

MODULE DIRECTORY

LEVEL 4

SCHOOL OF APPLIED COMPUTING

FACULTY OF ARCHITECTURE COMPUTING AND ENGINEERING

2018-2019

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INTRODUCTION

This Module Directory includes all the modules for Level 4 within the School of Applied Computing in the academic year 2018-2019.

This directory accompanies the Programme of Study Handbook, which will provide you with details of which modules you will be studying for your programme this year in the 'Programme of Study' section. This directory may include modules that are running on other programmes of study within your School/Faculty. If you require assistance in identifying the modules for your programme of study, please contact the Programme Director (whose name and contact details are provided in the accompanying Programme of Study Handbook), or the relevant Faculty Office.

The University has made every effort to make the information as full and as accurate as possible, but you should note that minor changes in the organisation of modules between the planning stage and the actual teaching are inevitable. We shall try to keep any such changes to a minimum, and you will receive plenty of advance warning in the event of any alteration. We would also be grateful if you would let us know about any changes that you think might be helpful if introduced into future handbooks.

MODULES

MODULE CODE: ACCA4002
TITLE: Data Analysis & Visualisation
DATED: 03/08/2017

LEVEL: 4
CREDITS: 20

JACS CODE: G310

AIM(S)

- To develop the knowledge and skills required to perform basic statistical analysis of experimental data.
- To introduce students to a wide variety of techniques used to display different types of data effectively. The student will learn to design data presentations for both static and interactive displays.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to demonstrate the ability to:

- select and apply appropriate statistical methods for the analysis of well-defined problems;
- demonstrate an ability to present nominal, ordinal, categorical and network data in forms that enable the easy understanding of the data;
- demonstrate an ability to rearrange data in order to extract hidden information from it
- apply colour, position, size, shape and icons to encode information creatively and effectively to solve well-defined problems in information visualisation.

INDICATIVE CONTENT

- Frequency distributions, descriptive statistics, the normal curve, percentiles and standard scores, hypothesis development, confidence limits.
- Correlation coefficients, the t test, chi-square test.
- Software for statistical analysis.
- Different types of data; nominal, ordinal, categorical, network data; univariate, bivariate, trivariate, hypervariate data.
- Appropriate display methods for differing data types; graphs, tables, icons.
- Histograms, boxplots, scatterplots, barcharts, mosaic plots, parallel coordinate plots, maps.
- Rearranging data to extract meaning from it; introducing distortion to provide clarity.
- Identifying problems with visualisations.

LEARNING AND TEACHING STRATEGY

Factual material will be presented in workshops that intersperse the presentation of new material with the opportunity for students to work through problems based upon this material. Some of these will be performed manually to ensure that the students understand the processes involved before introducing the students to software that will perform these tasks more rapidly and for larger datasets.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1 – Coursework - 50%

The module will be assessed by means of an assignment requiring students to create and evaluate visualisations of data sets containing multiple types of data.

Assessment Component 2 – Coursework - 50%

Given a dataset, students are expected to perform multiple statistical analyses requiring hypothesis definition, testing and evaluation allowing them to come to a reasoned judgement of the impact of the dataset provided.

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	100%

EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

Does the module contribute to ESD?	Yes
	No
If yes please provide brief details (no more than 100 words): Statistical analysis and data visualisation skills are fundamental to many scientific and analytical roles. They are applicable across a wide range of fields and useful in everyday life.	

READING LIST

Module Code	ACCA4002	
Module Title	Data Analysis & Visualisation	
Classification	Reading List entry	Electronic*
Essential	Kranzler, J.H. (2010) <i>Statistics for the Terrified</i> , Pearson	☒
Essential	Few, S. (2012), <i>Show Me The Numbers</i> , Analytics Press, Burlingame, CA.	☒
Further	Spiegel, M.R (2014) <i>Shaum's Outline of Statistics, fifth ed.</i> , McGraw Hill Education Limited	☒
Further	Gonick, L & Smith, W. (2000) <i>Cartoon Guide to</i>	☒

