

Programme specification

1. Overview/ factual information

Programme/award title(s)	<ol style="list-style-type: none"> 1. BSc (Hons) Information Technology and Computing (360 Points) <ul style="list-style-type: none"> • BSc (Hons) Information Technology and Computing • BSc (Hons) Information Technology and Computing (Computer Science) • BSc (Hons) Information Technology and Computing (Networking & Security) • BSc (Hons) Information Technology and Computing (Web Development) • BSc (Hons) Information Technology and Computing (Computing with Business) • BSc (Hons) Information Technology and Computing (Data Science) • BSc (Hons) Information Technology and Computing (Cyber Security) • BSc (Hons) Information Technology and Computing (Artificial Intelligence) 2. Diploma of Higher Education in Information Technology and Computing (240 points) <ul style="list-style-type: none"> • DipHE IT & Computing • DipHE IT & Computing (Computer Science) • DipHE IT & Computing (Networking & Security) • DipHE IT & Computing (Web Development) • DipHE IT & Computing (Computing with Business) • DipHE IT & Computing (Data Science) • DipHE IT & Computing (Cyber Security) • DipHE IT & Computing (Artificial Intelligence) 3. Certificate of Higher Education in Information Technology and Computing (120 points) <ul style="list-style-type: none"> • CertHE IT & Computing • CertHE IT & Computing (Computing with Business) • CertHE IT & Computing (Data Science) • CertHE IT & Computing (Cyber Security) • CertHE IT & Computing (Artificial Intelligence)
Teaching Institution	Arab Open University (AOU)
Awarding Institution	The Open University (OU)
Date of first OU validation	2003
Date of latest OU (re)validation	29 April 2017
Next revalidation	June 2021
Credit points for the award	360 points

UCAS Code	
HECoS Code	<p>ITC Pathway 100403 – mathematics 100367 - computing and information technology</p> <p>Computer Science 100403 – mathematics 100366 - computer science</p> <p>Network and Security 100403 – mathematics 100365 - computer networks</p> <p>Web Development 100403 – mathematics 100375 - Web and multimedia design</p> <p>Computing with Business 100403 – mathematics 100367 - computing and information technology 100361 - business information systems</p> <p>Cyber Security 100376 - computer and information security (Major/50%) 100365 - computer networks (Major/50%)</p> <p>Artificial Intelligence 100403 – mathematics 100359 - Artificial intelligence 100992 - machine learning</p> <p>Data Science 100406 - statistics (Major/34%) 100403 - mathematics (Major/33%) 100367 - computing and information technology (Major/33%)</p>
LDCS Code (FE Colleges)	
Programme start date and cycle of starts if appropriate.	September 2021
Underpinning QAA subject benchmark(s)	<p>Subject Benchmark Statement of Computing 2019 by Quality Assurance Agency for Higher Education's (QAA's), refer to https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-computing.pdf?sfvrsn=ef2c881_10</p> <p>Subject Benchmark Statement Mathematics, Statistics and Operational Research 2019 https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-mathematics-statistics-and-operational-research.pdf</p>
Other external and internal reference points used to inform programme outcomes. For apprenticeships, the standard or framework against which it will be delivered.	<p>External:</p> <ul style="list-style-type: none"> Computer Science Curricula 2013, ACM-IEEE Computer Society https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf

	<ul style="list-style-type: none"> • Cyber Security Curricula 2017, ACM-IEEE Computer Society - https://www.acm.org/binaries/content/assets/education/curricula-recommendations/csec2017.pdf • OU, UK Website : www.open.ac.uk • The Future of Jobs Report 2020-World Economic Forum https://www.weforum.org/reports/the-future-of-jobs-report-2020 <p>Internal:</p> <ul style="list-style-type: none"> • AOU Mission, Vision and Values - https://www.arabou.edu.kw/university/Pages/vision-and-mission.aspx • Learning and Teaching Strategy, Arab Open University https://www.arabou.edu.kw/blended-learning/Pages/about.aspx • The Bachelor Degree Award Requirements Bylaws, Arab Open University https://www.arabou.edu.kw/university/Documents/Regulations/student/en/The%20Bachelor%20Degree%20Award%20Requirements%20Bylaws.pdf • The Bachelor Award Examinations and Assessment Bylaws, Arab Open University https://www.arabou.edu.kw/university/Documents/Regulations/student/en/The%20Bachelor%20Award%20Examinations%20and%20Assessment%20Bylaws.pdf
Professional/statutory recognition	Recognised by Ministries of Higher Education in KSA, Kuwait, Lebanon, Egypt, Oman, Jordan, Bahrain, Sudan, Palestine and validated by Open University Validation Partnerships (OUVP), UK.
For apprenticeships fully or partially integrated Assessment.	N.A.
Mode(s) of Study (PT, FT, DL, Mix of DL & Face-to-Face) Apprenticeship	Blended Learning
Duration of the programme for each mode of study	Full time [3.5 - 12] Years
Dual accreditation (if applicable)	<ul style="list-style-type: none"> • The Open University (OU), United Kingdom • The Arab Open University (AOU), accredited from the Ministry of Higher Educations (MoHEs)
Date of production/revision of this specification	12 April, 2021

2. Programme Aims and Objectives

2.1 Educational aims and objectives

2.1.1 Educational aims and objectives of the Information Technology and Computing (ITC) programme

The Information Technology and Computing (ITC) programme has been designed and developed to provide a high-quality programme of study to students at the Faculty of Computer Studies (FCS), Arab Open University (AOU). The design and development of this programme have been taken into consideration the guidelines provided by professional standard bodies, including the QAA, UK (QAA2019) and the curriculum guidelines of ACM-IEEE 2013 and 2017 in addition to the up-to-date prospectus of the Computing and Information Technology provided by the Open University-UK. Hence, this programme will enable the students at FCS, AOU to fulfil the standards expected of the ITC graduates. The flexibly structured ITC programme has the following overall aims to:

- Provide students with a sound grasp of essential principles of hardware based, software based or systems-based technologies.
- Provide students familiarity with a variety of modern programming languages and the underlying principles of programming paradigms- functional, object oriented, logical etc.
- Enable students to solve scientific problems, along with appreciation for mathematical and scientific methods which will provide lifelong support to their carrier.
- Enable students to apply their knowledge and skills in a broad range of ITC related industries and organisations.
- Prepare students for employment in a wide range of firms, including communication systems, software engineering, networking and Security or web technologies.
- Enhance students' experience in communication, time management, analysis and problem solving.
- Develop students' skills for working in a team to tackle an appropriate development task and accomplish projects to demonstrate their ability to undertake a substantial piece of work.

2.1.2 Educational aims and objectives of the Information Technology and Computing (ITC) Pathway

This flexibly structured pathway has the following overall aims:

- Provide students with up-to-date principles and concepts of system based technologies, including hardware and/or software based systems.
- Enable students to apply their knowledge and understanding appropriately in activities such as analysis, abstraction, problem-solving, design, development and testing in a wide range of industries and organisations.
- Prepare students for employment in the field of ITC, including developing, integrating, and/or maintaining software and/or hardware based systems.

- Equip students with appropriate cognitive, key, practical and professional skills, including the skills needed to undertake lifelong learning in their chosen professional field.
- Enhance students' experience in communication, time management, analysis and problem solving related to ITC systems.
- Develop students' skills for working in a team to tackle an appropriate development task and accomplish projects to demonstrate their ability to undertake a substantial piece of work.

2.1.3 Educational aims and objectives of the Computer Science (CS) Pathway

Professionals working in the software industry at large bring many different kinds of expertise to their work environment. The aim of the Computer Science (CS) Pathway is to equip the student with the knowledge and skills he/she will need to take part in software related industry. In particular, our aim is to give the student:

- A grasp of computer science and of modern computer systems.
- Strong skills in software engineering, strategy and project management in addition to multimedia technologies.
- The ability to understand and work in software systems that are now being constructed and used, including distributed Internet systems, intelligent systems and databases.
- Essential skills required for software development and maintenance, such as analysis, design, programming and evaluation are built and maintained.
- A familiarity with a variety of modern programming languages and the underlying principles of Programming paradigms-functional, object oriented, logical, etc.
- An ability to solve scientific problems, along with appreciation for mathematical and scientific methods which will provide lifelong support to their carrier.
- An ability to work with other people in a team, communicating computing ideas effectively in a verbal and written manner.
- The qualities that come with being a graduate such as: specialist knowledge, intellectual self-confidence and independence, analytical ability and the life-long learning skills needed to keep up with fast-changing technologies.

2.1.4 Educational aims and objectives of the Web Development (WD) Pathway

This pathway has the following overall aims to:

- Provide students with a wide umbrella of up-to-date knowledge and understanding of Web based solutions, Internet of things and Cloud Computing.
- Prepare students to integrate the principles, concepts and techniques associated with web application/solutions, including the analysis, design and development processes involved.
- Provide the students with the necessary tools and methodologies, to construct, design and implement up-to-date web solutions; to enable them to carry out a project in web development that applies and extends their knowledge and understanding.

- Provide the students with the skills to be able to use the latest programming, networking and human-computer interaction methods for designing and developing advanced web applications.
- Provide students with the required skills that enable them to consider and understand the potentials and limitations of web based systems.
- Enable the students to work with other people in a team, communicating ideas effectively in a verbal and written manner.
- Provide the student with the qualities that come with being a graduate such as: specialist knowledge, intellectual self-confidence and independence, analytical ability and the life-long learning skills needed to keep up with fast-changing technologies.

2.1.5 Educational aims and objectives of the Networking and Security (N&S) Pathway

Networking and Security are disciplines that are closely intertwined and that undergo fast technological advances. The N&S Pathway aims to prepare the students for a professional career in these areas. It has the following overall aims to:

- Enable students to develop knowledge and understanding of the fundamental concepts and technologies related to Networking and Security.
- Prepare students to apply, creatively and responsibly, their knowledge and understanding of networking systems and security techniques in activities such as: the critical analysis of these systems; effective planning, administration, and management of such systems; the proposal and planning of enhancements to these systems; the objective evaluation of the use of such systems.
- Enable students to make reasoned arguments concerning the wide range of issues and challenges faced by networking and security systems.
- Prepare students for professional work in the fields of networking and security by providing them with the skills and capabilities needed to undertake lifelong learning and to keep their knowledge and understanding up to date.
- Enable the student to work with other people in a team, communicating ideas effectively in a verbal and written manner.
- Prepare students to not only be employed as Network related specialist, but also a Security specialist such as, Cyber Security Analysts, etc.
- Provide the student with the qualities that come with being a graduate such as: specialist knowledge, intellectual self-confidence and independence, analytical ability and the life-long learning skills needed to keep up with fast-changing technologies.

2.1.6 Educational aims and objectives of the Computing with Business (CwB) Pathway

Computing and Business are disciplines that have become closely intertwined through the world of work. The aim of the Computing and Business pathway is to equip the student with the knowledge and skills the student will need to take part in the management and execution of computer-related projects in a business setting. In particular, it has the following overall aims to:

- Provide the students a grasp of the key concepts of computing and of modern computer systems, especially in Business context.
- Provide the students an acquaintance with all facets of the world of business: markets, organizations, processes, strategies, policies and decision-making, etc., along with the role of ITC.
- Prepare the students to understand the types of software systems that are now being constructed and used in business and management fields such as, e-commerce systems, Management Information systems, ERP solutions, Human Capital Management, data analytics, etc.
- Provide students with essential skills required for software development and maintenance, such as analysis, design, programming and evaluation are built and maintained.
- Prepare the students to develop key business skills of communication, presentation and team working.
- Enable students to acquire the qualities that come with being a graduate: specialist knowledge, intellectual self-confidence and independence, analytical ability and the life-long learning skills needed to keep up with fast-changing technologies.

2.1.7 Educational aims and objectives of the Artificial Intelligence (AI) Pathway

Artificial Intelligence Pathway provides a strong theoretical infrastructure, along with deep technical focus to ensure that graduates have the right combination of theoretical background and technical ability. This unique combination of theoretical knowledge and technical capabilities are equipped to enjoy significant rewards in the world's most challenging industry.

Professionals working in the software industry at large bring many kinds of expertise to their work environment. The aim of the AI Pathway is to equip the student with the knowledge and skills he/she will need to take part in software related industry. AI Pathway aim is to:

- Prepare students for a professionally proven career able to meet industry demand for high calibre graduates in the domain of Computing and Artificial Intelligence as well as their related fields.
- Provide students with necessary knowledge in Mathematics and Computing to enable their depth and breadth study in the Artificial Intelligence fields.
- Develop students' theoretical and practical skills over a broad range of Artificial Intelligence key areas together with a knowledge of currently available tools and technologies.
- Build the students' practical and analytical skills required for software development, such as analysis, design, implementation, evaluation and maintenance.
- Develop students' legal background and ethical standards to become a responsible and socially aware information technology professional.
- Nurture student's confidence and transferable skills in communication, self-learning, scientific research, problem-solving, critical thinking, as well as being efficiently able to work in a team and as an individual.

2.1.8 Educational aims and objectives of the Data Science (DS) Pathway

Data Science is a new field that is still evolving and spreads across a wide range of discipline areas based in the enabling disciplines of computer science, statistics and applied mathematics. There is a need for universities to offer curriculum to equip employees with the multi-skilled data talent which employers are increasingly seeking. There is a growing demand for Data Scientists in both public and private sectors to identify and solve complex business problems. The emergence of Data Science, has recently led to a surge of demand globally for relevant courses, typically at the interface between Statistics and Computer Science with much of that demand coming from mature students wishing to up-skill in mid-career.

The graduate of this pathway will acquire a deep understanding of statistical and machine learning methods, programming and software development, algorithms and data structure. The graduates will develop expertise in communicating and visualizing data, including to non-specialists, and skills in thinking critically about the possibilities and limits of big data. The graduates will learn theories and techniques that will equip you with a range of skills to analyse complex data and guide evidence based decision and policy making across a range of public and private businesses. Together with developing knowledge and understanding of the fundamental concepts, techniques and technologies, and issues involved in their application, the DS Pathway aims to:

- Enable the student to keep ahead in a rapidly changing subject area by helping him/her to develop as an independent learner
- Develop relevant skills in communication and problem solving
- Imbue the qualities that come with being a graduate in any subject: specialist knowledge, intellectual self-confidence and independent, analytical ability and the life-long learning skills needed to keep up with fast-changing technologies and techniques
- Develop the capability to work with abstract concepts
- Develop in depth understanding of the key technologies in data science, business analytics, data mining, machine learning, visualization techniques, predictive modelling, and statistics.
- Familiarise the students with mathematical techniques involving matrices, linear algebra and calculus which are fundamental to applied mathematics and needed to analyse data using advanced numerical analysis, optimisation, network and graph theory
- Provide practical experience in the use of information and communication technologies
- Contribute understanding of machine learning, artificial intelligence and computer programming
- Give the ability to model real world situations and apply knowledge of statistics, mathematics and computing to develop solutions to practical problems.
- Uphold ethical practices in professional and industrial projects and work

2.1.9 Educational aims and objectives of the Cyber Security (CyS) Pathway

Cyber Security Pathway provides a strong theoretical infrastructure, along with deep technical focus to ensure that graduates have the right combination of theoretical background and technical ability. This unique combination of theoretical knowledge and technical capabilities are equipped to enjoy significant rewards in the world's most challenging industry.

The Cyber Security Pathway directly addresses the key challenges in cyber security and cover the skills gap in the market. This programme is directly contributing to positioning the University as the premier employment- focused and research informed institution, thus allowing the University to make a positive impact on the economy, society and culture of the MENA region and beyond through innovation and engagement.

