Module Descriptor
School of Computer Science and Statistics

Module Code	CS3031
Module Name	Advanced Telecommunications
Module Short Title	N/a
ECTS	5
Semester Taught	Second Semester
Contact Hours	Lecture hours: 31 Lab hours: 2 Total hours: 33
Module Personnel	Hitesh Tewari
Learning Outcomes	When students have successfully completed this module they should be able to: • Demonstrate an in-depth knowledge of the Transport and Application Layers; • Have a good understanding of cryptography, network security, electronic paymentst • Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies; • Have a working knowledge of network programming using sockets and the use of a cryptographic library, both of which the students must use as part of their continuous assessment tasks.
Learning Aims	*This option concentrates on building upon the students JF and SF years knowledge and introduces them to advanced topics in the areas of data communications and telecoms networks. A detail study is made of the TCP protocols in terms of multiplexing, flow and congestion control to understand the effects congestion in a large distributed network such as the Internet. A number of Application Layer protocols such as HTTP, SMTP, DNS and AJAX are studied to understand how Web Applications are designed today. The students are given an in-depth Network Security/Cryptography module which gives them an appreciation of how to secure communications over an open network such as the Internet. They are also introduced to the topic of Electronic Payments.*
Module Content	*Specific topics addressed in this module include:* • *Transport Layer Issues – Multiplexing, UDP, TCP, Flow Control, Congestion Control* • *Application Layer Issues – HTTP, SMTP, DNS, Web Applications* • *Network Security – Symmetric and Asymmetric Key Cryptography, Key Agreement Protocols, Authentication and Digital Signatures, X.509 and Public Key Infrastructure (PKI), Elliptic Curve Cryptography, Authentication Protocol and, Secure Protocols.* *Electronic Payment Systems – Ecash, Bitcoin, Micropayments*
Recommended Reading List	Computer Networking - A Top-Down Approach, 7th Ed., James F. Kurose, Pearson Intl. Understanding Cryptography, Christof Paar, Springer

Module Prerequisites	CS2031 – Telecommunications II
Assessment Details	Assessment is by examination (80%) and continuous assessment (20%). Continuous assessment is composed of two substantial programming assignments which the students are required to demo at a lab session. The supplemental assessment will be based solely (i.e. 100%) on the written exam.
Module Website	
Academic Year of Data	2018/19