	<i>Statistics</i> , William Morrow Paperbacks	
Further	Spence, R. (2006), <i>Information Visualization: Design for Interaction</i> . Prentice Hall	☐
Further	Tufte, E. (2001) <i>The Visual Display of Quantitative Information</i> (2 nd Ed.) Graphics Press USA	☐
Further	Tufte, E. (1997), <i>Visual Explanations, Images and Quantities, Evidence and Narrative</i> . Graphics Press	☐
Further	Tufte, E. (1990) <i>Envisioning Information</i> , Graphics Press USA	☐

MODULE CODE: ACCA4016
TITLE: Academic and Employability Skills
DATED: 16/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I130

AIM(S)

- To provide students with the essential knowledge and techniques that explain, underpin and enhance the requisite skills needed for success in an academic environment, while supporting transferable, sustainable, lifelong learning.
- To provide students with practical and logical problem-solving skills essential in typical laboratory or workshop environments.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

1. demonstrate an understanding and application of transferable skills in a learning environment;
2. demonstrate an understanding of logical thinking and problem solving in a contextualised environment.

INDICATIVE CONTENT

- Understanding the learning process, reflection, life-long learning.
- Gathering relevant information e.g. note taking, using the library and online resources.
- Creating a sustainable document repository.
- Communicating and presenting information e.g. presentation techniques and styles.
- Academic and Professional writing e.g. planning and structuring reports
- Standard referencing systems e.g. IEEE/Numeric system.
- Identifying goals and creating action plans
- Employability skills and competencies, professional presentation and self-promotion, e-Portfolio, choosing the right jobs and employers.
- Successful Self-management e.g. time management, organising space and resources, positive attitude, emotional intelligence, managing change, stress management.
- Self-evaluation skills
- Professional, legal, ethical and sustainability issues related to Higher Education, Employment, and Professional Practice.
- Understanding Plagiarism and Unfair Practice issues
- Health and Safety issues in context specific laboratory situations
- Understanding basic software constructs and logical thinking.
- Context specific practical skills, e.g. problem solving using programming techniques for Software Streams; Ability to Solder and use laboratory data acquisition equipment for Electronic streams.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2500 words	50%

Produce a written report, reflecting and evidencing the academic and professional skills learned during the course of the module.

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
In-Class practical	2 hrs	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	100%

READING LIST

Module Code	ACCA4016	
Module Title	Academic and Employability Skills	
Classification	Reading List entry	Electronic*
Essential	Cottrell, S. (2050), <i>Skills for Success: Personal Development and Employability</i> , Palgrave Macmillan.	☒
Essential	Cottrell, S., (2013) 4 th edition, <i>The Study Skills Handbook</i> , Palgrave Macmillan.	☐
Essential	Sebesta, R. (2012) <i>Concepts of Programming Languages</i> , Pearson Education	☐
Essential	Smale, B. and Fowlie, J. (2015) <i>How to Succeed at University: An Essential Guide to Academic Skills and Personal Development</i> , Sage Publications Ltd.	☒
Further	Farrell, I. (2010) <i>A Beginner's Guide to Programming Logic and Design</i> , Course Technology	☐
Further	Cottrell, S., (2011) 2 nd edition <i>Critical Thinking Skills: Developing Effective Analysis and Argument</i> , Palgrave Macmillan.	☐
Further	Duquenoy, P. (2007) 1 st edition, <i>Ethical, Legal and Professional Issues in Computing</i> , Thomson Learning.	☐
Further	Emden, J. and Becker, L. (2010) 2 nd edition, <i>Presentation Skills for Students</i> , Palgrave Macmillan.	☐
Further	<i>Cite Them Right: The Essential Referencing Guide</i> , Palgrave Macmillan.	☐
Further	Pedler, M., Burgoyne, J., Boydell, T. (2006) 5 th edition, <i>A Manager's Guide to Self Development</i>	☐
Further	International Journal for Academic Development.	☐
Further	Journal of the International Consortium for Educational Development.	☐
Further	http://www.skills4study.com	☒
Further	http://www.palgrave.com/skills4study	☒
Further	http://www.how-to-study.com	☒
Further	https://www.codecademy.com/	☒

MODULE CODE: ACCA4017
TITLE: Software Development
DATED: 16/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I310

AIM(S)

To introduce students to software constructs and to the development of software using a high level programming language. Simple design concepts and good programming practice will be adopted.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