The Cyber Security Pathway aims to provide graduates with an ability to:

- Acquire the necessary theoretical foundation and practical skills in the Cybersecurity domain, which will enable them to work effectively in industry and prepare them for postgraduate study.
- Evaluate and analyse a broad range of tools and techniques, which are at the forefront of defined aspects of cybersecurity and an ability to exercise critical judgement.
- Critically analyse and apply essential concepts, principles, practices, and research showing effective judgement to frame questions and to solve problems.
- Investigate and critically evaluate arguments, assumptions, and data to identify the root cause of computer-based malicious activity.
- Critically review and recognize the legal, social, ethical and professional issues involved in Cyber Security and be guided by the adoption of their best practices.
- Undertake projects to a professional industry recognized standard, within Computer Security, by the consistent application of development, management and evaluation methods and techniques.
- Develop transferable skills necessary for employment including initiation, commitment, time-management, decision making, documentation, presentation, and the ability to communicate findings with both specialist and non-specialist audiences.

2.2 Relationship to other programmes and awards

(Where the award is part of a hierarchy of awards/programmes, this section describes the articulation between them, opportunities for progression upon completion of the programme, and arrangements for bridging modules or induction)

To obtain the BSc. (Hons) degree students must achieve 360 credit points.

Opportunities to transfer between ITC Programme Pathways

A Transition Plan has been prepared to enable students registered in the current ITC Programme pathways to transition smoothly to the updated pathways after revalidation. Proper

academic advising will be provided to such students to help them to achieve smooth transition into updated pathways.

Employment Opportunities

Information Technology and Computing skills have become fundamental to the way we live, work, socialize and play. This degree opens up the world of technology and an array of exciting careers in a wide range of sectors – from systems and software industry, finance, government, health, education and the ‘third sector’, to business, gaming, and commerce.

It will help the student to become a dominant player in the field of Computing and Information Technologies; to analyse, develop, test, maintain, integrate and use hardware and/or software or hybrid systems; to participate in innovating new solutions to meet specific market or organisation needs. A choice of pathways through the degree will enable the students to concentrate their studies on Information Technologies and Computing, Computer Science, Web Development, Networking & Security or Computing with Business.

The ITC skills are in great demand in the Middle Eastern region, since it is a developing and emerging region, which requires to build its IT. Also, there is a growing trend and awareness amongst the countries of the Middle Eastern region in which AOU operates, to either shift away from oil dependency or explore alternative avenues to create jobs for young generation of the future. At the forefront of this trend is the focus on developing the “Knowledge Economy”, which will require highly skilled ITC graduates. Hence, the graduates of our ITC programme are expected to find employment opportunities both at their local developing sector as well as in the international market.

Some of the key areas in which our graduates can find employment opportunities include the following but not limited to:

Pathway	Job Opportunities	
ITC	<ul style="list-style-type: none"> • System modelling, analysis, development and integration, including hardware, software and web-based systems • Cloud Computing Engineer • Computer Network Specialist • Computer Support Specialist • Database Administrator 	<ul style="list-style-type: none"> • Mobile Technology • Software Designer/Developer • Storage Management • Information Technology Analyst • Information Technology Leadership • Information Security Specialist • Software/Application Developer
CS	<ul style="list-style-type: none"> • Software Developer • Computer Systems Analyst • Web Developer • Software quality assurance manager • Data analyst 	<ul style="list-style-type: none"> • Database Administrator • Computer Hardware Engineer • Information Security Analyst • Computer and Information Research Scientists/ Systems Managers • Full stack developer
N&S	<ul style="list-style-type: none"> • Security Analyst • Security Engineer • Security Architect 	<ul style="list-style-type: none"> • Network technical architects • Network technicians • Network principals

	<ul style="list-style-type: none"> • Security Administrator • Security Software Developer • Cryptographer 	<ul style="list-style-type: none"> • Network administrators • Cryptanalyst • Network and Security Consultant
WD	<ul style="list-style-type: none"> • Applications developer • Game developer • Multimedia programmer • Web content manager • web application developer • website designer 	<ul style="list-style-type: none"> • database designer • digital marketing • graphics designer • multimedia production • programmer • software developer
CwB	<ul style="list-style-type: none"> • Software Developer • Applications Programmer • Systems Programmer • Multimedia Programmer 	<ul style="list-style-type: none"> • Systems Analyst • Computer Sales Support • Database Administrator • IT Technical Support Officer
CyS	<ul style="list-style-type: none"> • Network designer • IT Network Security • Cyber Security Analyst • Cyber Security Consultant • Penetration & vulnerability tester • Cyber security manager/ administrator • Cyber security architect • Security Auditor 	<ul style="list-style-type: none"> • Penetration Tester • Computer Forensics Investigator • Cryptographer • Cyber Security Risk Analyst • Cyber Software Developer • Chief Security Officer • Ethical Hacker • Threat Manager /Responder • Network Administrator
AI	<ul style="list-style-type: none"> • Applications Developer • AI Data Analyst/Engineer • Applied Machine Learning Engineer • Big Data Engineer/Architect • Business Intelligence Developer • Cloud Computing Engineer • Computational Linguist • Computer vision engineer • Security Analyst Engineer 	<ul style="list-style-type: none"> • Designer in Human-Centered Machine Learning • Embedded Machine Learning Engineer • Machine Learning Operations (MLOps) Developer • Machine Learning Researcher • Data Scientist • Research Scientist • Robotics Scientist
DS	<ul style="list-style-type: none"> • Data analyst • Data engineer • Data scientist • Machine learning engineer • Machine learning scientist • Applications architect • Enterprise architect • Data architect • Infrastructure architect • Business Intelligence (BI) developer • Statistician, 	<ul style="list-style-type: none"> • Senior data scientist • Python developer (data scientist) • R developer (data scientist) • System modelling, analysis • development and integration, including hardware, software and web-based systems • Software industry • Network design, development and maintenance • Storage management • Big data analytics

	<ul style="list-style-type: none"> • Business analyst- data science • Senior associate - data scientist • Health informatics 	<ul style="list-style-type: none"> • Web development, internet of things, cloud technologies, • Financial sector including banking
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2.3 For Foundation Degrees, please list where the 60 credit work-related learning takes place. For apprenticeships an articulation of how the work based learning and academic content are organised with the award.

NA

2.4 List of all exit awards

1. Certificate of Higher Education in Information Technology and Computing (120 points)
 - CertHE IT & Computing
 - CertHE IT & Computing (Computing with Business)
 - CertHE IT & Computing (Data Science)
 - CertHE IT & Computing (Cyber Security)
 - CertHE IT & Computing (Artificial Intelligence)
2. Diploma of Higher Education in Information Technology and Computing (240 points)
 - DipHE IT & Computing
 - DipHE IT & Computing (Computer Science)
 - DipHE IT & Computing (Networking & Security)
 - DipHE IT & Computing (Web Development)
 - DipHE IT & Computing (Computing with Business)
 - DipHE IT & Computing (Data Science)
 - DipHE IT & Computing (Cyber Security)
 - DipHE IT & Computing (Artificial Intelligence)

3. Programme structure and learning outcomes

3.1 ITC Programme Pathways

3.1.1 ITC Pathway						
Programme Structure						
Compulsory modules		Credit points	Optional modules	Credit Hours	Is module compensatable?	Semester runs in
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU) = Level 4 (OU)	TM105 Introduction to Programming	15	Nil	4	NA	A.Y. 2021-2023
	TM103 Computer Architecture and Organization	15	Nil	4	NA	
	MT131 Discrete Mathematics	15	Nil	4	NA	
	MT132 Linear Algebra	15	Nil	4	NA	
	M110 Python Programming	30	Nil	8	NA	
	TM112 Introduction to Computing and Information Technology	30	Nil	8	NA	
Level 2 (AOU) = Level 5 (OU)	M269 Algorithm, Data structure and Computability	30	Nil	8	NA	A.Y. 2023-2024
	M251 Object-Oriented Programming using Java	30	Nil	8	NA	
	TM255 Communication and Information Technologies	30	Nil	8	NA	
	T215B Communication and Information Technologies – Part B	30	Nil	8	NA	
Level 3 (AOU) = Level 6 (OU)	TM351 Data Management and Analysis	30	Nil	8	NA	A.Y. 2024-2025
	TM354 Software Engineering	30	Nil	8	NA	
	TM355 Communications Technology	30	Nil	8	NA	
	TM471 Graduation Project	30	Nil	8	NA	

<u>Learning Outcomes – ITC Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the ITC pathway should be able to:</p> <p>A1. Describe and evaluate the principles, concepts and techniques associated with the technology of computers and digital communication systems, at both the individual component and the system level, including use of appropriate models.</p> <p>A2. Recognise the broad range of contexts in which computers and digital communication systems are used and of the various ways in which users interact with them.</p> <p>A3. Outline the major trends and issues in Information Technology and Computing.</p> <p>A4. Integrate professionally the lifecycle of computing and IT systems, including the integration of theory and practice to develop specifications, designs, and implementations to solve novel problems.</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student’s first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU’s learning/teaching strategy provides contact hours that are equal to 25% of the course credit hours. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The ITC Pathway will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours. 2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.

<u>Learning Outcomes – ITC Pathway</u>	
3A. Knowledge and understanding	
	<p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students, communicating face-to-face, email and computer conferencing.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the ITC Pathway is achieved through a combination of continuous assessment and exams. These assessments are central to the teaching of each module, enabling tutors to identify and comment on student knowledge and understanding. Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>

3B. Cognitive skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the ITC pathway should be able to:</p> <p>B1. Evaluate and Differentiate between IT and Computing systems, including hardware based, software based or system based contexts.</p>	<p>Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop mathematical, programming and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work,</p>

3B. Cognitive skills	
<p>B2. Appraise and illustrate principles of ITC technologies for abstracting, modelling, problem-solving, designing and testing in the fields of Information Technology and Computing, being aware of the limitations involved.</p> <p>B3. Distinguish the features and specifications of hardware based, software based IT and Computing systems.</p> <p>B4. Critically analyse ITC systems' processes and outcomes through small projects.</p>	<p>there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team's members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme are achieved through a combination of continuous assessment:</p> <p>Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules, this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the ITC pathway should be able to:</p> <p>C1. Design, develop, deploy and manage small computing and IT projects.</p> <p>C2. Examine, compare, compile, judge and choose IT computing systems, according to particular demand.</p> <p>C3. Plan and organize themselves and their work appropriately; keep systematic records of work in progress and outcomes.</p> <p>C4. Manage risk and complexity, including the ability to perform trouble shooting in unstructured environments.</p>	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in ITC. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student's skills in the contexts of computation, testing and analysis. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance.</p> <p>Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA)

3C. Practical and professional skills	
	<ul style="list-style-type: none"> ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferrable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the ITC pathway should be able to:</p> <p>D1. Demonstrate the ability to work independently and as part of a team, gathering and evaluating different types of information, identifying problems, developing and documenting solutions, and making effective use of ICT for project management, communication and collaboration.</p> <p>D2. Communicate and report professionally and effectively in an Information Technology and Computing context.</p> <p>D3. Apply problem-solving skills in an Information Technology and Computing context.</p> <p>D4. Critically analyse and use data and information effectively in Information Technology and Computing context.</p> <p>D5. Exhibit proficiency in using the appropriate numerical and mathematical skills.</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the pathway. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills. AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed earlier levels. Higher level modules aim to develop students' ability to conduct independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to</p>

3D. Key/transferable skills	
<p>D6. Conduct own self learning to the extent that they are prepared for lifelong learning after graduating.</p>	<p>feedback from a variety of audiences, as well as to manage increasingly large workloads.</p> <p>Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3.1.2 CS Pathway						
Programme Structure						
Compulsory modules	Credit points	Optional modules	Credit Hours	Is module compensatable?	Semester runs in	
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU) = Level 4 (OU)	TM105 Introduction to Programming	15	Nil	4	NA	A.Y. 2021-2023
	TM103 Computer Architecture and Organization	15	Nil	4	NA	
	MT131 Discrete Mathematics	15	Nil	4	NA	
	MT132 Linear Algebra	15	Nil	4	NA	
	M110 Python Programming	30	Nil	8	NA	
	TM112 Introduction to Computing and Information Technology	30	Nil	8	NA	
Level 2 (AOU) = Level 5 (OU)	M269 Algorithm, Data structure and Computability	30	Nil	8	NA	A.Y. 2023-2024
	M251 Object-Oriented Programming using Java	30	Nil	8	NA	
	TT284 Web Technologies	30	Nil	8	NA	
	TM298 Operating Systems	15	Nil	4	NA	
	TM240 Computer Graphics and Multimedia	15	Nil	4		
Level 3 (AOU) = Level 6 (OU)	TM351 Data Management and Analysis	30	Nil	8	NA	A.Y. 2024-2025
	TM354 Software Engineering	30	Nil	8	NA	
	TM358 Machine learning and Artificial Intelligence	30	Nil	8	NA	
	TM471 Graduation Project	30	Nil	8	NA	

<u>Learning Outcomes – CS Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CS pathway should be able to:</p> <p>A1. Define and effectively use the key concepts of computer science.</p> <p>A2. Recognise the methods and tools used to develop software solutions.</p> <p>A3. Explain the key concepts of software development, integration and maintenance, including principles of requirements analysis, design and programming.</p> <p>A4. Describe the different approaches and methods/techniques of representing, visualizing and extracting information from data, including from the large data sets (Big Data).</p> <p>A5. Integrate the key concepts related to Computer Science, including algorithms, data structures, computability, object oriented programming languages, Web technologies, Software Engineering, development and testing of software systems.</p> <p>A6. Discover and select novel solutions in a range of situations in which computer science can be applied, the ways in which people interact with computer science solutions, and the ethical, social and legal problems that computer science can create and solve.</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student’s first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU’s learning/teaching strategy provides contact hours that are equal to 25% of the course credit hours. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The CS Pathway will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours. 2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.

