theories and practice in assessing sustainability to CC; Sustainability approaches to tackle key CC Sectors – biodiversity, water resources, energy, health, food security, etc.

CCS 616: Indigenous Design Development of Instruments for Climate Change Research (2 Units)

Understanding parameters that define our climate. Instrumentation for climate change studies. Procedures for data acquisition, analysis and interpretation. Application of results in addressing societal needs. Design and development of indigenous instruments for data acquisition. Science and Engineering considerations in instrument design. Seminar on design implementation. Data generation and data handling. Employing the knowledge in research activities.

CCS 654. Entrepreneurship for Climate Change Adaptation (2 Units)

Climate change adaptation as an economic opportunity; Assessing market potential of climate-smart technologies, creating new products and new services; Project planning

in climate change adaptation enterprises; prospective business projects in climate change adaptation; corporate strategies for addressing climate change; Value chain approaches to developing enterprises for climate change adaptation; Public sector projects and initiatives in climate change adaptation; Case studies of enterprise development and business planning for climate change adaptation; Case studies of public sector initiatives in climate change adaptation- agriculture, energy, housing, sanitation, water, transportation, etc.

CCS 648. Water Resource Management and Climate Change Adaptation (2 Units)

Concepts and techniques of Integrated Water Resources Management – IWRM; Climate change impacts on the hydrological cycle water resources, Weather variability and environmental conditions. Adaption options and alternatives in the IWRM tool kit. Climate change and weather variability as forces in models for predicting impacts and selection of best coping strategies and practices; Optimization of catchment basin management.

4.0 PhD Courses

First Semester		
Compulsory courses		
Courses	Title	Units
PGC 701	Synopsis Writing and Grant Writing	3
CCS 703	General Concept of Climate Change to various fields I	3
CCS 781	Seminar 1 presentation on Research Proposal	3
CCS 783	Book and/or Journal Article Review on Climate Change	3
	Sub-Total	12

Second Semester Courses		
Compulsory Courses		
Courses	Title	Unit
CCS 702	General Concept of Climate Change to various Fields II	3
CCS 782	Seminar II presentation at the end of Research Work	3
CCS 790	Thesis /Project	12
	Total	30

PGC 701: Synopsis Writing and Grant Writing (3units)

Identification of types and nature of grant and grant writing; mining of grants application calls on the internet. Determining appropriate strategy for each grant application. Study of various grant application structures and contents and writing of concept notes, detailed project description, budgeting and budget defence. Study of sample grant writings in various forms and writing of mock research and other grants. Identification of University of Nigeria synopsis structure and requirements (Introduction, Methodology and Results). Determining the content of each sub-unit of the synopsis. Steps in writing of synopsis from the Dissertation/Thesis document. Structural and language issues. Common errors in synopsis writing and strategies for avoiding them. The roles of the student and the supervisor in the production of a synopsis. Writing of mock synopsis. All registered Ph.D students must attend a solution-based interactive workshop to be organized by the School of Postgraduate Studies for a practical

demonstration and application of the knowledge acquired from the course, conducted by selected experts.

CCS 703: General Concept of Climate Change to various field I (3units)

Climate change as a trans-disciplinary event. Climate change and health, climate change and engineering, climate change and Physics, climate and ICT, climate change and geology, climate change and chemistry, climate change and Law, climate change and humanities, climate change and social sciences, climate change and innovation, culture, climate change and Agriculture, geography etc.

CCS 702: General Concept of Climate Change to various field II (3units)

Climate change as a trans-disciplinary event. Climate change and health, climate change and engineering, climate change and Physics, climate and ICT, climate change and geology, climate change and chemistry, climate change and Law, climate change and humanities, climate change and social sciences, climate change and innovation, culture, climate change and Agriculture, geography etc.

CCS 781: Seminar 1 presentations on Research Proposal (3 units)

This seminar presentation serves as the first research proposal at the beginning of the student's research program. It is at the end of this presentation, that the student is expected to know if she or he will continue with the research project. It is a very crucial and decisive period.

CCS 782 Seminar II presentation at the End of Research Work (3 units)

This is seminar presentation at the end of research work before the final defence. This is the final presentation, reporting the results, findings, deductions, conclusion and recommendations from the student's work. If the student is successful he or she then submits his/her synopsis and prepares for his or her final Thesis/Project defence.

CCS 783 Books and/or Journal Article Review on Climate Change (3 units)

The purpose of this course is to expose students to book or/and Journal review. Particularly books and or Journals in climate change. This will allow them develop skills in paper or book review and thereby prepare them for seasoned academics in future.

CCS 790 Thesis /Project (12 units)

Results from the Thesis/project should be able to solve climate change societal problems, if well tackled.