1. Understand the syntax and semantics of a high-level programming language and develop programs using good programming practices.
2. Select and deploy basic software constructs using simple algorithms in the development of solutions to programming problems

INDICATIVE CONTENT

- The software life cycle – analysis, design, implementation and maintenance
- Algorithm design – flow charts and pseudo-code
- The programming environment – editor, compiler, debugger
- High level language programming syntax and semantics e.g. C, C++, C#, etc.
- Data types, variables, operators, control structures, data structures, functions
- Software testing and debugging
- Documentation including user guides, technical guides, etc.
- Introduction to problem solving techniques for well-defined problems e.g. interpreting natural language problem definitions, variable identification techniques, divide and conquer, etc.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	2800 words	70%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
In-class practical	2 hours	30%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	70%
Practical	30%
TOTAL	100%

READING LIST

Module Code	ACCA4017	
Module Title	Programming I	
Classification	Reading List entry	Electronic*
Essential	Davenport, K. & Vine, M. (2014) <i>C Programming for the Absolute Beginner</i> ,, Cengage Learning PTR	☒
Further	McGrath, M. (2012) <i>C Programming In Easy Steps 4th Edition</i> , In Easy Steps Limited	☐
Further	Greene, J. (2013) <i>Head First C#</i> , O'Reilly Media	☐

MODULE CODE: ACCA4018
TITLE: Internet Technology & Security
DATED: 22/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I120

AIM(S)

- To provide the student with an understanding of the underlying concepts and principles necessary for the implementation of web technologies including the analysis of the security of an Internet/intranet system with regard to internal and external threats

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

1. Demonstrate an understanding of the standards, concepts, principles and practice required in the implementation of websites and to select and deploy web languages to implement websites.
2. Demonstrate systematic understanding of security policies and measures to mitigate internal and external attacks and threats in a network.

INDICATIVE CONTENT

- Web fundamentals, including web architecture, browsers, web-enabled devices and compatibility issues.
- Web design concepts: information architecture, design principles, page layouts and grids, schematic design tools.
- Core technologies and standards for building web pages e.g. HTML and XHTML for structural layout and CSS for visual design and style.
- Web content: text, graphics, audio, animations, video, etc., hypertext and hypermedia, web forms.
- Web Accessibility: guidelines, standards, tools and techniques for designing accessible websites.
- Website evaluation e.g. standards validation, performance assessment and evaluation tools.
- Network security and principles.
- Developing a comprehensive network and self-defending networks.
- Security policy, standards, guidelines and procedures.
- Authentication, Authorisation, and Accounting.
- Firewall technologies.
- Fundamentals of cryptography.
- Intrusion detection system and intrusion prevention system.
- Web and database attacks – attacking web servers, category of risk, vulnerabilities of Web Servers and applications, permissions, SQL injections, attacking tools.
- Database Vulnerabilities – locating databases on the network, database server password cracking, locating vulnerabilities in databases.
- HTML – Vulnerabilities, analysing suspicious sites, MS04-040 threats.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Tutorial	60	30%
Independent learning	140	70%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	2000 words + implementation	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	2000 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	100%

READING LIST

Module Code	ACCA4018	
Module Title	Internet Technology & Security	
Classification	Reading List entry	Electronic*
Essential	Web Design with HTML, CSS, JavaScript and jQuery Set, Wiley (2014) By Jon Duckett	☐
Essential	Stallings, W (2014) Cryptography and network security, principles and practice, Pearson Education Ltd. 2016	☐
Further	Don't Make Me Think Revisited, Pearson (2014) By Steve Krug	☒
Further	Lambert, M., 2016. <i>Learning Bootstrap 4</i> 2nd ed., Packt Publishing.	☒
Further	Kyrnin, J., 2015. <i>Bootstrap in 24 Hours, Sams Teach Yourself</i> 1st ed., Sams Publishing.	☒
Further	Megosinarso, R., 2014. <i>Step By Step Bootstrap 3: A</i>	☒