<u>Learning Outcomes – CS Pathway</u>	
3A. Knowledge and understanding	
	<p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students, communicating face-to-face, email and computer conferencing.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the CS Pathway is achieved through a combination of continuous assessment and exams. These assessments are central to the teaching of each module, enabling tutors to identify and comment on student knowledge and understanding. Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>
3B. Cognitive skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CS pathway should be able to:</p> <p>B1. Interpret and analyse problems, and design & evaluate novel solutions to them.</p>	<p>Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop mathematical, programming and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work,</p>

3B. Cognitive skills	
<p>B2. Explain key software development concepts and apply them to practical problems.</p> <p>B3. Distinguish between a variety of software design and development methods, tools and testing methodologies.</p> <p>B4. Compare and contrast a variety of software development methods and tools, identifying the best choices to apply to specific problems.</p> <p>B5. Distinguish and appreciate the various roles, functions and interactions of members of a software “solution” development team.</p> <p>B6. Evaluate and analyse, as computational thinker, to provide efficient computing solutions.</p>	<p>there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team’s members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme are achieved through a combination of continuous assessment:</p> <p>Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules, this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CS pathway should be able to:</p> <p>C1. Plan, design, develop, test and evaluates computer science applications.</p> <p>C2. Deploy modern software tools for construction of computer science solutions and applications to solve practical problems.</p> <p>C3. Test and critically evaluate different software solutions.</p> <p>C4. Integrate computer science base component into a multidisciplinary project.</p> <p>C5. Handle ethical, social and legal issues that may arise during software development and use.</p>	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in CS. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student’s skills in the contexts of computation, testing and analysis. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance.</p> <p>Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA)

3C. Practical and professional skills	
	<ul style="list-style-type: none"> ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferrable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CS pathway should be able to:</p> <p>D1. Organise their work independently, planning, monitoring, reflecting on and improving your own learning.</p> <p>D2. Categorise work in a group, communicating effectively.</p> <p>D3. Investigate, find, assess and apply information from a variety of sources, using the most suitable information technology solution where necessary.</p> <p>D4. Apply numerical and analytical techniques to solve problems.</p> <p>D5. Critically analyse and effectively use data and information in Computer Science concept.</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the pathway. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills. AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed earlier levels. Higher level modules aim to develop students' ability to conduct independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to</p>

3D. Key/transferable skills	
	<p>feedback from a variety of audiences, as well as to manage increasingly large workloads.</p> <p>Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3.1.3 N&S Pathway						
<u>Programme Structure</u>						
Compulsory modules	Credit points	Optional modules	Credit Hours	Is module compensatable?	Semester runs in	
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU) = Level 4 (OU)	TM105 Introduction to Programming	15	Nil	4	NA	A.Y. 2021-2023
	TM103 Computer Architecture and Organization	15	Nil	4	NA	
	MT131 Discrete Mathematics	15	Nil	4	NA	
	MT132 Linear Algebra	15	Nil	4	NA	
	M110 Python Programming	30	Nil	8	NA	
	TM112 Introduction to Computing and Information Technology	30	Nil	8	NA	
Level 2 (AOU) = Level 5 (OU)	T216A Cisco Networking (CCNA)-A	30	Nil	8	NA	A.Y. 2023-2024
	T216B Cisco Networking (CCNA)-B	30	Nil	8	NA	
	TM254 Managing IT: the why, the what and the how	30	Nil	8	NA	
	M251 Object-Oriented Programming using Java	30	Nil	8	NA	
Level 3 (AOU) = Level 6 (OU)	T316 Advanced Networking	30	Nil	8	NA	A.Y. 2024-2025
	T318 Applied Network Security	30	Nil	8	NA	
	T321: Operating System Server Administration	30	Nil	8	NA	
	TM471 Graduation Project	30	Nil	8	NA	

<u>Learning Outcomes – N&S Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the N&S pathway should be able to:</p> <p>A1. Define, identify, and describe the fundamental concepts of security at the level of policy and strategy in computer system, principles and techniques associated with wired and wireless communication networks, along with their underlying security challenges and countermeasures, at both the individual component and the system level. This includes topics such as computer system operation and architectures; LANs; WLANs; WANs; fixed and mobile telephone networks; encoding; modulation; multiplexing; routing; switching; protocols; standards; network management and reliability; security and privacy.</p> <p>A2. Describe and evaluate the physical principles underlying computer and digital communication networks, and the mathematical rules governing security algorithms and protocols used in these networks. Critically evaluate security techniques used to protect system and user data.</p> <p>A3. Identify and describe the possibilities and limitations of computer networking and security systems, together with the technological and commercial compromises inherent in the design of such systems.</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student's first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU's learning/teaching strategy provides contact hours that are equal to 25% of the course credit hours. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The N&S Pathway will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours. 2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.

Learning Outcomes – N&S Pathway

3A. Knowledge and understanding

<p>A4. Discover and select novel solutions in a range of situations in which networking and security systems can be applied.</p> <p>A5. Describe the interaction of social, historical, economic, political and personal issues with networking systems and their corresponding security measures.</p> <p>A6. Identify the major trends in computer networking and security technologies and recognise the implications of these trends.</p>	<p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students, communicating face-to-face, email and computer conferencing.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the N&S Pathway is achieved through a combination of continuous assessment and exams. These assessments are central to the teaching of each module, enabling tutors to identify and comment on student knowledge and understanding. Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>
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3B. Cognitive skills

Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the N&S pathway should be able to:</p> <p>B1. Explain the key concepts related to networks (wired and wireless) and security. Explain the significant issues such as security and</p>	<p>Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop mathematical, programming and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work,</p>

3B. Cognitive skills	
<p>resilience, appreciate the role of firewalls, malware protection, backup strategies etc.</p> <p>B2. Interpret techniques for modelling, designing, developing, problem-solving and testing of communication networks, computer systems and their related security measures and protocols, being aware of the limitations and challenges involved. This includes techniques such as simulating, diagramming, optimising, and their associated tools.</p> <p>B3. Explain, contrast and/or critically analyse and refine specifications of proposals for and/or implementations of networking and communication systems in addition to security techniques, making use of technical literature, simulations and/or mathematical modelling, as appropriate.</p> <p>B4. Express reasoned arguments about social, historical, economic, political and personal issues, as they apply to computer networking and security systems. Appreciate the role of humans in Cyber Security as well as the different sources of threats and how to mitigate against them.</p> <p>B5. Devise and organise project in networking and security.</p>	<p>there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team's members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme are achieved through a combination of continuous assessment:</p> <p>Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules, this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the N&S pathway should be able to:</p> <p>C1. Use appropriate simulation and modelling tools in order to investigate, analyse, design, evaluate and/or test networking and communication systems in addition to network security systems and methods. Design systems that connect mobile devices and undertake analysis of network traffic, storage media (cards, disks) for evidence of misuse.</p> <p>C2. Plan and organise themselves and their work appropriately; keep systematic records of work in progress and outcomes.</p> <p>C3. Manage risk and complexity and evaluation of Network Security alternatives.</p> <p>C4. Critically discuss and assess alternatives for Networking and Security solutions.</p>	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in N&S. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student's skills in the contexts of computation, testing and analysis. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance.</p> <p>Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA)

3C. Practical and professional skills	
	<ul style="list-style-type: none"> ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferrable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the N&S pathway should be able to:</p> <p>D1. Organise and improve their own learning and performance to the extent that they are prepared for lifelong learning.</p> <p>D2. Communicate and report effectively in the context of networking & security and technology by discussing, describing, and explaining related concepts and ideas.</p> <p>D3. Demonstrate the ability to work independently and as part of a team, gathering and evaluating different types of data/information, identifying problems, developing and documenting solutions, and making effective use of ICT for project management, communication and collaboration.</p> <p>D4. Apply appropriate numerical and mathematical skills.</p> <p>D5. Apply problem-solving skills in the context of networking and security.</p> <p>D6. Apply state –of-the-art tools effectively to support work in networking and security.</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the pathway. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills. AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed earlier levels. Higher level modules aim to develop students’ ability to conduct independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to</p>

3D. Key/transferable skills	
<p>D7. Survey, retrieve, evaluate, critically assess and effectively use data/information related to networking and security.</p>	<p>feedback from a variety of audiences, as well as to manage increasingly large workloads.</p> <p>Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3.1.4 WD Pathway						
<u>Programme Structure</u>						
Compulsory modules	Credit points	Optional modules	Credit Hours	Is module compensatable?	Semester runs in	
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU) = Level 4 (OU)	TM105 Introduction to Programming	15	Nil	4	NA	A.Y. 2021-2023
	TM103 Computer Architecture and Organization	15	Nil	4	NA	
	MT131 Discrete Mathematics	15	Nil	4	NA	
	MT132 Linear Algebra	15	Nil	4	NA	
	M110 Python Programming	30	Nil	8	NA	
	TM112 Introduction to Computing and Information Technology	30	Nil	8	NA	
Level 2 (AOU) = Level 5 (OU)	TM254 Managing IT: the why, the what and the how	30	Nil	8	NA	A.Y. 2023-2024
	M251 Object-Oriented Programming using Java	30	Nil	8	NA	
	TT284 Web Technologies	30	Nil	8	NA	
	M252 Internet Programming	30	Nil	8	NA	
Level 3 (AOU) = Level 6 (OU)	TM352 Web, Mobile and Cloud Technologies	30	Nil	8	NA	A.Y. 2024-2025
	TM354 Software Engineering	30	Nil	8	NA	
	TM356 Interaction Design and User Experience	30	Nil	8	NA	
	TM471 Graduation Project	30	Nil	8	NA	

<u>Learning Outcomes – WD Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the WD pathway should be able to:</p> <p>A1. Explain the principles, concepts and techniques associated with web development, including an understanding of the analysis, design and development processes involved.</p> <p>A2. Recognise the terms, hypothesis, theories and practices associated with web development at both the individual component and the system level, including the use of appropriate models.</p> <p>A3. Demonstrate a range of social, legal, ethical and professional skills required for continuing professional development in the web development discipline within a world-wide context.</p> <p>A4. Discover and select novel solutions in a range of situations in which web technologies/solutions can be applied.</p> <p>A5. Define the possibilities and limitations of the state of the art web based systems.</p> <p>A6. Identify and explain of key concepts related to Cloud Computing and services, Project Management and Internet Security.</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student’s first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU’s learning/teaching strategy provides contact hours that are equal to 25% of the course credit hours. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The WD Pathway will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours. 2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.

<u>Learning Outcomes – WD Pathway</u>	
3A. Knowledge and understanding	
	<p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students, communicating face-to-face, email and computer conferencing.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the WD Pathway is achieved through a combination of continuous assessment and exams. These assessments are central to the teaching of each module, enabling tutors to identify and comment on student knowledge and understanding. Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>
3B. Cognitive skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the WD pathway should be able to:</p> <p>B1. Evaluate and analyse, as computational thinker, to provide efficient web-based solutions.</p>	<p>Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop mathematical, programming and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work,</p>

3B. Cognitive skills	
<p>B2. Associate theory and practice hence aiding in the comprehension of web development practices and applications.</p> <p>B3. Correlate between the main concepts/approaches related to software development and the state-of-the-art web technologies to provide innovative web based solutions, including the recent technologies such as Cloud Computing, Internet of things, etc.</p> <p>B4. Analyse and refine specifications and implementations of web based systems/applications, including testing and critical evaluation.</p> <p>B5. Devise and organise innovative projects in Web Development.</p>	<p>there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team's members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme are achieved through a combination of continuous assessment:</p> <p>Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules, this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the WD pathway should be able to:</p> <ul style="list-style-type: none"> C1. Design and develop responsive web solutions. C2. Create, integrate, maintain and optimize advanced web-based systems for different usages. C3. Plan and organize themselves and their work appropriately; keep systematic records of work in progress and outcomes. C4. Examine and enhance the development of web based systems and portals through an iterative process. C5. Evaluate the Key Performance Indicators of interactive design. C6. Manage risk and complexity in their work. 	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in WD. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student's skills in the contexts of computation, testing and analysis. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance.</p> <p>Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA)

3C. Practical and professional skills	
	<ul style="list-style-type: none"> ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferrable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the WD pathway should be able to:</p> <p>D1. Organise own learning and performance to the level that they are prepared for lifelong learning after graduating.</p> <p>D2. Show and demonstrate a range of transferable skills in, problem solving, communication, project management, self-management, working individually, working in a group in a distance setting and collaborate via computer-mediated communication.</p> <p>D3. Investigate, retrieve, reflect, and assess and use data/information effectively in a web development context.</p> <p>D4. Apply appropriate numerical and mathematical skills to solve practical problems related to web development.</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the pathway. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills. AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed earlier levels. Higher level modules aim to develop students' ability to conduct independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to</p>

3D. Key/transferable skills

feedback from a variety of audiences, as well as to manage increasingly large workloads.

Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:

- Tutor marked assignments (TMAs)
- Midterm Assessment (MTA)
- Final Exam

In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit.

However, other assessment mechanisms are used for specific modules and graduation project

3.1.5 CwB Pathway						
Programme Structure						
Compulsory modules	Credit points	Optional modules	Credit Hours	Is module compensatable?	Semester runs in	
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU)	TM105 Introduction to Programming	15	Nil	4	NA	A.Y. 2021-2023
	TM103 Computer Architecture and Organization	15	Nil	4	NA	
Level 4 (OU)	MT131 Discrete Mathematics	15	Nil	4	NA	
	MT132 Linear Algebra	15	Nil	4	NA	
	M110 Python Programming	30	Nil	8	NA	
	BUS110 Introduction to Business	30	Nil	8	NA	
Level 2 (AOU)	B207A Shaping Business Opportunities-A	30	Nil	8	NA	A.Y. 2023-2024
	B207B Shaping Business Opportunities -B	30	Nil	8	NA	
Level 5 (OU)	M251 Object-Oriented Programming using Java	30	Nil	8	NA	
	TM254 Managing IT: the why, the what and the how	30	Nil	4	NA	
Level 3 (AOU)	BUS310 Strategic Management	30	Nil	8	NA	A.Y. 2024-2025
	TM351 Data Management and Analysis	30	Nil	8	NA	
Level 6 (OU)	TM354 Software Engineering	30	Nil	8	NA	
	TM471 Graduation Project	30	Nil	8	NA	

<u>Learning Outcomes – CwB Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CwB pathway should be able to:</p> <p>A1. Explain the key concepts of computing, data management and analysis, including principles of design and implementation of IT project, and the representation and meaning of data in a business context.</p> <p>A2. Integrate legal managerial and professional issues in computing.</p> <p>A3. Explain the key concepts of programming languages, algorithms, methods and techniques.</p> <p>A4. Identify Information systems technology including data structure, data bases and the internet.</p> <p>A5. Choose the methods and tools used for IT projects and service management.</p> <p>A6. Identify decision making and support tools.</p> <p>A7. Recognize the key concepts of financial management, and human resource management.</p> <p>A8. Recognize the key concepts of strategic planning and management of change.</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student’s first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU’s learning/teaching strategy provides contact hours that are equal to 25% of the course credit hours. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The CwB Pathway will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours. 2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.

Learning Outcomes – CwB Pathway

3A. Knowledge and understanding

	<p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students, communicating face-to-face, email and computer conferencing.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the CwB Pathway is achieved through a combination of continuous assessment and exams. These assessments are central to the teaching of each module, enabling tutors to identify and comment on student knowledge and understanding. Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>
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3B. Cognitive skills

Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CwB pathway should be able to:</p> <p>B1. Analyse practical problems, and use software development concepts to design and evaluate solutions to them.</p>	<p>Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop mathematical, programming and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work,</p>

3B. Cognitive skills	
<p>B2. Describe, compare and contrast a variety of IT project management methods and tools, identifying the best choices to apply to specific problems.</p> <p>B3. Explain the various roles, functions and interactions of members of a project management team;</p> <p>B4. Appraise business concepts and models and apply them to different aspects of business behaviour.</p> <p>B5. Evaluate business decisions and government business policy.</p>	<p>there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team's members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme are achieved through a combination of continuous assessment:</p> <p>Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules, this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CwB pathway should be able to:</p> <p>C1. Design, develop, test, appraise, maintain and support computer systems in a business computing environment that are well structured, reliable and usable. They should be able to apply their knowledge to analyse business problems, prepare strategies and make effective decisions to solve such problems.</p> <p>C2. Use modern decision making management tools.</p> <p>C3. Manipulate ethical, social and legal issues that may arising from IT project management and use, and from business decisions and policies.</p>	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in CwB. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student's skills in the contexts of computation, testing and analysis. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance.</p> <p>Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA)

3C. Practical and professional skills	
	<ul style="list-style-type: none"> ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferrable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the CwB pathway should be able to:</p> <p>D1. Demonstrate independency in learning, planning, monitoring, and work accomplishment.</p> <p>D2. Communicate effectively with team members, managers and customers.</p> <p>D3. Plan and manage a project to complete within budget and schedule, appreciate the legal and professional implications of their work and present their work in the form of report.</p> <p>D4. Find, assess and apply information from a variety of sources, using information technology where necessary.</p> <p>D5. Use numerical and analytical techniques to solve problems showing in depth knowledge of IT and business management.</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the pathway. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills. AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed earlier levels. Higher level modules aim to develop students' ability to conduct independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to</p>

3D. Key/transferable skills	
	<p>feedback from a variety of audiences, as well as to manage increasingly large workloads.</p> <p>Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3.1.6 DS Pathway						
Programme Structure						
Compulsory modules		Credit points	Optional modules	Credit Hours	Is module compensatable ?	Semester runs in
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU) = Level 4 (OU)	M140 Introducing statistics	30	Nil	8	No	A.Y. 2021-2023
	MT131 Discrete Mathematics	15	Nil	4	No	
	MT132 Linear Algebra	15	Nil	4	No	
	M110 Python Programming	30	Nil	8	No	
	TM112 Introduction to Computing and Information Technology	30	Nil	8	No	
Level 2 (AOU) = Level 5 (OU)	MT248 Analysing data	15	Nil	4	No	A.Y. 2023-2024
	M269 Algorithms, data structures and computability	30	Nil	8	No	
	MST224 Mathematical methods	30	Nil	8	No	
	MT249 Practical modern statistics	15	Nil	4	No	
	M218 Relational Databases	15	Nil	4	No	
Level 3 (AOU) = Level 6 (OU)	M238 Data Visualization	15	Nil	4	No	A.Y. 2024-2025
	M348 Applied statistical modelling	30	Nil	8	No	
	TM358 Machine learning and artificial intelligence	30	Nil	8	No	
	TM351 Data management and analysis	30	Nil	8	No	
	TM471 Graduation Project	30	Nil	8	No	

<u>Learning Outcomes – DS Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>When you complete your studies for this qualification, you will have knowledge and understanding of:</p> <p>A1. A range of simple and more advanced methods for analysing statistical data and working with statistical models and carrying out statistical inference</p> <p>A2. Calculus, differential equations, linear algebra, multivariable calculus and vector calculus</p> <p>A3. The fundamental principles, concepts and techniques underlying computing and IT, relational databases, SQL language and the range of models used to support the analysis and design of computing and IT systems</p> <p>A4. The range of situations in which computing and IT systems are used in data science and the possibilities and limitations of such systems</p> <p>A5. Core disciplines of machine learning and artificial intelligence</p> <p>A6. The ethical and legal issues associated with data science</p> <p>A7. Advanced data management and analysis, data visualization, mathematical methods and fundamental algorithms and data structures in computer science.</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student’s first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU’s learning/teaching strategy provides contact hours that are equal to 25% of what traditional universities require. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The DS programme will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours.

