1.	Name of Course	**Semantic Web Programming**				
2.	Course Code	**GCPS5014**				
3.	Name(s) of academic staff					
4.	Rationale for the inclusion of the course/module in the programme	**Core Module** Allowing data to be shared and reused across application, enterprise, and community boundaries will be possible with a major advancement in the Web; an advancement that is built on semantic Web technologies. Semantic Web technology is a powerful new technology that can unify and fully leverage the ever-growing data, information, and services that are available on the Internet. Semantic Web Programming takes the Semantic Web directly and boldly into solving practical, real-world problems that flexibly deliver real value from our growing ability to access information and services from our laptop to the enterprise to the World Wide Web.				
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**: The Semantic Web offers a powerful, practical approach to gain mastery over the multitude of information and information services. Semantics offer the leverage to make more information better and not overwhelmingly worse. This requires new data representations that improve our ability to capture and share knowledge and new programming constructs and tools to make this information work for our application.
10.	**Learning outcomes:** By the end of the subject, students should be able to: - Demonstrate an understanding of the main Semantic Web concepts and their relationship with one another. - Demonstrate an understanding of knowledge representation and application integration. - Model Information, and to establish the data model through RDF. - Create a knowledge model using RDFS and OWL 2. - Understand the knowledge model to extract useful information through search, navigation, and formal queries via SPARQL. - Represent knowledge through an exploration of the semantic rule languages, including the W3C standard SWRL. - Integrate the knowledgebase with an application that acts upon it. - Apply a Programming Framework after fully exploring Semantic Web frameworks. - Integrate the information into a knowledge model from sources such as relational databases, web services, and other formats. - Align the data along ontological concepts to unify the disparate information. - Output the information into many formats, including RDFa, microformats, SPARQL endpoints, and more. - Expand into powerful, useful areas, including semantic services, time and space, SemanticWeb architectures and best practices, after unfolding SemanticWeb tools. - Demonstrate an understanding of series of architecture patterns and Best Practices for constructing various Semantic Web applications.

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 course explores Semantic Web Programming through actual data formats, working code, and tools. The course takes a developer perspective that is aimed at application results. It focuses the explanations and justifications on what is needed to be built and manage the Semantic Web applications. It is organized to introduce Semantic Web Programming, then a foundation of Semantic Web Programming, followed with an explanation on how to build Semantic Web Applications; finally the course will expand students' knowledge of Semantic Web Programming into powerful, useful areas, including semantic services, time and space, Semantic Web architectures and best practices.
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** **50%** • Midterm test **10%** • Assignment **10%** • Project **30%** **Final Examination** **50%** **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
	4	**3**	**3**	**4**	**3**	**3**	**3**	**3**

18.	Content outline of the course/module and the SLT per topic					

	Details	**SLT**				
		L	**T**	**P**	**O**	**Total**
Topic 1	**Preparing to Program a Semantic Web of Data** • Defining the Semantic Web • Identifying the Major Programming Components • Determining Impacts on Programming • Avoiding the Roadblocks, Myths, and Hype • Understanding SemanticWeb Origins • Exploring SemanticWeb Examples	3	1	0	8	12
Topic 2	**Hello Semantic Web World** • Setting Up Your Semantic Web Development Environment • Programming the Hello Semantic WebWorld Application	3	1	0	8	12
Topic 3	**Modeling Information** • Modeling Information in Software • The SemanticWeb Information Model: The Resource Description Framework (RDF) • Exchanging Information with RDF	3	1	0	8	12
Topic 4	**Incorporating Semantics** • Semantics on the Web • Introduction to Ontologies	3	1	0	8	12
Topic 5	**Modeling Knowledge in the Real World** • Exploring the Components of the SemanticWeb • Exploring the Profiles of OWL • Demonstrating OWL Inference • Working with Ontologies	3	1	0	8	12
Topic 6	**Discovering Information** • Navigating the Semantic Web • Searching the Semantic Web	3	1	0	8	12

Topic 7	**Adding Rules** • What Are Rules? • Reasons for Rules • Rule Languages • SWRL Essentials • Jena Rules • Rule Interchange Format		3	1	**0**	**8**	**12**
Topic 8	**Applying a Programming Framework** • Framing the Semantic Web • The Jena SemanticWeb Framework • Programming with Jena • Common App Overview: FriendTracker		3	1	**0**	**8**	**12**
Topic 9	**Combining Information** • Combining Information • Exposing XML-Based Web Services as RDF • Exposing Relational Databases as RDF • Exposing Other Sources of Data		3	1	**0**	**8**	**12**
Topic 10	**Aligning Information** • Data Source, Domain, and Application Ontologies • Aligning Ontologies • FriendTracker • Record Linkage		3	1	**0**	**8**	**12**
Topic 11	**Sharing Information** • Microformats • eRDF • RDFa • Tools and Frameworks • FriendTracker in RDFa		3	1	**0**	**8**	**12**
Topic 12	**Developing and Using Semantic Services** • Implementing Semantic Services • Semantic Markup forWeb Services • Web Service Modeling Ontology • Semantic Annotations for WSDL		3	1	**0**	**8**	**12**

Topic 13	**Managing Space and Time** • Space and Time in Software • Representing Spatiotemporal Data on the Semantic Web • Spatial and Temporal Software with Jena		3	1	0	8	12
Topic 14	**Semantic Web Patterns and Best Practices** • Aggregating Disparate Data Sources • Annotating Unstructured Data • Coordinating Semantic Services • Applying Semantic Web Best Practices • Creating URIs • Specifying Units of Measurement • Representing N-ary Relationships • Managing Bad Data		3	1	0	8	12
	Total SLT		168				

19.	**Main references supporting the course:** 1. John Hebeler, Matthew Fisher, Ryan Blace, and Andrew Perez-Lopez., **"Semantic Web Programming"**. Wiley, 2009.
	Additional references supporting the course: 1. Toby Segaran, Colin Evans, Jamie Taylor. "Programming the Semantic Web", O'Reilly Media, 2009. 2. Haralambos Marmanis, Dmitry Babenko. "Algorithms of the Intelligent Web". Manning Publications, 2009. 3. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph. "Foundations of Semantic Web Technologies", Chapman and Hall/CRC, 2009.
20.	**Other additional information** All materials will be available to the students online.