	<i>Quick Guide to Responsive Web Development Using Bootstrap 3</i> 1st ed., CreateSpace Independent Publishing Platform.	
Further	H.Carr, C. Snyder, B. Bailey (2010) The Management of Network Security, Technology, Design and Management Control, Pearson Education Ltd.	☐
Further	M. Gregg, (2017) Certified Ethical Hacker (CEH) Cert Guide, Pearson Education Ltd.	☒
Further	Ciampa, M (2013) Security+ Guide to Network security fundamentals, Cengage Learning	☒
Further	D. Kim, M. Solomon, (2016) Fundamentals of Information System Security, Jones and Bartlett Learning	☐
Further	J. Michael Stewart (2013) Network Security, firewalls, and VPNs, Jones and Bartlett Learning,	☐
Further	M. Whitman, H. Mattord (2017) Principles of Information Security, Cengage Learning	☐

MODULE CODE: ACCB4001
TITLE: Computer Architecture and Networks
DATED: 16/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I111

AIM(S)

This module will provide the student with an understanding of the key concepts and building blocks of computer systems, and also clarify the issues associated with network use and how this has developed. It will identify the architectural concepts behind networking and help develop the preliminary skills necessary to install and manage networks.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

1. Demonstrate a sound understanding of the essential characteristics and concepts of computer systems and components, number systems, data capacities and transfer speeds in the context of typical PC environments
2. Demonstrate a knowledge and understanding of network principles and protocols used in the OSI and TCP/IP models. Implement simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes

INDICATIVE CONTENT

- Fundamentals of number systems. Binary, Dec and Hex notation, representation and conversion.
- Computer systems: major components and peripherals
- Storage devices. Backup and archiving. RAID etc.
- Nomenclature and specification of typical data capacities and transfer speeds
- Processor architecture: RISC, CISC and multi-core processors.
- Computer architecture: system block diagram, CPU, memory, input/output unit, system clock, data bus, address bus, control bus, fetch-execute cycle. Harvard v Von-Neumann
- Memory Organisation: Main RAM, cache, virtual memory etc,
- Input/output including polled, interrupts and direct memory access.
- Network principles and definition of a network
- Exploring of networks e.g. LAN, WAN, Internet, etc.
- ISO OSI reference model
- TCP/IP protocol model
- Network protocols and communications
- IP Addressing, IPv4, IPv6, subnetting and VLSM
- Networks access and configuring network operating system
- Ethernet, IEEE 802.3, LLC and MAC sub layers, CSMA/CD
- Network Security

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning		
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Report	2500 words equivalent	50%

Assessment Summary

Activity type	Percentage
Written exam	50%
Coursework	0%
Practical	50%
TOTAL	100%

READING LIST

Module Code	ACCB4001	
Module Title	Computer Architecture and Networks	
Classification	Reading List entry	Electronic*
Essential	W Stallings, Computer Organization and Architecture (10 th Ed), Pearson, 2016	☐
Essential	Introduction to Networks v6 Companion Guide by Cisco Networking Academy, Cisco Press. Published Nov 22, 2016	☐
Further	http://www.netacad.com (username and password required)	☒
Further	I Englander, The architecture of Computer Hardware, Systems Software & Networking – An Information Technology Approach, John Wiley & sons, 2010	☐

MODULE CODE: ACCB4013
TITLE: Information Engineering
DATED: 22/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I140

AIM(S)

- To introduce the student to the underlying concepts of systems analysis and design of computer-based systems with an emphasis on requirements analysis. This continues through to the analysis of data. Database design techniques are studied and used to translate theoretical skill into practical applications.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

1. Apply appropriate systems investigation and analysis techniques to identify and translate user requirements into a requirements specification.
2. Produce systems specifications and use them appropriately in the development of a database design model.
3. Produce a database solution that involves problem solving techniques to create a prototype application.

INDICATIVE CONTENT

- Systems development lifecycle (SDLC) rational and stages, including alternative approaches to analysis and design.
- Systems investigation techniques, requirements gathering, reporting and investigation.
- Modeling and recording techniques appropriate the approach employed(e.g. use case diagrams or DFD, use case or process description, class diagrams or ERD).
- Database models (e.g. relational, Object-Oriented and Object relational).
- Database design and entity analysis techniques. Select suitable data types, entity and reverential constrains.
- Database implementation using suitable DBMS software.