<u>Learning Outcomes – DS Pathway</u>	
3A. Knowledge and understanding	
	<p>2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.</p> <p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the DS programme is achieved through a combination of continuous assessments:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) <p>and final exam.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>

3B. Cognitive skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>On completion of this qualification, you will have developed the following cognitive skills:</p> <p>B1. Use your judgement in applying and selecting a wide range of mathematics and statistics tools and techniques to solve real world problems</p> <p>B2. Construct appropriate mathematical, statistical and data visualization models to draw justifiable inferences in qualitative and quantitative problem-solving skills</p> <p>B3. Reason with abstract concepts</p> <p>B4. Apply and critically evaluate key computing and IT concepts in a range of contexts</p> <p>B5. Select and apply appropriate techniques and tools for abstracting, modelling, problem-solving, designing and testing computing and IT systems, designing relational databases and be aware of the limitations involved</p>	<p>Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop, mathematical, statistical and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work, there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team's members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) <p>and final exam</p> <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules,</p>

3B. Cognitive skills	
	<p>this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>When you complete this qualification you will be able to:</p> <p>C1. Be an independent learner, able to acquire further knowledge with minimal guidance or support</p> <p>C2. Use appropriate professional tools, including programming languages and designing database models to support your work</p> <p>C3. Apply mathematical, statistical and computational concepts, principles and methods</p> <p>C4. Analyse and evaluate problems and plan strategies for their solution</p>	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in data science. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student's skills in the contexts of computation, modelling, analysis and simulation. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance.</p> <p>Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-</p>

3C. Practical and professional skills	
<p>C5. Analyse, design, visualize, evaluate and/or test models and systems, using appropriate simulation and modelling tools as appropriate</p> <p>C6. Identify and address the ethical, social and legal issues that may arise during the development and use of computing and IT systems</p>	<p>library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final exam. <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>When you complete this qualification you will be able to:</p> <p>D1. Communicate information, arguments, ideas and issues clearly and in appropriate ways, bearing in mind the audience for and the purpose of the communication</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the programme. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills.</p>

3D. Key/transferable skills	
<p>D2. Find, assess and apply information from a variety of sources, using information technology where appropriate</p> <p>D3. Select, and use accurately, appropriate numerical and analytical techniques to solve problems</p> <p>D4. Prepare mathematical, statistical, visualization, database design and computational content for a range of purposes, which may include writing for both specialist and non-specialist audiences</p> <p>D5. Recognise and understand a range of technological and practical problems and select suitable techniques for solving them</p>	<p>AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed earlier levels. Higher level modules aim to develop students' ability to conduct independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to feedback from a variety of audiences, as well as to manage increasingly large workloads.</p> <p>Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final exam. <p>In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit. However, other assessment mechanisms are used for specific modules and graduation project</p>

3.1.7 CyS Pathway						
Programme Structure						
Compulsory modules		Credit points	Optional modules	Credit Hours	Is module compensatable?	Semester runs in
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU) = Level 4 (OU)	TM129 Technologies in Practice	30	Nil	8	NA	A.Y. 2021-2023
	MT131 Discrete Mathematics	15	Nil	4	NA	
	MT132 Linear Algebra	15	Nil	4	NA	
	M110 Python Programming	30	Nil	8	NA	
	TM112 Introduction to computing and Information Technology	30	Nil	8	NA	
Level 2 (AOU) = Level 5 (OU)	TT284 Web Technologies	30	Nil	8	NA	A.Y. 2023-2024
	T216A Cisco Networking (CCNA) Part 1	30	Nil	8	NA	
	T216B Cisco Networking (CCNA) Part 2	30	Nil	8	NA	
	TM256 Cyber Security	30	Nil	8	NA	
Level 3 (AOU) = Level 6 (OU)	TM311 Information Security	30	Nil	8	NA	A.Y. 2024-2025
	TM359 System Penetration Testing	30	Nil	8	NA	
	T318 Applied Network Security	30	Nil	8	NA	
	TM471 Graduation Project	30	Nil	8	NA	

<u>Learning Outcomes – CyS Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>When you complete your studies for this qualification, you will have knowledge and understanding of:</p> <p>A1. Indicate a broad critical range of the fundamental principles, concepts and techniques in relation to design and development of secure digital systems and their secure use.</p> <p>A2. Identify theories, practices, and major trends of Cyber Security within networked systems including an appreciation of a range of methods, models and tools to support secure management and analysis of information systems, along with awareness of the various operating systems and platforms.</p> <p>A3. Describe the development and implementation of secure systems as well as methods and tools used in the design, implementation and testing including offensive methodologies.</p> <p>A4. Recognize the professional, psychological, ethical, social and legal issues that can be associated with the development and deployment of digital systems.</p> <p>A5. Demonstrate the ability to critically analyse, develop and apply digital solutions appropriate to security examination and testing.</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student's first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU's learning/teaching strategy provides contact hours that are equal to 25% of the course credit hours. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The Cyber Security programme will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours. 2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.

<u>Learning Outcomes – CyS Pathway</u>	
3A. Knowledge and understanding	
	<p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students, communicating face-to-face, email and computer conferencing.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the Cyber Security programme is achieved through a combination of continuous assessment and exams. These assessments are central to the teaching of each module, enabling tutors to identify and comment on student knowledge and understanding. Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>
3B. Cognitive skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
On completion of this qualification you will have developed the following cognitive skills:	Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop mathematical, programming and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work,

3B. Cognitive skills	
<p>B1. Apply and critically evaluate key digital and Cyber Security concepts in a range of contexts.</p> <p>B2. Select and apply appropriate techniques and tools for abstracting, modelling, problem solving, designing and testing Cyber Security systems and be aware of the limitations involved</p> <p>B3. Compare, contrast and critically analyse and refine specifications and implementations of digital systems from a Cyber Security perspective.</p> <p>B4. Devise and carry out Cyber Security project that applies and extends your knowledge and understanding and critically reflect on the processes involved and the outcomes of your work.</p> <p>B5. Appreciate of the risks, safety issues, legislation and regulatory requirements when designing/managing/deploying/securing a Cyber Security-based system.</p>	<p>there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team's members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme are achieved through a combination of continuous assessment:</p> <p>Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules, this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>When you complete this qualification you will be able to:</p> <p>C1. Analyse, design, evaluate and/or test digital and Cyber Security systems, using appropriate simulation and modelling tools where appropriate.</p> <p>C2. Plan and organize yourself and your work appropriately, including keeping systematic records of work in progress and outcomes.</p> <p>C3. Address the professional, ethical, social and legal issues that may arise during the development and use of digital and Cyber Security systems.</p> <p>C4. Use appropriate professional tools to support your work.</p>	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in Cyber Security. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student's skills in the contexts of computation, testing and analysis. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance. Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p>

3C. Practical and professional skills	
	<ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p><i>When you complete this qualification you will be able to:</i></p> <p>D1. Communicate information, findings, arguments efficiently with specialized and non-specialized audiences through professional documentation and presentation skills.</p> <p>D2. Demonstrate professional working skills including initiation, commitment, decision making as well as the ability to work individually and as part of a team.</p> <p>D3. Select, and use accurately, appropriate numerical and analytical techniques to solve problems.</p> <p>D4. Use information retrieval skills, gathering and evaluating different types of information.</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the programme. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills. AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed earlier levels. Higher level modules aim to develop students' ability to conduct</p>

3D. Key/transferable skills	
<p>D5. Manage their own learning and development, including time management and organizational skills in order to keep up-to-date with digital and Cyber Security systems.</p>	<p>independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to feedback from a variety of audiences, as well as to manage increasingly large workloads.</p> <p>Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3.1.8 AI Pathway

Programme Structure

Compulsory modules		Credit points	Optional modules	Credit Hours	Is module compensatable?	Semester runs in
Level 0: Foundation Year including University and Faculty requirements						
Level 1 (AOU) = Level 4 (OU)	MT141 Introduction to Probability and Statistics	15	Nil	4	NA	A.Y. 2021-2023
	TM103 Computer Architecture and Organization	15	Nil	4	NA	
	MT131 Discrete Mathematics	15	Nil	4	NA	
	MT132 Linear Algebra	15	Nil	4	NA	
	M110 Python Programming	30	Nil	8	NA	
	TM112 Introduction to Computing and Information Technology	30	Nil	8	NA	
Level 2 (AOU) = Level 5 (OU)	M269 Algorithm, Data structure and Computability	30	Nil	8	NA	A.Y. 2023-2024
	TM270 Artificial intelligence	30	Nil	8	NA	
	TM271 Machine Learning and Deep learning	30	Nil	8	NA	
	TM275 Parallel and Distributed System	15	Nil	4	NA	
	TM276 Software Development Processes and Methodologies	15	Nil	4	NA	
Level 3 (AOU) = Level 6 (OU)	TM351 Data Management and Analysis	30	Nil	8	NA	A.Y. 2024-2025
	TM340 Natural Language Processing	30	Nil	8	NA	
	TM341 Computer Vision	30	Nil	8	NA	
	TM471 Graduation Project	30	Nil	8	NA	

<u>Learning Outcomes – AI Pathway</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the AI programme should be able to:</p> <p>A1. Recognize the mathematical and statistical foundations of AI computing systems along with comprehensive knowledge of programming languages, styles, data structures and algorithms.</p> <p>A2. Identify principles and tools available to software development processes and methodologies.</p> <p>A3. indicate core disciplines of AI such as machine learning, deep learning, knowledge extraction and processing, parallel and distributed systems, and natural language processing.</p> <p>A4. Describe systems requirements for both rule-based and data driven systems including the recognition and analysis of criteria and models leading to specifications used in the solution of specific AI problems.</p> <p>A5. Recognize the professional, psychological, ethical, social and legal issues that can be associated with the development and deployment of AI systems</p>	<p>Learning and teaching strategy: Knowledge and understanding is acquired from specially prepared teaching texts for majority of modules, supported by self-assessment and in-text questions, reference texts, multi-media packages, directed reading, computer mediated conferencing, web-based resources, and video and audio recordings. Student learning is supported by a tutor, who is the student’s first and main point of contact, answering their queries, grading and commenting on their work.</p> <p>AOU’s learning/teaching strategy provides contact hours that are equal to 25% of the course credit hours. Thus, AOU students experience the benefits of both the open and traditional university systems.</p> <p>The Artificial Intelligence programme will be delivered through two complementary modes:</p> <ol style="list-style-type: none"> 1. Face-to-face interactive tutorials, constituting 25% of course credit hours. 2. Interactive self-learning delivered through specially designed teaching and support materials that are conducive for self-learning, constituting 75% of course credit hours.

<u>Learning Outcomes – AI Pathway</u>	
3A. Knowledge and understanding	
	<p>Students work independently with the teaching materials but are encouraged to form self-help groups with other students, communicating face-to-face, email and computer conferencing.</p> <p>Assessment Strategy: Assessment of the knowledge and understanding components of the Artificial Intelligence programme is achieved through a combination of continuous assessment and exams. These assessments are central to the teaching of each module, enabling tutors to identify and comment on student knowledge and understanding. Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project.</p>
3B. Cognitive skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
Students graduating from the AI programme should be able to:	<p>Learning and teaching strategy: Cognitive skills and processes are introduced at a very simple level at Level 1, primarily via material specifically designed to develop mathematical, programming and technological skills in a progressive way. Although modules at Levels 2 and 3 continue this work,</p>

3B. Cognitive skills	
<p>B1. Use your judgment in applying and selecting a wide range of applications of AI and an understanding of their suitability to a range of problem domains.</p> <p>B2. Construct an abstract model for a given problem and devise appropriate mechanized techniques to solve the problem</p> <p>B3. Apply and critically evaluate key computing and AI concepts in a range of contexts</p> <p>B4. Select and apply appropriate AI techniques and tools for abstracting, modelling, problem solving, designing, implementing and testing AI systems and be aware of the limitations involved</p> <p>B5. Device and carry out AI project that applies and extends your knowledge and understanding and critically reflect on the processes involved and the outcomes of your work</p>	<p>there is significant variation between modules in the degree to which skills are taught explicitly in the module materials.</p> <p>Cognitive skills are promoted in the teaching materials via a range of activities including self-assessment exercises, multi-media tasks and computer-based investigations. They are supported by tutor led face to face discussions and activities. Computer conferencing facilities provide an environment for interaction bringing students, tutors and module team's members together for critical discussions and guidance. Tutor feedback aids the development of these skills.</p> <p>Assessment Methodology: Assessment of the cognitive skills of the programme are achieved through a combination of continuous assessment:</p> <p>Every major module comprises of:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>The cognitive skills are assessed by questions asking for the application of concepts in new situations for analysis, for synthesis, etc., In some modules, this skill will be assessed using more open-ended design, investigative and project activities.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the AI programme should be able to:</p> <ul style="list-style-type: none"> C1. Plan, analyse, design, develop and maintain reliable AI software, with particular regard to Intelligent Systems using appropriate programming paradigms and languages. C2. Deploy modern software tools for construction of AI solutions and applications to solve practical problems. C3. Test and critically evaluate different machine learning and AI software solutions. C4. Explain the risks aspects associated with various intelligent systems. C5. Address the professional, ethical, social and legal issues that may arise during the development and use of AI systems 	<p>Learning and teaching strategy: Practical and professional skills are taught cumulatively throughout the programme. Students are exposed to a variety of introductory courses, which would lead to more advanced courses in Artificial Intelligence. These skills are developed and enhanced through the teaching and communication with the tutor. Modules will include supplementary material that will enrich the learning experience and increase the knowledge learnt. Some modules will adopt the practical hands-on approach that aim to develop the student's skills in the contexts of computation, testing and analysis. Some modules will include specialised software and tools that will improve the teaching strategy. Modules also provide study guides, assignment and project guides and specimen examination papers. Feedback on assignments provides individual tuition and guidance. Students are taught this material through interactive classroom activities and presentations. In writing their TMA, students make use of different electronic resources such as the internet and the e-library. AOU has developed its e-library through the addition of relevant databases which include academic refereed journals, publications, and conference proceedings to support the students in research based assignments.</p> <p>Assessment Methodology: Assessment of the practical skills of the programme is achieved through a combination of continuous assessment:</p>

