Level 6 Advanced Diploma in Routing & Switching (112)
151 Credits

Unit: Telephone Signalling System Technologies **Exam Paper No.:** 4	**Guided Learning Hours:** 220 **Number of Credits:** 22
Prerequisites: Networking knowledge.	**Corequisites:** A pass or higher in Diploma in IP Routing or equivalence.
Aim: The aim of this unit is to provide good understanding of the SS7 Signalling network, architecture and protocols. Upon completion of this unit, the learners will have a good understanding of: Signalling System 7 (SS7) Network Architecture; Signalling Network Elements: Service Switching Points (SSPs), Signal Transfer Points (STPs) and Service Control Points (SCPs); Signalling Network Structures; SS7 Protocols & Protocol Stacks; SS7 Signal Units; Signalling Links; Message Transfer Part (MTP) Level 1-3; Skinny Client Control Protocol (SCCP), Transaction Capabilities Application Part (TCAP) and ISDN User Part (ISUP); SS7 in Mobile Networks. Learners can be existing or those intending to be Network & Telecom Technical Staff Engineers involved in development, testing, and deployment; requiring comprehensive details of SS7 Network Architecture, procedures and operations. Although this unit requires no previous knowledge or understanding of SS7, a basic understanding of telecommunication network and OSI models would be beneficial.	
Required Materials: Recommended Learning Resources.	**Supplementary Materials:** Lecture notes and tutor extra reading recommendations.
Special Requirements: The unit requires a combination of lectures, demonstrations, discussions, and hands-on labs.	
Intended Learning Outcomes:	**Assessment Criteria:**
1 Understand a set of telephony signalling protocols which are used to set up most of the world's public switched telephone network telephone calls.	1.1 Define signalling 1.2 Explain the history of signalling and PSTN 1.3 Define Channel Associated Signalling (CAS) 1.4 Define Common Channel Signalling (CCS) 1.5 Analyse the International Telephony Standards 1.6 Identify the services provided SS7/C7 1.7 Analyse SS7/C7 Signalling architecture 1.8 Outline SS7/C7 protocol stack 1.9 Identify how PSTN works and the relations to SS7/C7
2 The common channel signalling system standard, signalling architecture and voice-and-data channels carrying signalling information.	2.1 Define processes, procedures and protocols used in Public Switched Telephone Network (PSTN) 2.2 Outline the exchange of information over digital network 2.3 Describe out-of-band signalling 2.4 Compare and contrast Personal communication Services (PCS) and signalling system 2.5 Analyse advantages of SS7
3 The SS7 framework architecture, essential components; the services and its usage in telecommunication.	3.1 Outline SS7 network elements 3.2 Define SS7 protocols 3.3 Analyse SS7 functions 3.4 Be able to describe how SS7 operates 3.5 Define Signalling Transfer Points (STPs)
4 Overview of SS7 standards, network architecture, SS7 management and processes at national, regional, and	4.1 Explain importance of standards 4.2 Give an outline of standards bodies

international levels.	4.3 Compare and contrast national and industry standards
5 The components of the SS7 protocol stack and the hardware and software functions of the SS7 protocol divisional functional abstractions.	5.1 Outline the Layer 2 protocol Message Transfer Part 2 (MTP2) 5.2 Identify the functions of MTP2 5.3 Outline the Layer 3 protocol Message Transfer Part 3 (MTP3) 5.4 Analyse the functions of MTP3 5.5 Outline the Layer 4 protocol Broadband/ISDN User Part (BISUP) 5.6 Describe the functions of Broadband ISDN User Part 5.7 Outline Signalling Connection Control Part (SCCP) 5.8 Outline the components of Transaction Capabilities Application Part (TCAP) 5.9 Describe TCAP functions
6 Principles, methodologies of service-oriented architecture, what it is, and how it affects what architects, CIOs, project managers, business analysts.	6.1 Define intelligent networking 6.2 Explore how intelligent networks operates 6.3 Outline the Global System for Mobile (GSM) communication 6.4 Analyse GSM phases 6.5 Define Mobile Application Part (MAP) 6.6 Outline MAP operations
7 How Service providers can cut costs with SS7oIP and describe how SS7 Over IP enables wireless service providers to rapidly deploy emerging IP-based services for the mobile Internet that freely interact with the legacy mobile infrastructure.	7.1 Outline the Next Generation Networks (NGN) 7.2 Describe the NGN architecture 7.3 Define Signalling Transport protocols 7.4 Describe the Signalling Gateway 7.5 Define Transport Adaption Layer Interface (TALI)
Methods of Evaluation: A 3-hour essay written paper with 5 questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in Telephone Signalling System Technology with a weighting of 100%.	

Recommended Learning Resources: Telephone Signalling System Technology

Text Books	• Signaling System No. 7 (SS7/C7): Protocol, Architecture, and Services - A Complete, Practical Guide to the World's Most Popular Signaling System, and Intelligent Networks by Lee Dryburgh and Jeff Hewett. ISBN-10: 1587050404 • Signaling in Telecommunication Networks by John G. van Bosse and Fabrizio U. Devetak. ISBN-10: 0471662887 • Voice over IP in Wireless Heterogeneous Networks: Signaling, Mobility and Security: Signaling, Mobility, Security by Hanane Fathi, Shyam S. Chakraborty and Ramjee Prasad. ISBN-10: 1402066309
Study Manuals 	BCE produced study packs
CD ROM 	Power-point slides
Software 	None