LEARNING AND TEACHING STRATEGY

Key concepts and theoretical issues will be delivered through a formal mechanism such as lectures, which will allow the student to gain the knowledge applicable to the module. During weekly laboratory sessions, students will apply the theoretical concepts to practical situations.

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
In-class controlled assessment	1 day (not exam conditions)	30%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	2000 words + design work	70%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	70%
Practical	30%
TOTAL	100%

READING LIST

Module Code	ACCB4013	
Module Title	Information Engineering	
Classification	Reading List entry	Electronic*
Essential	Begg, C. and Connolly, T. (2010) <i>Database Systems, A Practical Approach to Design, implementation and Management</i> Addison Wesley	☐
Essential	Hoffer, J.A., George, J.F. and Valacich, J.S. (2011) <i>Modern Systems Analysis and Design</i> , 6 th International Edition., Prentice Hall: New Jersey	☐
Essential	Begg, C. and Connolly, T. Holowczak R. (2008) <i>Business Database Solutions</i> , Addison Wesley	☐
Further	Stevens, P. & Pooley, R. (2006) <i>Using UML: Software Engineering with Objects and Components</i> , 2 nd Edition., Addison Wesley	☐
Further	Dennis, A., Wixom, B.H. and Tegarden, D. (2010) <i>Systems Analysis and Design: An Object-oriented Approach with UML</i> , 3 rd Edition., Wiley: MA.	☐

Further	Elmasri, R. and Navathe, S. (2010) <i>Fundamentals of Database Systems</i> , Addison Wesley	☐
Further	http://www.acm.org	☒
Further	http://www.bized.co.uk	☒
Further	http://www.managers.org.uk	☒
Further	http://www.cbronline.com	☒
Further	http://www.ee.vl.ac.uk	☒
Further	http://juno.emeraldinsight.com	☒
Further	http://www.ft.chadwyck.co.uk	☒
Further	http://www.itwales.com	☒
Further	http://www3.gartner.com	☒
Further	http://www.silicon.com	☒
Further	http://www.mckinseyquarterly.com	☒
Further	http://www.zdnetweek.co.uk	☒
Further	http://www.databasejournal.com	☒
Further	http://www.w3schools.com/sql/default.asp	☒
Further	http://www.sqlcourse.com	☒
Further	http://www.1keydata.com/sql/sql.html	☒
Further	http://www.sqlzoo.net	☒

MODULE CODE: ACDA4003
TITLE: Mathematics
DATED: 16/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I100

AIM(S)

To provide in-depth coverage of important mathematical ideas, techniques and tools necessary for an understanding of the mathematics encountered in computing and electronic engineering topics.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

1. Apply appropriate mathematical techniques to the solution of mathematical problems.
2. Use contemporary software tools to solve mathematical problems.

INDICATIVE CONTENT

- Fundamental Algebra/Trigonometry: Solution of Equations
- Matrix methods
- Complex numbers
- logic
- Sets, relations and functions
- Combinatorial analysis
- Graph theory
- Logs, exponentials and powers
- Co-ordinate Systems
- Vector Analysis: vector rules and notation as applied to static and dynamic vector quantities.
- The Calculus: the methods of differentiation and integration, partial differentiation, 1st order differential equations.
- Statistics: Probability theory and statistical analysis.
- Use of technical computing tools (e.g. MATLAB, Octave) for:
 - o Calculating
 - o Visualising
 - o Scripting

- o Programming
- o Solving equations

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Practical in-class test	2 hours	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	100%

READING LIST

Module Code	ACDA4003	
Module Title	Mathematics	
Classification	Reading List entry	Electronic*
Essential	Stroud, K.A. and Booth, D. J. (2017) Engineering Mathematics, Palgrave	☒
Essential	Moore, H. (2018) MATLAB for Engineers: Global Edition, 5 th Edition Pearson	☒
Further	Bird J.O. (2010) Higher Engineering Mathematics, Newnes	☐
Further	Palm, W.J. (2010) Introduction to MATLAB for Engineers, 3 rd Edition, McGraw-Hill	☐
Further	Singh, K. (2011) Engineering Mathematics through applications, Palgrave	☐