3C. Practical and professional skills	
	<ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3D. Key/transferrable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>Students graduating from the AI programme should be able to:</p> <p>D1. Recognize and understand a range of technological and real-world problems and select suitable AI techniques for solving them</p> <p>D2. Find, assess and apply information from a variety of sources, using information technology where appropriate</p> <p>D3. Communicate information, arguments, ideas and issues clearly and in appropriate ways, bearing in mind the audience for and the purpose of the communication</p> <p>D4. Work independently, planning, monitoring, reflecting on and improving your own learning</p>	<p>Learning and teaching strategy: Transferable skills are developed throughout the programme. The skills of research, presentation, self-reflection and communication are essential to all modules and are increasingly developed as the student progresses throughout the programme. The interactive blended learning delivered through specially designed support material helps students to enhance their own independent learning skills. AOU expect students to naturally develop the skills of learning to learn as they develop through the suite of modules, and this is drawn to their attention through a combination of skills based assessment and tutor feedback during face-to-face tutorials and feedback to assignments.</p> <p>Level-1 and level-2 modules supports the students in acquiring basic skills and level 3 modules expect students to show application of skills developed</p>

3D. Key/transferable skills	
	<p>earlier levels. Higher level modules aim to develop students' ability to conduct independent research using a variety of databases and websites, and to develop group-working skills. As work becomes more complex at these modules, students are tested on their abilities to respond positively to feedback from a variety of audiences, as well as to manage increasingly large workloads.</p> <p>Assessment Methodology: Assessment of the key skills of the programme is achieved through a combination of continuous assessment:</p> <ul style="list-style-type: none"> ▪ Tutor marked assignments (TMAs) ▪ Midterm Assessment (MTA) ▪ Final Exam <p>In some cases the assessment is implicit, but where the relevant skills have been taught in the related course material the assessment is generally explicit.</p> <p>However, other assessment mechanisms are used for specific modules and graduation project</p>

3.2 Learning Outcomes of Exit Awards of All ITC Pathways

3.2.1 Certificate of Higher Education in Information Technology and Computing (120 points)

- a) CertHE IT & Computing
- b) CertHE IT & Computing (Computing with Business)
- c) CertHE IT & Computing (Data Science)
- d) CertHE IT & Computing (Cyber Security)
- e) CertHE IT & Computing (Artificial Intelligence)

a) CertHE IT & Computing

for the 4 pathways:

- Information Technology and Computing
- Computer Science
- Networking and Security
- Web Development

Requirements for the CertHE IT & Computing

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
TM105	Introduction to Programming	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Educational aims

The aim of this certificate is to equip students with the basic skills and knowledge that you will need to underpin a career in the computing and IT sector. It will develop your knowledge and understanding of the fundamental technologies, techniques and trends of modern digital technology and introduce you to some of the issues involved in their application. You will gain some practical experience in the use of a modern programming environment and ubiquitous computing devices.

Learning outcomes

A. Knowledge and understanding of:

Students completing 120 points from the CertHE IT & Computing should be able to:

- A1. Describe the principles and concepts associated with the technology of computers
- A2. Recognise a range of contexts in which computers and digital communication systems are used.
- A3. Outline some trends and issues in Information Technology and Computing.

A4. Integrate the lifecycle of computing and IT systems,

B. Cognitive Skills:

Students completing 120 points from the **CertHE IT & Computing** should be able to:

- B1. Evaluate and Differentiate between IT and Computing systems.
- B2. Appraise and illustrate some principles of ITC technologies.
- B3. Distinguish the features and specifications of hardware based, software based IT and Computing systems.
- B4. Analyse ITC systems' processes and outcomes through small projects.

C. Practical and/or professional Skills:

Students completing 120 points from the **CertHE IT & Computing** should be able to:

- C1. Develop small computing and IT projects.
- C2. Choose IT computing systems, according to particular demand.
- C3. Organize themselves and their work.
- C4. Manage risk in unstructured environments.

D. Transferable skills:

Students completing 120 points from the **CertHE IT & Computing** should be able to:

- D1. Demonstrate the ability to work independently and as part of a team,
- D2. Communicate and report.
- D3. Apply problem-solving skills in an IT context.
- D4. Use data and information in IT context.
- D5. Exhibit ability to use the appropriate numerical and mathematical skills.
- D6. Conduct own self learning for lifelong learning.

b) CertHE IT & Computing (Computing with Business)

Requirements for the **CertHE IT & Computing (Computing with Business)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
TM105	Introduction to Programming	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
BUS110	Introduction to Business	AOU	30	8
			120	32

Educational aims

The aim of this certificate is to equip you with the basic skills and knowledge that you will need to underpin a career in the computing and IT sector. It will develop your knowledge and understanding of the fundamental technologies, techniques and trends of modern

digital technology and introduce you to some of the issues involved in their application. You will gain some practical experience in the use of a modern programming environment and ubiquitous computing devices.

Learning outcomes

A. Knowledge and understanding of:

Students completing 120 points from the **CertHE IT & Computing (Computing with Business)** should be able to:

- A1. Explain the key concepts of computing, data management and analysis, including principles of design and implementation of IT project, and the representation and meaning of data in a business context.
- A2. Integrate legal managerial and professional issues in computing.
- A3. Explain the key concepts of programming languages, algorithms, methods and techniques.
- A4. Identify Information systems technology including data structure, data bases and the internet.
- A5. Choose the methods and tools used for IT projects and service management.
- A6. Identify decision making and support tools.
- A7. Recognize the key concepts of financial management, and human resource management.
- A8. Recognize the key concepts of strategic planning and management of change.

B. Cognitive Skills:

Students completing 120 points from the **CertHE IT & Computing (Computing with Business)** should be able to:

- B1. Analyse practical problems, and use software development concepts to design and evaluate solutions to them.
- B2. Describe, compare and contrast a variety of IT project management methods and tools, identifying the best choices to apply to specific problems.
- B3. Explain the various roles, functions and interactions of members of a project management team;
- B4. Appraise business concepts and models and apply them to different aspects of business behaviour.
- B5. Evaluate business decisions and government business policy.

C. Practical and/or professional Skills:

Students completing 120 points from the **CertHE IT & Computing (Computing with Business)** should be able to:

- C1. Design, develop, test, appraise, maintain and support computer systems in a business computing environment that are well structured, reliable and usable. They should be able to apply their knowledge to analyse business problems, prepare strategies and make effective decisions to solve such problems.

- C2. Use modern decision making management tools.
 C3. Manipulate ethical, social and legal issues that may arising from IT project management and use, and from business decisions and policies. Manipulate

D. Transferable skills:

Students completing 120 points from the **CertHE IT & Computing (Computing with Business)** should be able to:

- D1. Demonstrate independency in learning, planning, monitoring, and work accomplishment.
 D2. Communicate effectively with team members, managers and customers.
 D3. Plan and manage a project to complete within budget and schedule, appreciate the legal and professional implications of their work and present their work in the form of report.
 D4. Find, assess and apply information from a variety of sources, using information technology where necessary.
 D5. Use numerical and analytical techniques to solve problems showing in depth knowledge of IT and business management.

c) CertHE IT & Computing (Data Science)

Requirements for the **CertHE IT & Computing (Data Science)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
M140	Introducing statistics	OU	30	8
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Educational aims

Students will learn theories and techniques that will equip them with a range of basic skills in computer programming and data analysis that form the basis of evidence-based decision and policy making across a range of public and private businesses. This qualification will provide students with a base across discipline areas and the opportunity to specialize in one or more of these if they pursue further study or employment in computing or data science. Together with developing knowledge and understanding of the fundamental concepts, techniques and technologies, and issues involved in their application.

Learning outcomes

A. Knowledge and understanding of:

Students completing 120 points from the **CertHE IT & Computing (Data Science)** should have knowledge and understanding of:

- A1. A range of methods for analysing statistical data
- A2. Basics of calculus, matrices and vectors
- A3. The fundamental principles, concepts and techniques underlying computing and IT
- A4. The range of situations in which computing and IT systems are used and the possibilities and limitations of such systems
- A5. The ethical and legal issues associated in data science

B. Cognitive Skills:

Students completing 120 points from the **CertHE IT & Computing (Data Science)** should be able to:

- B1. Use their judgement in selecting and applying a range of basic mathematical and statistical tools and techniques to solve some elementary real world problems
- B2. Construct appropriate statistical models and draw justifiable inferences using qualitative and quantitative problem-solving skills
- B3. Apply computing and IT concepts, techniques and tools appropriately

C. Practical and/or professional Skills:

Students completing 120 points from the **CertHE IT & Computing (Data Science)** should be able to:

- C1. Be an independent learner, able to acquire further knowledge with minimal guidance or support
- C2. Use appropriate professional tools, including programming languages, to support your work
- C3. Apply basic mathematical, statistical and computational concepts, principles and methods
- C4. Identify and address the ethical, social and legal issues that may arise during the development and use of computing and IT systems

D. Transferable skills:

Students completing 120 points from the **CertHE IT & Computing (Data Science)** should be able to:

- D1. Communicate information, arguments, ideas and issues clearly and in appropriate ways, bearing in mind the audience for and the purpose of the communication
- D2. Find, assess and apply information from a variety of sources, using information technology where appropriate
- D3. Select, and use accurately, appropriate statistical and mathematical techniques to solve problems
- D4. Recognize and understand a range of technological and practical problems and select suitable techniques for solving them

d) CertHE IT & Computing (Cyber Security)

Requirements for the **CertHE IT & Computing (Cyber Security)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Point	CHs
TM129	Technologies in practice	OU	30	8
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4

M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Educational aims

The aim of this certificate is to equip you with the basic skills and knowledge that you will need to underpin a career in the computing and IT sector. It will develop your knowledge and understanding of the fundamental technologies, techniques and trends of modern digital technology and introduce you to some of the issues involved in their application. You will gain some practical experience in the use of a modern programming environment and ubiquitous computing devices.

Learning Outcomes

A. Knowledge and understanding:

Students completing 120 points from the **CertHE IT & Computing (Cyber Security)** should be able to:

- A1. Indicate basic principles, concepts and techniques in relation to secure digital systems.
- A2. Identify basic theories, and practices of networking and security
- A3. Describe basic steps for development and implementation of secure systems.
- A4. Recognize main professional, psychological, ethical, social and legal issues in IT.

B. Cognitive Skills:

Students completing 120 points from the **CertHE IT & Computing (Cyber Security)** should be able to:

- B1. Evaluate key digital and cybersecurity concepts in a range of contexts.
- B2. Select appropriate techniques and tools for abstracting cybersecurity systems.
- B3. Compare specifications of digital systems from a security perspective

C. Practical and/or professional Skills:

Students completing 120 points from the **CertHE IT & Computing (Cyber Security)** should be able to:

- C1. Design outlines of a Cyber Security system
- C2. Organize yourself and your work appropriately.
- C3. Address basic professional, ethical, social and legal issues in IT
- C4. Use appropriate tools to support your work

D. Transferable skills:

Students completing 120 points from the **CertHE IT & Computing (Cyber Security)** should be able to:

- D1. Communicate information with specialized and non-specialized audiences through documentation and presentation skills.
- D2. Demonstrate working skills including initiation and commitment as well as the ability to work individually and as part of a team.
- D3. Select, and use accurately, appropriate numerical techniques to solve problems.
- D4. Use information retrieval skills
- D5. Manage their own learning and development.

e) CertHE IT & Computing (Artificial Intelligence)

Requirements for the **CertHE IT & Computing (Artificial Intelligence)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
MT141	Introduction to Probability and Statistics	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Educational aims

The aim of this certificate is to equip you with the basic skills and knowledge that you will need to underpin a career in the computing and IT sector. It will develop your knowledge and understanding of the fundamental technologies, techniques and trends of modern digital technology and introduce you to some of the issues involved in their application. You will gain some practical experience in the use of a modern programming environment and ubiquitous computing devices.

Learning outcomes

A. Knowledge and understanding of:

Students graduating from the **CertHE IT & Computing (Artificial Intelligence)** should be able to:

- A1. Recognize the mathematical and statistical foundations of AI computing systems along with comprehensive knowledge of programming languages.
- A2. Identify principles and tools available to software development processes and methodologies.
- A3. Indicate basics concepts that enable understanding of machine learning.
- A4. Describe systems requirements for AI problems.
- A5. Recognize basic professional, psychological, ethical, social and legal issues in the AI field.

B. Cognitive Skills:

Students graduating from the **CertHE IT & Computing (Artificial Intelligence)** should be able to:

- B1. Use your judgment in applying and selecting a range of simple applications in AI.
- B2. Construct an abstract model for a given problem.
- B3. Apply and evaluate key computing and AI concepts in a range of contexts
- B4. Select basic techniques to solve and abstract AI problems
- B5. Devise simple programming project that applies and extends your knowledge and understanding

C. Practical and/or professional Skills:

Students graduating from the **CertHE IT & Computing (Artificial Intelligence)** should be able to:

- C1. develop simple programmes, using appropriate programming paradigms and languages.
- C3. Test and critically evaluate different machine learning and AI software solutions.
- C4. Explain the risks aspects associated with various intelligent systems
- C5. Address professional, ethical, social and legal issues that may arise during the development and use of AI systems

D. Transferable skills:

Students graduating from the **CertHE IT & Computing (Artificial Intelligence)** should be able to:

- D1. Recognize and understand a range of technology in computing field.
- D2. Find information from a variety of sources, using information technology where appropriate
- D3. Communicate information, ideas and issues clearly and appropriately,
- D4. Work independently, planning, monitoring, reflecting on and improving your own learning

3.2.2 Diploma of Higher Education in Information Technology and Computing (240 points)

- a) **DipHE IT & Computing**
- b) **DipHE IT & Computing (Computer Science)**
- c) **DipHE IT & Computing (Networking & Security)**
- d) **DipHE IT & Computing (Web Development)**
- e) **DipHE IT & Computing (Computing with Business)**
- f) **DipHE IT & Computing (Data Science)**
- g) **DipHE IT & Computing (Cyber Security)**
- h) **DipHE IT & Computing (Artificial Intelligence)**

- a) **DipHE IT & Computing**

Requirements for the **DipHE IT & Computing**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
TM105	Introduction to Programming	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Points	CHs
M269	Algorithm, Data structure and Computability	OU	30	8
M251	Object-Oriented Programming using Java	AOU	30	8
TM255	Communication and Information Technologies	OU	30	8
T215B	Communication and Information Technologies – Part B	OU	30	8
			120	32

Educational aims

The aim of this diploma is to equip you with the knowledge and skills you will need to underpin a broad-based career in the computing and IT sector. As an independent learner you will gain many transferable skills – such as communication, numeracy and organisational – that are valued by employers. You will also acquire an understanding of the fundamental concepts, technologies and techniques applicable to both computing and IT.

Learning outcomes

A. Knowledge and understanding of:

Students completing 240 points from the **DipHE IT & Computing** should be able to:

- A1. Describe and evaluate the principles, concepts and techniques associated with the technology of computers and digital communication systems.
- A2. Recognise a range of contexts in which computers and digital communication systems are used and ways in which users interact with them.
- A3. Outline trends and issues in Information Technology and Computing.
- A4. Integrate the lifecycle of computing and IT systems, including the integration of theory and practice to solve problems.

B. Cognitive Skills:

Students completing 240 points from the **DipHE IT & Computing** should be able to:

- B1. Evaluate and Differentiate between IT and Computing systems, including hardware based, software based or system based contexts.
- B2. Appraise and illustrate principles of ITC technologies for abstracting, modelling, and problem-solving in the fields of Information Technology and Computing.
- B3. Distinguish the features and specifications of hardware based, software based IT and Computing systems.
- B4. Analyse ITC systems' processes and outcomes through small projects.

