1.	Name of Course				**Software and Database in Data Communication Network**	
2.	Course Code				**GNET5014**	
3.	Name(s) of academic staff					
4.	Rationale for the inclusion of the course/module in the programme				Core Module Advances in ICT are affecting most segments of business, society, and governments today in many if not most regions of the world. From a software engineering perspective, and also from a database perspective, developing telecommunication applications is different from developing traditional applications based on mainframe. Some of these differences arise due to changes in the technologies involved, some differences are due to the business climate today, and some differences are due to the scope and nature of the distributed applications themselves.	
5.	Semester and Year offered				Semester 1 / Year 1	

6.	Total Student Learning Time (SLT)	Face to Face				Total Guided and Independent Learning
	L = Lecture T = Tutorial P = Practical O= Others	**L**	**T**	**P**	**O**	Independent study=112 hours **Total** =168
		42	**14**	**/**	**112**	

7.	Credit Value	4 42 Hours of Lecture 14 Hours of Tutorial
8.	Prerequisite (if any)	None

9.	**Objectives**: To provide an overall understanding of the functionalities of telecommunication systems and how they are implemented in the form of hardware and software. Characteristics, attributes and architecture of software implementing telecommunication functions are covered. The subject also aims to provide an understanding of design and development techniques and processes of different categories of telecommunication systems. The database part of the subject provides the students with knowledge on how to formulate business rules and build databases in view of telecommunication environment requirements.
10.	**Learning outcomes:** By the end of the subject, students should be able to: • Recognize the main functionalities of telecommunication systems and how they are implemented. • Recognize the common software architectures and their attributes for telecommunication systems. • Recognize common software development activities and process models. • Recognize the telecommunication protocol software development process and techniques. • Demonstrate an understanding of the object-oriented software development approach and process. • Demonstrate a broad understanding the software design and development aspects of embedded system software development environment. • Demonstrate an understanding of software testing approach and methods. • Apply general database design techniques. • Formulate business rule and generally build database in view of telecommunication environment requirements..

11.	**Transferable Skills:**
	- Literature and data searching skills
	- Independent study and self learning skills
	- Technical writing and presentation skills
	- Oral/Written Communication skills
	- Critical thinking and problem solving skills
	- Time and Self-management skills
	- Teamwork skills
	- Independent research skills
	- Analysis and decision-making skills
	- IT skills
12.	**Teaching-learning and assessment strategy** A variety of teaching and learning strategies are used throughout the course, including: • Classroom lessons. Lectures and Power Point presentations • Tutorials • Hands-on Laboratory Sessions • brainstorming • Lecturer-led problem-solving sessions • Solving assigned problems in groups and individually • collaborative and co-operative learning; • Independent study. Assessment strategies include the following: • Performance Assessment (Project, participation, Assigned exercises) • Lecturer Observation • Quizzes, tests, and examinations
13.	**Synopsis:** The Software and Database in Data Communication Network subject is to address many of the differences between Web software engineering and traditional software engineering platforms. The subject introduces and discusses methodologies and technologies for successful application development in the Web environment. Furthermore the subject in its second part covers database processing techniques.
14.	**Mode of Delivery:** • Classroom lessons. Lectures and Presentations • Tutorial sessions: Practice exercises • Hands-on Laboratory Sessions
15.	**Assessment Methods and Types:** The assessment for this course will be based on the following:

Coursework		**40%**
• Midterm test	**10%**	
• Assignment	**10%**	
• Project	**20%**	
Final Examination		**60%**
Assessment		**100%**

16.	**Mapping of the course/module to the Programme Aims**

A1	A2	A3	A4	A5	A6	A7
5	**4**	**3**	**4**	**3**	**3**	**2**

17.	**Mapping of the course/module to the Programme Learning Outcomes**

LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8
2	**3**	**3**	**4**	**3**	**3**	**3**	**3**