C. Practical and/or professional Skills:

Students completing 240 points from the **DipHE IT & Computing** should be able to:

- C1. Design, develop, and manage small computing and IT projects.
- C2. Examine, compare, compile, and choose IT computing systems, according to particular demand.
- C3. Plan and organize themselves and their work appropriately.
- C4. Manage risk and complexity in unstructured environments.

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing** should be able to:

- D1. Demonstrate the ability to work independently and as part of a team, identifying problems, developing and documenting solutions, and making effective use of ICT for project management, communication and collaboration.
- D2. Communicate and report effectively in an Information Technology and Computing context.
- D3. Apply problem-solving skills in an Information Technology and Computing context.
- D4. analyse and use data and information effectively in Information Technology and Computing context.
- D5. Exhibit ability to use the appropriate numerical and mathematical skills.
- D6. Conduct own self learning to the extent that they are prepared for lifelong learning after graduating.

b) DipHE IT & Computing (Computer Science)

Requirements for the **DipHE IT & Computing (Computer Science)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
TM105	Introduction to Programming	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Points	CHs
M269	Algorithm, Data structure and Computability	OU	30	8
M251	M251 Object-Oriented Programming using Java	AOU	30	8
TT284	Web Technologies	OU	30	8
TM298	Operating Systems	AOU	15	4
TM240	Computer Graphics and Multimedia	AOU	15	4
			120	32

Educational aims

The aim of this diploma is to equip you with the knowledge and skills you will need to underpin a broad-based career in the computing and IT sector. As an independent learner you will gain many transferable skills – such as communication, numeracy and organisational – that are valued by employers. You will also acquire an understanding of the fundamental concepts, technologies and techniques applicable to both computing and IT.

Learning outcomes

A. Knowledge and understanding of:

Students completing 240 points from the **DipHE IT & Computing (Computer Science)** should be able to:

- A1. Define and effectively use the key concepts of computer science.
- A2. Recognise the methods and tools used to develop software solutions.
- A3. Explain the key concepts of software development, integration and maintenance, including principles of design and programming.
- A4. Describe the different approaches and methods/techniques of representing, data, including.
- A5. Integrate the key concepts related to Computer Science, including algorithms, data structures, computability, object-oriented programming languages, Web technologies.
- A6. Discover and select novel solutions in a range of situations in which computer science can be applied, and the ethical, social and legal problems that computer science can create and solve.

B. Cognitive Skills:

Students completing 240 points from the **DipHE IT & Computing (Computer Science)** should be able to:

- B1. Interpret problems, and design novel solutions to them.
- B2. Explain key software development concepts and apply them to practical problems.
- B3. Distinguish between some software design and development methods and tools.
- B4. Compare software development methods and tools to identifying the best choices to be applied for specific problems.

- B5. Appreciate the roles, functions and interactions of members of a software “solution” development team.
- B6. Evaluate as computational thinker how to provide efficient computing solutions.

C. Practical and/or professional Skills:

Students completing 240 points from the **DipHE IT & Computing (Computer Science)** should be able to:

- C1. Plan, design, and develop computer science applications.
- C2. Deploy software tools for construction of computer science solutions and applications to solve problems.
- C3. Evaluate different software solutions.
- C4. Integrate computer science base component into a multidisciplinary project.
- C5. Handle ethical, social and legal issues in IT.

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing (Computer Science)** should be able to:

- D1. Organise their work independently, planning, monitoring, reflecting on and improving your own learning.
- D2. Categorise work in a group, communicating effectively.
- D3. Investigate, find, assess and apply information from a variety of sources.
- D4. Apply numerical and analytical techniques to solve problems.
- D5. Analyse and effectively use data and information in Computer Science concept.

c) DipHE IT & Computing (Networking & Security)

Requirements for the **DipHE IT & Computing (Networking & Security)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
TM105	Introduction to Programming	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Points	CHs
T216A	Cisco Networking (CCNA)-A	OU	30	8
T216B	Cisco Networking (CCNA)-B	OU	30	8
TM254	Managing IT: the why, the what and the how	OU	30	8
M251	Object-Oriented Programming using Java	AOU	30	8

			120	32
<p>Educational aims</p> <p>The aim of this diploma is to equip you with the knowledge and skills you will need to underpin a broad-based career in the computing and IT sector. As an independent learner you will gain many transferable skills – such as communication, numeracy and organisational – that are valued by employers. You will also acquire an understanding of the fundamental concepts, technologies and techniques applicable to both computing and IT.</p> <p>Learning outcomes</p> <p>A. Knowledge and understanding of: Students completing 240 points from the DipHE IT & Computing (Networking & Security) should be able to:</p> <ul style="list-style-type: none"> A1. Define, identify, and describe the fundamental concepts of Networking including LANs; WLANs; WANs; routing; switching; protocols; standards; network management. A2. Describe and evaluate the physical principles underlying computer and digital communication networks, and the mathematical rules governing protocols used in these networks. A3. Identify and describe the possibilities and limitations of computer networking together with the technological inherent in the design of such systems. A4. Discover novel solutions in a range of situations in which networking can be applied. A5. Describe the interaction of social, historical, economic, political and personal issues with networking systems. A6. Identify the major trends in computer networking and security technologies and recognise the implications of these trends. <p>B. Cognitive Skills: Students completing 240 points from the DipHE IT & Computing (Networking & Security) should be able to:</p> <ul style="list-style-type: none"> B1. Explain the key concepts related to networks (wired and wireless). B2. Interpret techniques for modelling, designing, and developing communication networks, and computer systems. This includes techniques such as simulating tools. B3. Explain and contrast implementations of networking and communication systems, making use of technical literature, simulations and/or mathematical modelling, as appropriate. B4. Express reasoned arguments about social, historical, economic, political and personal issues, as they apply to computer networking. B5. Devise project in networking. <p>C. Practical and/or professional Skills: Students completing 240 points from the DipHE IT & Computing (Networking & Security) should be able to:</p>				

- C1. Use appropriate simulation and modelling tools in order to investigate, design, evaluate and/or test networking.
- C2. Plan and organise themselves and their work appropriately.
- C3. Manage risk and complexity and evaluation of Network alternatives.
- C4. Discuss and assess alternatives for Networking solutions.

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing (Networking & Security)** should be able to:

- D1. Organise and improve their own learning and performance to the extent that they are prepared for lifelong learning.
- D2. Communicate and report effectively in the context of networking and technology by discussing, describing, and explaining related concepts and ideas.
- D3. Demonstrate the ability to work independently and as part of a team, gathering and evaluating different types of data/information, identifying problems, developing and documenting solutions, and making effective use of ICT for project management, communication and collaboration.
- D4. Apply appropriate numerical and mathematical skills.
- D5. Apply problem-solving skills in the context of networking.
- D6. Apply tools to support work in networking.
- D7. Survey, retrieve, evaluate and use data/information related to networking.

d) DipHE IT & Computing (Web Development)

Requirements for the **DipHE IT & Computing (Web Development)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
TM105	Introduction to Programming	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Points	CHs
TM254	Managing IT: the why, the what and the how	OU	30	8
M251	Object-Oriented Programming using Java	AOU	30	8
TT284	Web Technologies	OU	30	8
M252	Internet Programming	AOU	30	8
			120	32

Educational aims

The aim of this diploma is to equip you with the knowledge and skills you will need to underpin a broad-based career in the computing and IT sector. As an independent learner you will gain many transferable skills – such as communication, numeracy and organisational – that are valued by employers. You will also acquire an understanding of the fundamental concepts, technologies and techniques applicable to both computing and IT.

Learning outcomes

A. Knowledge and understanding of:

Students completing 240 points from the **DipHE IT & Computing (Web Development)** should be able to:

- A1. Explain the principles, concepts and techniques associated with web development, including an understanding of the design and development processes involved.
- A2. Recognise the terms, hypothesis, theories and practices associated with web development at individual component level.
- A3. Demonstrate a range of social, legal, ethical and professional skills required for the web development discipline within a world-wide context.
- A4. Discover novel solutions in a range of situations in which web technologies/solutions can be applied.
- A5. Define the possibilities and limitations of the state of the art web based systems.
- A6. Identify and explain of key concepts related to Project Management and Internet Security.

B. Cognitive Skills:

Students completing 240 points from the **DipHE IT & Computing (Web Development)** should be able to:

- B1. Evaluate as computational thinker, to provide efficient web-based solutions.
- B2. Associate theory and practice of web development practices and applications.
- B3. Correlate between the main concepts/approaches related the state-of-the-art web technologies to provide web based solutions.
- B4. Analyse implementations of web based systems/applications
- B5. Devise projects in Web Development.

C. Practical and/or professional Skills:

Students completing 240 points from the **DipHE IT & Computing (Web Development)** should be able to:

- C1. Design and develop responsive web solutions.
- C2. Create web-based systems for different usages.
- C3. Plan and organize themselves and their work appropriately; keep systematic records of work in progress and outcomes.

- C4. Examine and enhance the development of web based systems and portals through an iterative process.
- C5. Evaluate the Key Performance Indicators of interactive design.
- C6. Manage risk and complexity in their work.

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing (Web Development)** should be able to:

- D1. Organise own learning and performance to the level that they are prepared for lifelong learning after graduating.
- D2. Show and demonstrate a range of transferable skills in, problem solving, communication, project management, self-management, working individually.
- D3. Retrieve and reflect the use of data/information in a web development context.
- D4. Apply appropriate numerical and mathematical skills to solve practical problems related to web development.

e) DipHE IT & Computing (Computing with Business)

Requirements for the **DipHE IT & Computing (Computing with Business)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
TM105	Introduction to Programming	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
BUS110	Introduction to Business	AOU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Points	CHs
B207A	Shaping Business Opportunities - A	OU	30	8
B207B	Shaping Business Opportunities - B	OU	30	8
M251	Object-Oriented Programming using Java	AOU	30	8
TM254	Managing IT: the why, the what and the how	OU	30	8
			120	32

Educational aims

The aim of this diploma is to equip you with the knowledge and skills you will need to underpin a broad-based career in the computing and IT sector. As an independent learner you will gain many transferable skills – such as communication, numeracy and organisational – that are valued by employers. You will also acquire an understanding of the fundamental concepts, technologies and techniques applicable to both computing and IT.

Learning outcomes

A. Knowledge and understanding of:

Students completing 240 points from the **DipHE IT & Computing (Computing with Business)** should be able to:

- A1. Explain the key concepts of computing, data management and analysis, including principles of design and implementation of IT project, and the representation and meaning of data in a business context.
- A2. Integrate legal managerial and professional issues in computing.
- A3. Explain the key concepts of programming languages, algorithms, methods and techniques.
- A4. Identify Information systems technology including data structure, data bases and the internet.
- A5. Choose the methods and tools used for IT projects and service management.
- A6. Identify decision making and support tools.
- A7. Recognize the key concepts of financial management, and human resource management.
- A8. Recognize the key concepts of strategic planning and management of change.

B. Cognitive Skills:

Students completing 240 points from the **DipHE IT & Computing (Computing with Business)** should be able to:

- B1. Analyse practical problems, and use software development concepts to evaluate solutions to them.
- B2. Describe, compare and contrast IT project management methods, identifying the best choices to apply to specific problems.
- B3. Explain the roles, functions and interactions of members of a project management team.
- B4. Appraise business concepts and models and apply them to different aspects of business behaviour.
- B5. Evaluate business decisions and government business policy.

C. Practical and/or professional Skills:

Students completing 240 points from the **DipHE IT & Computing (Computing with Business)** should be able to:

- C1. Design, develop, and support computer systems in a business computing environment. They should be able to apply their knowledge to analyse business problems.
- C2. Use modern decision making management tools.
- C3. Manipulate ethical, social and legal issues that may arising from IT project management.

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing (Computing with Business)** should be able to:

- D1. Demonstrate independency in learning, planning, monitoring, and work accomplishment.
- D2. Communicate effectively with team members.
- D3. Plan and manage a project to complete within budget and schedule, appreciate the legal and professional implications of their work and present their work in the form of report.
- D4. Find information from a variety of sources, using information technology where necessary.
- D5. Use numerical and analytical techniques to solve problems showing in depth knowledge of IT and business management.

f) **DipHE IT & Computing (Data Science)**

Requirements for the **DipHE IT & Computing (Data Science)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
M140	Introducing statistics	OU	30	8
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Points	CHs
MT248	Analysing data	OU	15	4
M269	Algorithms, data structures and computability	OU	30	8
MST224	Mathematical methods	OU	30	8
MT249	Practical modern statistics	OU	15	4
M218	Relational Databases	AOU	15	4
M238	Data Visualization	AOU	15	4
			120	32

Educational aims

Students will learn theories and techniques that will equip them with a range of skills to analyse and visualize complex data and guide evidence-based decision and policy making across a range of public and private organizations. This qualification will provide them with a broad base across discipline areas and the opportunity to specialize in one or more of these if they pursue further study or employment in data science. Together with developing knowledge and understanding of the fundamental concepts, techniques and technologies, and issues involved in their application.

Learning outcomes

A. Knowledge and understanding of:

Students completing 240 points from the **DipHE IT & Computing (Data Science)** should have knowledge and understanding of:

- A1. a range of simple and more advanced methods for analysing and visualizing statistical data
- A2. calculus, differential equations, linear algebra, multivariable calculus and vector calculus
- A3. the fundamental principles, concepts and techniques underlying computing and IT, relational databases and the range of models used to support the analysis and design of computing and IT systems
- A4. the range of situations in which computing and IT systems are used in data analysis and the possibilities and limitations of such systems
- A5. the ethical and legal issues associated with computing

B. Cognitive Skills:

Students completing 240 points from the **DipHE IT & Computing (Data Science)** should be able to:

- B1. use their judgement in applying and selecting a wide range of mathematics and statistics tools and techniques to solve real world problems
- B2. construct appropriate mathematical and statistical and visualization to draw justifiable inferences in qualitative and quantitative problem-solving skills
- B3. reason with abstract concepts
- B4. select, apply and critically evaluate key database, computing and IT concepts and tools in a range of contexts

C. Practical and/or professional Skills:

Students completing 240 points from the **DipHE IT & Computing (Data Science)** should be able to:

- C1. be an independent learner, able to acquire further knowledge with minimal guidance or support
- C2. use appropriate professional tools, including programming languages and algorithms to support your work
- C3. apply mathematical, visualization, statistical and computational concepts, principles and methods
- C4. analyse and evaluate problems and plan strategies for their solution
- C5. identify and address the ethical, social and legal issues that may arise during the development and use of computing and IT systems.

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing (Data Science)** should be able to:

- D1. communicate information, arguments, ideas and issues clearly and in appropriate ways, bearing in mind the audience for and the purpose of the communication
- D2. find, assess and apply information from a variety of sources, using information technology where appropriate

- D3. prepare mathematical, visualization, statistical and computational content for a range of purposes, which may include writing for both specialist and non-specialist audiences
- D4. recognize and understand a range of database, technological and practical problems and select suitable techniques for solving them.

g) DipHE IT & Computing (Cyber Security)

Requirements for the **DipHE IT & Computing (Cyber Security)**:

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Point	CHs
TM129	Technologies in practice	OU	30	8
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Point	CHs
TT284	Web technologies	OU	30	8
T216A	Cisco networking (CCNA) part1	OU	30	8
T216B	Cisco networking (CCNA) part2 TM357	OU	30	8
TM256	Cyber Security	OU	30	8
			120	32

Educational aims

The aim of this diploma is to equip you with the knowledge and skills you will need to underpin a broad-based career in the computing and IT sector. As an independent learner you will gain many transferable skills – such as communication, numeracy and organisational – that are valued by employers. You will also acquire an understanding of the fundamental concepts, technologies and techniques applicable to both computing and IT.

Learning Outcomes

A. Knowledge and understanding:

Students completing 240 points from the **DipHE IT & Computing (Cyber Security)** should be able to:

- A1. Indicate a range of the fundamental principles, concepts and techniques in relation to secure digital systems and their secure use.
- A2. Identify theories, and practices of cybersecurity within networked systems including an appreciation of a range of methods, models and tools to support secure management

- A3. Describe the development and implementation of secure systems as well as methods and tools used in the design and implementation.
- A4. Recognize the professional, psychological, ethical, social and legal issues that can be associated with the development and deployment of digital systems
- A5. Demonstrate the ability to develop and apply digital solutions appropriate to security examination.

B. Cognitive Skills:

Students completing 240 points from the **DipHE IT & Computing (Cyber Security)** should be able to:

- B1. Apply and evaluate key digital and cybersecurity concepts in a range of contexts.
- B2. Select and apply appropriate techniques and tools for abstracting, modelling, problem solving, designing cybersecurity systems.
- B3. Compare and refine specifications and implementations of digital systems from a cybersecurity perspective
- B5. Appreciate of the risks, safety issues, legislation and regulatory requirements when designing/managing a cybersecurity-based system

C. Practical and/or professional Skills:

Students completing 240 points from the **DipHE IT & Computing (Cyber Security)** should be able to:

- C1. Design digital and cybersecurity systems, using appropriate simulation and modelling tools where appropriate
- C2. Plan and organize yourself and your work appropriately, including keeping systematic records of work in progress and outcomes
- C3. Address the professional, ethical, social and legal issues that may arise during the development and use of digital and cybersecurity systems
- C4. Use appropriate professional tools to support your work

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing (Cyber Security)** should be able to:

- D1. Communicate information, findings, arguments efficiently with specialized and non-specialized audiences through professional documentation and presentation skills.
- D2. Demonstrate professional working skills including initiation, commitment, decision making as well as the ability to work individually and as part of a team.
- D3. Select, and use accurately, appropriate numerical and analytical techniques to solve problems.
- D4. Use information retrieval skills, gathering and evaluating different types of information

D5. Manage their own learning and development, including time management and organizational skills in order to keep up-to-date with digital and Cyber Security systems

h) DipHE IT & Computing (Artificial Intelligence)

Requirements for the **DipHE IT & Computing (Artificial Intelligence)**

Level 1 (AOU) = Level 4 (OU)				
Code	Module Title	Source	Points	CHs
MT141	Introduction to Probability and Statistics	AOU	15	4
TM103	Computer Architecture and Organization	AOU	15	4
MT131	Discrete Mathematics	AOU	15	4
MT132	Linear Algebra	AOU	15	4
M110	Python Programming	AOU	30	8
TM112	Introduction to Computing and Information Technology	OU	30	8
			120	32

Level 2 (AOU) = Level 5 (OU)				
Code	Module Title	Source	Points	CHs
M269	Algorithm, Data structure and Computability	OU	30	8
TM270	Artificial intelligence	AOU	30	8
TM271	Machine Learning and Deep learning	AOU	30	8
TM275	Parallel and Distributed Systems	AOU	15	4
TM276	Software Development Processes and Methodologies	AOU	15	4
			120	32

Educational aims

The aim of this diploma is to equip you with the knowledge and skills you will need to underpin a broad-based career in the computing and IT sector. As an independent learner you will gain many transferable skills – such as communication, numeracy and organisational – that are valued by employers. You will also acquire an understanding of the fundamental concepts, technologies and techniques applicable to both computing and IT.

Learning outcomes

A. Knowledge and understanding of:

Students completing 240 points from the **DipHE IT & Computing (Artificial Intelligence)** should be able to:

- A1. Recognize the mathematical and statistical foundations of AI computing systems along with comprehensive knowledge of programming languages, styles, data structures and algorithms.
- A2. Identify principles and tools available to software development processes and methodologies.

- A3. indicate core disciplines of AI such as machine learning, deep learning, knowledge extraction and processing, parallel and distributed systems.
- A4. Describe systems requirements for both rule-based and data driven systems including the recognition and analysis of criteria and models leading to specifications used in the solution of specific AI problems.
- A5. Recognize the professional, psychological, ethical, social and legal issues that can be associated with the development and deployment of AI systems

B. Cognitive Skills:

Students completing 240 points from the **DipHE IT & Computing (Artificial Intelligence)** should be able to:

- B1. Use your judgment in applying and selecting a range of applications of AI and an understanding of their suitability to a range of problem domains.
- B2. Construct an abstract model for a given problem and devise appropriate mechanized techniques to solve the problem
- B3. Apply and evaluate key computing and AI concepts in a range of contexts
- B4. Select and apply appropriate AI techniques and tools for abstracting, modelling, problem solving, and designing AI systems and be aware of the limitations involved
- B5. Devise AI project that applies and extends your knowledge and understanding and reflect on the processes involved and the outcomes of your work

C. Practical and/or professional Skills:

Students completing 240 points from the **DipHE IT & Computing (Artificial Intelligence)** should be able to:

- C1. Plan, analyse, design, and develop AI software, with particular regard to Intelligent Systems using appropriate programming paradigms and languages.
- C2. Deploy modern software tools for construction of AI solutions and applications to solve practical problems.
- C3. Test and evaluate different machine learning and AI software solutions.
- C4. Explain the risks aspects associated with various intelligent systems
- C5. Address the professional, ethical, social and legal issues that may arise during the development and use of AI systems

D. Transferable skills:

Students completing 240 points from the **DipHE IT & Computing (Artificial Intelligence)** should be able to:

- D1. Recognize and understand a range of technological and real world problems and select suitable AI techniques for solving them
- D2. Find, assess and apply information from a variety of sources, using information technology where appropriate
- D3. Communicate information, arguments, ideas and issues clearly and in appropriate ways, bearing in mind the audience for and the purpose of the communication

D4. Work independently, planning, monitoring, reflecting on and improving your own learning

4. Distinctive features of the programme structure

- **Where applicable, this section provides details on distinctive features such as:**
 - where in the structure above a professional/placement year fits in and how it may affect progression
 - any restrictions regarding the availability of elective modules
 - where in the programme structure students must make a choice of pathway/route

The Information Technology and Computing Programme is designed to deliver valuable pathways with unique set of courses that can help students to equip a set of analytical, practical and professional skills. This program is designed to meet the requirements of AOU policies and frameworks. In addition, the programme is supported through AOU strategic plan in term of offering new programmes that meet MENA market's needs.

Admitting students to Information Technology and Computing programme is consistent with AOU vision and mission. The programme is designed to allow students from different ages and experiences to join the programme and move on smoothly. However, some restrictions might be applied according to the local policies at the offering countries.

The profile of admitting students is according to the mission of AOU and also in compliance with the programme aims and available resources in the various branches. All freshmen shall sit for the Language Placement Test in English pursuant to the standards approved by the University Council. The students score low grade in the admission test shall register for the English orientation course. However, the credit hours due to such courses shall not be included in his/her cumulative averages. Students may study for the first semester of the programme, only the university general requirements. Elective modules are not part of the 360 points validated by the OU but are present to satisfy overall aims of the programme and the labour market needs. The programme comprises of two types of elective modules: faculty mandatory electives and faculty general electives. Students are allowed to choose modules from the faculty general electives. The elective modules assess a number of learning outcomes that blend well in terms of covering some of the learning outcomes of practical and professional skills, and key/transferable skills from the Information Technology and Computing programme.

In addition to the above mentioned, the programme has the following distinctive features:

- The program will be offered in blended learning teaching style, which provide our students with more flexibilities in term of completing time and without any geographical restrictions. All modules are delivered based on a blended learning model, which consist of 25% face-to-face and 75% is self-learning. The 25% face-to-face consist of 2 hours per week for 8 CHs module, and 2 hours biweekly for the 4 and 3 CHs modules or based on local regulations of MoHE, in addition to one

office hour per 2 taught hours. On the other hand, the 75% self-learning depends on the students' self-study based on the teaching materials uploaded on the Central-LMS. Such materials are mainly PowerPoint slides, lectures note, activities, and other e-resources.

- The selected courses in the program are unique and meet the market needs locally and globally.
- Professional staff with good experience in Information Technology and Computing are hired to deliver the core courses.
- The program will enable the students to acquire professional certificates in the domain of Information Technology and Computing.
- Boosted by the collective intelligence of multiple tutor teams at different branches.
- The programme will be offered by complying the local requirements of the higher education ministries in the offering countries.
- The Industrial Advisory Board (IAB) members in each branch will update the demanding labour market skills and support in getting industrial training for the graduates.

Overall Programme Structure

The 96 Credit Hours core modules are placed in section-3 for revalidation. Students seeking a BSc (Hons) degree in ITC at AOU must complete at least 131 credit hours including the 96 CH core modules and 35 AOU requirements.

1. Overall AI Programme Requirements (AOU) (Table-1)
2. General University requirements (Table-2)
3. Faculty compulsory Requirements (Table-3)
4. Faculty elective requirements (Table-4)
5. Faculty core requirements (Table-5)
6. Specialization/Core Requirements (Table-6)

Table 1: Programme Requirements

Requirement type	Credit Hours
University Requirements/ Mandatory	18
University Requirements/ Electives	3
Faculty Requirements/ Mandatory	8
Faculty Requirements/ Electives	6
Specialization Requirements/ Mandatory	96
Total Credit Hours	131

The details of the previous requirements will be described as follows:

University Requirements/ Mandatory (60 points) (18 Credit Hours)

Table 2: Details of University Requirements (Mandatory)

Module	Module Title	Credit	Pre-requisites
AR113	Arabic Communication Skills	3	--

GB102	Principles of Entrepreneurship for	3	--
GR118	Life Skills and Coexistence	3	--
GT101	Learning and Information	3	--
EL111	English Communication Skills I	3	EL099
EL112	English Communication Skills II	3	EL111
Total		18	

* The list of modules and/or the modules contents may be updated/replaced as per AOU university council decision or local accreditation requirements.

University Requirements/ Electives (10 points) (3 Credit Hours)

Table 3: Details of University Requirements (Electives)

Module Code	Module Title	Credit Hours	Pre-requisites
GR111	Arabic Islamic Civilization	3	--
GR112	Issues and Problems of Development in the	3	--
GR115	Current International Issues and Problems	3	--
GR116	Youth Empowerment	3	--
GR117	Women Empowerment	3	--
GR121	Environment and Health	3	--
GR131	General Branch Requirement	3	--
CH101	Chinese for Beginners (I)	3	--
CH102	Chinese for Beginners (II)	3	CH101
SL101	Spanish for Beginners (I)	3	--
SL102	Spanish for Beginners (II)	3	SL101
FR101	French for Beginners (I)	3	--
FR102	French for Beginners (II)	3	FR101

* The list of modules and/or the modules contents may be updated/replaced as per AOU university council decision or local accreditation requirements.

Faculty Requirements / Mandatory (30 points) (8 Credit Hours)

Table 4: Details of Faculty Requirements (Mandatory)

Module code	Module title	Credit Hours	Points	Source	Pre-requisites
MST129	Applied Calculus	4	15	AOU	EL099
TM260*	Ethics, Law and the Governance in IT	4	15	AOU	As per the pathway ⁺

* the pre-requisite can be registered in parallel

*The TM260 may be replaced by an applied module as per the local accreditation requirement.

Faculty Requirements / Elective (20 points) (6 Credit Hours)

Table 5: Details of Faculty Requirements (Electives)

code	Module title	ITC	CS	N&S	WD	CWB	CYS	DS	AI	Pre-requisites
Level 1 (AOU) = Level 4 (OU)										
MS102	Physics	✓	✓	✓	✓	✓	✓	✓	✓	EL111
M109	.NET Programming	✓	✓	✓	✓	✓	✓	✓	✓	EL111
MT101	General Mathematics	✓	✓	✓	✓	✓	✓	✓	✓	-
M115*	Python for ML and DS							✓		M110
Level 2 (AOU) = Level 5 (OU)										
TM297	Compression Methods for Multimedia	✓								TM112 & MT131
M277	Competitive Programming	✓	✓							M251 & (M269)*
TM295	System Modelling		✓							MT132
TM290	Cryptography and Internet Security			✓			✓			TM112
TM287	Web Applications Development				✓					TM105
TM291	Management Information Systems					✓				BUS110 & TM105
TM280	Smart IoT Systems								✓	TM112
Level 3 (AOU) = Level 6 (OU)										
MT390	Image Processing	✓								MT132 & M251
MT372	Parallel Computing		✓							M269 & M251
MT395*	Applied Cyber Security			✓			✓			TM260
MT380	Service Oriented Architecture				✓					M251
TM391	E-Commerce					✓				B207B & M251
TM338	Data Mining							✓		MT249
TM339	Big Data Analytics							✓		MT249
TM380	Autonomous Robotic System								✓	TM271

()+ can be registered in parallel.

- The Data Science Students are highly recommended to study M115 as an elective module
- The Cyber Security Students are highly recommended to study MT395 as an elective module
- MT395* can be an elective module for the all tracks based on advising.

- *Note- The student will not be allowed to take more than one elective module per level from the above Table-5, according to proper Academic Advising. Core modules of any pathway might serve as Elective modules for other pathways, according to proper Academic Advising.*

Specialisation/ Core Requirements (96 Credit Hours)

The students will be encouraged to finish each level before moving on to the next level. The details of core modules are given as follows:

Table 6: Details of Specialization/Core Requirements

Table 6. Programme Plan of All Pathways of ITC

Level 1 (AOU) = Level 4 (OU)													
Code	Module title	Source	Point	CHs	ITC	CS	N&S	WD	CwB	CyS	DS	AI	Pre-Requisite
TM103	Computer Organization and Architecture	AOU	15	4	✓	✓	✓	✓	✓			✓	EL111
TM105	Introduction to Programming	AOU	15	4	✓	✓	✓	✓	✓				EL111
MT131	Discrete Mathematics	AOU	15	4	✓	✓	✓	✓	✓	✓	✓	✓	EL111
MT132	Linear Algebra	AOU	15	4	✓	✓	✓	✓	✓	✓	✓	✓	EL111
M110	Python Programming	AOU	30	8	✓	✓	✓	✓	✓	✓	✓	✓	EL111
TM112	Introduction to Computing and Information Technology	OU	30	8	✓	✓	✓	✓		✓	✓	✓	M110
BUS110	Introduction to Business	AOU	30	8					✓				EL111
TM129	Technologies in Practice	OU	30	8						✓			M110
M140	Introducing Statistics	OU	30	8							✓		EL111
MT141	Introduction to Probability and Statistics	AOU	15	4								✓	EL111
						120	120	120	120	120	120	120	

Level 2 (AOU) = Level 5 (OU)													
Code	Module title	Source	Point	CHs	ITC	CS	N&S	WD	CwB	CyS	DS	AI	Pre-Requisite
B207A	Shaping Business Opportunities-A	OU	30	8					✓				BUS110
B207B	Shaping Business Opportunities -B	OU	30	8					✓				B207A
T216A	Cisco Networking (CCNA)-A	OU	30	8			✓			✓			TM112
T216B	Cisco Networking (CCNA)-B	OU	30	8			✓			✓			T216A
M251	Object-Oriented Programming using Java	AOU	30	8	✓	✓	✓	✓	✓				TM105
M269	Algorithms, Data Structures and Computability	OU	30	8	✓	✓					✓	✓	M110 & MT131
TT284	Web Technologies	OU	30	8		✓		✓		✓			TM112
TM298	Operating Systems	AOU	15	4		✓							TM105 & TM103