		Content outline of the course/module and the SLT per topic					
18.					SLT		
		Details	**L**	**T**	**P**	**O**	**Total**
	Topic 1	**Web Engineering: Introduction and Perspectives** • Evolution of THE WEB • WEB development practices • WEB engineering • Evolutionary WEB development • WEB system design: challenges	3	1	0	8	12
	Topic 2	**A Practical Process for Web Engineering** • Current WEB application development processes • THE augmented webhelix process • Project evaluation framework • Application of THE augmented webhelix process	3	1	0	8	12
	Topic 3	**Model-Centric Architecting Process** • Comprehensive method • Model-centric architecting process • Application and future trends	3	1	0	8	12
	Topic 4	**Architecture, Specification, and Design of Service-Oriented Systems** • Peer-To-peer information systems (P2PIS) • Historical technologies used IN service-oriented systems • Implementation issues • Requirement specification issues	3	1	0	8	12
	Topic 5	**Data Integration Through Service-Based Mediation for Web-Enabled Information Systems** • A declarative data integration and transformation technique • Mediator architecture • Application scenario and discussion • Future trends	3	1	0	8	12
	Topic 6	**Using Patterns for Engineering High-Quality Web Applications** • Towards a systematic integration of patterns IN THE engineering of large-scale WEB applications • Future trends	3	1	0	8	12

Topic 7	**Component-Based Deployment for Web Applications** • Characterizing THE component problem • Real World scenarios • Business impacts	3	1	**0**	8	**12**
Topic 8	**Emerging Database System Architectures** • History • Relational Data Model • Next Generation Data Model • Hybrid Database Technologies • Future Study Related to Database Technologies • Future Database Applications	3	1	**0**	8	**12**
Topic 9	**Data Mining** • Overview of Data Mining Techniques • Data Characterization • Classification Techniques • Association Rule Discovery	3	1	**0**	8	**12**
Topic 10	**Object-Oriented Database Systems** • Functionality • Implementation • Applications	3	1	**0**	8	**12**
Topic 11	**Query Optimization Concepts and Methodologies in Multidatabase Systems** • Semantic Discrepancy and Schema Conflicts • Optimization at the Algebra Level • Optimization at the Execution Strategy Level	3	1	**0**	8	**12**
Topic 12	**Development of Multilevel Secure Database Systems** • Access Control: Basic Concepts • Mandatory Access Control • Multilevel Security in Relational DBMSs • Multilevel Security in Object DBMSs • Secure Concurrency Control	3	1	**0**	8	**12**
Topic 13	**Fuzzy Query Processing in the Distributed Relational Databases Environment** • Fuzzy Set Theory • Fuzzy Query Translation Based on the a-Cuts Operations of Fuzzy Numbers • Fuzzy Query Translation in the Distributed Relational Databases Environment • Data Estimation in the Distributed Relational Databases Environment	3	1	**0**	8	**12**

Topic 14	**Data Compression: Theory and Techniques** • Fundamentals of Data Compression • Statistical Coding • Dictionary Coding • Universal Coding • Special Methods	3	1	0	8	12
	Total SLT		168			

19.	**Main references supporting the course:** 1. Daniel M. Brandon, **"Software Engineering for Modern Web Applications: Methodologies and Technologies"**. IGI Global, 2008. 2. Cornelius T. Leondes, **"Database and data communication network systems: techniques and applications – Volume 1"**. Elsevier, 2002.
	Additional references supporting the course: 1. Eve A., Philip G., Andrew G., "Software Engineering for Internet Applications", The MIT Press, 2006. 2. Leon S., Rich R., "Web Application Architecture: Principles, Protocols and Practices". Wiley, 2009. 3. Cornelius T. Leondes, "Database and data communication network systems: techniques and applications - Volume 2 and 3". Elsevier, 2002. 4. Ramez Elmasri, Shamkant B. Navathe., "Fundamentals of Database Systems (6th Edition)", Addison Wesley, 2010.
20.	**Other additional information** All materials will be available to the students online.