TM240	Computer Graphics and Multimedia	AOU	15	4		✓								MT132 & TM105	
TM255	Communication and Information Technologies	OU	30	8	✓									TM112	
TM254	Managing IT: the why, the what and the how	OU	30	8				✓	✓	✓				M110	
MT248	Analysing data	OU	15	4								✓		M140	
MST224	Mathematical methods	OU	30	8								✓		MST129 & MT132	
MT249	Practical modern statistics	OU	15	4								✓		MT248	
TM256	Cyber Security	OU	30	8							✓			TM129	
T215B	Communication and Information Technologies – Part B	OU	30	8	✓									TM255	
TM275	Parallel and Distributed Systems	AOU	15	4									✓	TM103	
TM270	Artificial intelligence	AOU	30	8									✓	TM112 & MT141	
TM271	Machine Learning and Deep learning	AOU	30	8									✓	TM270 & MT141	
TM276	Software Development Processes and Methodologies	AOU	15	4									✓	TM112	
M252	Internet Programming	AOU	30	8					✓					TM112	
M218	Relational Databases	AOU	15	4									✓	M110 & MT131	
M238	Data Visualization	AOU	15	4									✓	M110	
								120	120	120	120	120	120	120	

Level 3 (AOU) = Level 6 (OU)													
Code	Module title	Source	Point	CHs	ITC	CS	N&S	WD	CwB	CyS	DS	AI	Pre-Requisite
BUS310	Strategic Management	AOU	30	8					✓				B207B
T316	Advanced Networking	AOU	30	8			✓						T216B
T318	Applied Network Security	AOU	30	8			✓			✓			T216B
TM351	Data Management and Analysis	OU	30	8	✓	✓			✓		✓	✓	M269 or M251*

TM352	Web, Mobile and Cloud Technologies	OU	30	8				✓					TT284 or M251*
TM354	Software Engineering	OU	30	8	✓	✓		✓	✓				M251
TM355	Communications Technology	OU	30	8	✓								T215B
TM356	Interaction Design and User Experience	OU	30	8				✓					TT284
TM311	Information security	OU	30	8						✓			T216A
TM359	System penetration testing	OU	30	8						✓			TM256
M348	Applied statistical modelling	OU	30	8							✓		MT248
TM358	Machine learning and artificial intelligence	OU	30	8		✓					✓		M269
TM340	Natural Language Processing	AOU	30	8								✓	TM271
TM341	Computer Vision	AOU	30	8								✓	TM271
T321	Operating System Server Administration	AOU	30	8			✓						T216A
TM471	Graduation Project (ITC pathway)	AOU	30	8	✓								TM355 or TM354 or TM351**
TM471	Graduation Project (CS pathway)	AOU	30	8		✓							TM354 or TM358 or TM351**
TM471	Graduation Project (NS pathway)	AOU	30	8			✓						T316 or T318 or T321**
TM471	Graduation Project (WD pathway)	AOU	30	8				✓					TM352 or TM354 or TM356**
TM471	Graduation Project (CwB pathway)	AOU	30	8					✓				(TM351 & BUS310) or (TM354 & BUS310**)
TM471	Graduation Project (CyS pathway)	AOU	30	8						✓			TM311 or TM359 or T318**
TM471	Graduation Project (DS pathway)	AOU	30	8							✓		M348 or TM358 or TM351**
TM471	Graduation Project (AI pathway)	AOU	30	8								✓	TM351 or TM340* or TM341**
						120	120	120	120	120	120	120	
Total Number of Points per Pathway						360	360	360	360	360	360	360	

* Based on selected pathway

** Based on advising

ITC Programme's Pathways - Study Plan

The academic year at AOU consists of two main academic semesters (Fall and Spring), each consists of 16 weeks, and additional (optional) summer semester of 10 weeks. The following structure plan is a suggested plan based on Fall and Spring semesters.

• Information Technology and Computing Pathway –Recommended Study Plan

First Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (13 CHs)	EL111	English Communication Skills I	3	EL099
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2 nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111
	MT131	Discrete Mathematics	4	EL111
	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (14 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111
		A module from University Requirement/Elective	3	-
2 nd (19 CHs)	TM112	Introduction to Computing and Information Technology	8	M110
	TM105	Introduction to Programming	4	EL111
	TM103	Computer Organization and Architecture	4	EL111
		Faculty Elective	3	
Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (16 CHs)	M251	Object-Oriented Programming using Java	8	TM105
	TM255	Communication and Information Technologies	8	TM112
2 nd (20 CHs)	M269	Algorithms, Data Structures and Computability	8	M110 & MT131
	T215B	Communication and Information Technologies – Part B	8	TM255
	TM260	Ethics, Law and the Governance in IT	4	TM255
Fourth Year				

Semester	Modules	Title	Credit Hours	Prerequisite
1 st (20 CHs)	TM351	Data Management and Analysis	8	M269 or M251
	TM354	Software Engineering	8	M251
	TM471A	Graduation Project-A	4	TM355 or TM354 or TM351
2 nd (15 CHs)	TM355	Communications Technology	8	T215B
	TM471B	Graduation Project-B	4	TM471A
		Faculty Elective	3	

• **Computer Science Pathway - Recommended Study Plan**

First Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (13 CHs)	EL111	English Communication Skills I	3	EL099
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2 nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111
	MT131	Discrete Mathematics	4	EL111
	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (14 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111
		A module from University Requirement/Elective	3	-
2 nd (19 CHs)	TM112	Introduction to Computing and Information Technology	8	M110
	TM105	Introduction to Programming	4	EL111
	TM103	Computer Organization and Architecture	4	EL111
		Faculty Elective	3	
Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (16 CHs)	M251	Object-Oriented Programming using Java	8	TM105
	TT284	Web Technologies	8	TM112
2 nd (20 CHs)	M269	Algorithms, Data Structures and Computability	8	M110 & MT131

	TM298	Operating Systems	4	TM105 & TM103
	TM240	Computer Graphics and Multimedia	4	MT132 & TM105
	TM260	Ethics, Law and the Governance in IT	4	TT284
Fourth Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (20 CHs)	TM351	Data Management and Analysis	8	M269 or M251
	TM354	Software Engineering	8	M251
	TM471A	Graduation Project-A	4	TM354 or TM351 or TM358
2 nd (15 CHs)	TM358	Machine learning and artificial intelligence	8	M269
	TM471B	Graduation Project-B	4	TM471A
		Faculty Elective	3	

• **Network & Security Pathway -Recommended Study Plan**

First Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (13 CHs)	EL111	English Communication Skills I	3	EL099
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2 nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111
	MT131	Discrete Mathematics	4	EL111
	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (14 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111
		A module from University Requirement/Elective	3	-
2 nd (19 CHs)	TM112	Introduction to Computing and Information Technology	8	M110
	TM105	Introduction to Programming	4	EL111
	TM103	Computer Organization and Architecture	4	EL111
		Faculty Elective	3	

Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (16 CHs)	T216A	Cisco Networking (CCNA)-A	8	TM112
	TM254	Managing IT: the why, the what and the how	8	M110
2 nd (20 CHs)	T216B	Cisco Networking (CCNA)-B	8	T216A
	M251	Object-Oriented Programming using Java	8	TM105
	TM260	Ethics, Law and the Governance in IT	4	T216B
Fourth Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (20 CHs)	T316	Advanced Networking	8	T216B
	T318	Applied Network Security	8	T216B
	TM471A	Graduation Project-A	4	T316 or T318 or T321
2 nd (15 CHs)	T321	Operating System Server Administration	8	T216A
	TM471B	Graduation Project-B	4	TM471A
		Faculty Elective	3	

• **Web Development Pathway -Recommended Study Plan**

First Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (13 CHs)	EL111	English Communication Skills I	3	EL099
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2 nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111
	MT131	Discrete Mathematics	4	EL111
	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (14 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111
		A module from University Requirement/Elective	3	-
2 nd (19 CHs)	TM112	Introduction to Computing and Information Technology	8	M110

	TM105	Introduction to Programming	4	EL111
	TM103	Computer Organization and Architecture	4	EL111
		Faculty Elective	3	
Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (16 CHs)	M251	Object-Oriented Programming using Java	8	TM105
	M252	Internet Programming	8	TM112
2 nd (20 CHs)	TM254	Managing IT: the why, the what and the how	8	M110
	TT284	Web Technologies	8	TM112
	TM260	Ethics, Law and the Governance in IT	4	TM254
Fourth Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (20 CHs)	TM352	Web, Mobile and Cloud Technologies	8	TT284 or M251
	TM354	Software Engineering	8	M251
	TM471A	Graduation Project-A	4	TM352 or TM354 or TM356
2 nd (15 CHs)	TM356	Interaction Design and User Experience	8	TT284
	TM471B	Graduation Project-B	4	TM471A
		Faculty Elective	3	

• **Computing with Business Pathway -Recommended Study Plan**

First Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (13 CHs)	EL111	English Communication Skills I	3	EL099
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2 nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111
	MT131	Discrete Mathematics	4	EL111
	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (14 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111

		A module from University requirement/Elective	3	-
2nd (19 CHs)	BUS110	Introduction to Business	8	EL111
	TM105	Introduction to Programming	4	EL111
	TM103	Computer Organization and Architecture	4	EL111
		Faculty Elective	3	
Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1st (16 CHs)	B207A	Shaping Business Opportunities-A	8	BUS110
	M251	Object-Oriented Programming using Java	8	TM105
2nd (20 CHs)	B207B	Shaping Business Opportunities-B	8	B207A
	TM254	Managing IT: the why, the what and the how	8	M110
	TM260	Ethics, Law and the Governance in IT	4	TT284
Fourth Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1st (20 CHs)	BUS310	Strategic Management	8	B207B
	TM354	Software Engineering	8	M251
	TM471A	Graduation Project-A	4	(TM351 & BUS310) or (TM354 & BUS310)
2nd (15 CHs)	TM351	Data Management and Analysis	8	M251
	TM471B	Graduation Project-B	4	TM471A
		Faculty Elective	3	

• **Data Science Pathway -Recommended Study Plan**

First Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1st (13 CHs)	EL111	English Communication Skills I	3	-
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111
	MT131	Discrete Mathematics	4	EL111
	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite

1 st (14 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111
		A module from University Requirement/Elective	3	-
2 nd (20 CHs)	TM112	Introduction to Computing and Information Technology	8	M110
	M140	Introducing statistics	8	EL111
	TM260	Ethics, Law and the Governance in IT	4	M110
Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (16 CHs)	M218	Relational Databases	4	M110, MT131
	MT248	Analysing data	4	M140
	M269	Algorithms, Data Structures and Computability	8	M110 and MT131
2 nd (19 CHs)	M238	Data Visualization	4	M110
	MST224	Mathematical Methods	8	MST129 & MT132
	MT249	Practical Modern Statistics	4	MT248
		Faculty Elective	3	
Fourth Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (20 CHs)	M348	Applied Statistical Modelling	8	MT248
	TM351	Data management and analysis	8	M269
	TM471A	Graduation Project-A	4	M348 or TM351 or TM358
2 nd (15 CHs)	TM358	Machine learning and artificial intelligence	8	M269
	TM471B	Graduation Project-B	4	TM471A
		Faculty Elective	3	

• **Cyber Security Pathway -Recommended Study Plan**

First Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (13 CHs)	EL111	English Communication Skills I	3	EL099
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2 nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111
	MT131	Discrete Mathematics	4	EL111

	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (14 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111
		A module from University Requirement/Elective	3	-
2 nd (20 CHs)	TM112	Introduction to Computing and Information Technology- 2	8	M110
	TM129	Technologies in practice	8	M110
		Faculty Elective	3	
Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (16 CHs)	TT284	Web technologies	8	TM112
	T216A	Cisco networking (CCNA) part1	8	TM112
2 nd (19 CHs)	T216B	Cisco networking (CCNA) part2	8	T216A
	TM256	Cyber Security	8	TM129
	TM260	Ethics, Law and the Governance in IT	4	TM256
Fourth Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (20 CHs)	TM311	Information security	8	T216B
	TM359	System penetration testing	8	TM256
	TM471A	Graduation Project-A	4	TM311 or TM359 or T318
2 nd (15 CHs)	T318	Applied Network Security	8	T216B
	TM471B	Graduation Project-B	4	TM471A
		Faculty Elective	3	

• **Artificial Intelligence Pathway -Recommended Study Plan**

First Year				
Semester	Modules	Title	Credit Hours	Pre-requisite
1 st (13 CHs)	EL111	English Communication Skills I	3	EL099
	GR118	Life Skills and Coexistence	3	-
	GT101	Computing Essentials	3	-
	MST129	Applied Calculus	4	EL099
2 nd (14 CHs)	AR113	Arabic Communication Skills	3	-
	EL112	English Communication Skills II	3	EL111

	MT131	Discrete Mathematics	4	EL111
	MT132	Linear Algebra	4	EL111
Second Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (18 CHs)	GB102	Principles of Entrepreneurship for Non-Specialists	3	-
	M110	Python Programming	8	EL111
	MT141	Introduction to Probability and Statistics	4	EL111
		A module from University Requirement/Elective	3	-
2 nd (15 CHs)	TM112	Introduction to Computing and Information Technology	8	M110
	TM103	Computer Architecture and Organization	4	EL111
		Faculty Elective	3	
Third Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (16 CHs)	M269	Algorithm, Data structure and Computability	8	M110 & MT131
	TM270	Artificial intelligence	8	TM112 & MT141
2 nd (20 CHs)	TM271	Machine Learning and Deep learning	8	MT141 & TM270
	TM275	Parallel and Distributed Systems	4	TM103
	TM276	Software Development Processes and Methodologies	4	TM112
	TM260	Ethics, Law and the Governance in IT	4	TM271
Fourth Year				
Semester	Modules	Title	Credit Hours	Prerequisite
1 st (20 CHs)	TM351	Data Management and Analysis	8	M269
	TM340	Natural Language Processing	8	TM271
	TM471A	Graduation Project - A	4	TM351 or TM340 or TM341
2 nd (15 CHs)	TM341	Computer Vision	8	TM271
	TM471B	Graduation Project - B	4	TM471A
		Faculty Elective	3	

Programme Structure of all pathways of ITC Programme

	ITC	CS	N&S	WD	AI	CyS	DS	CwB	
Level 0	University Requirements (All Pathways)								
Level 1 (AOU) = Level 4 (OU)	Faculty Requirements (All Pathways)								
	MST129 – Applied Calculus (4 CHs)								
	Specialization/Core Requirements								
	MT131 Discrete Mathematics (4 CHs)		MT132 Linear Algebra (4 CHs)			M110 Python Programming (8 CHs)			
	TM103 Computer Organization and Architecture (4 CHs)	TM103 Computer Organization and Architecture (4 CHs)	TM103 Computer Organization and Architecture (4 CHs)	TM103 Computer Organization and Architecture (4 CHs)	TM103 Computer Organization and Architecture (4 CHs)	TM129 Technologies in practice (8 CHs)	M140 Introducing to Statistics (8 CHs)	TM103 Computer Organization and Architecture (4 CHs)	
	TM105 Introduction to Programming (4 CHs)	TM105 Introduction to Programming (4 CHs)	TM105 Introduction to Programming (4 CHs)	TM105 Introduction to Programming (4 CHs)	MT141 Introduction to Probability and Statistics (4 CHs)			TM105 Introduction to Programming (4 CHs)	
	TM112 Introduction to Computing and Information Technology (8 CHs)	TM112 Introduction to Computing and Information Technology (8 CHs)	TM112 Introduction to Computing and Information Technology (8 CHs)	TM112 Introduction to Computing and Information Technology (8 CHs)	TM112 Introduction to Computing and Information Technology (8 CHs)	TM112 Introduction to Computing and Information Technology (8 CHs)	TM112 Introduction to Computing and Information Technology (8 CHs)	BUS110 Introduction to Business (8 CHs)	
	Electives								
	Student can select from variety of elective modules								
	Level 2 (AOU) = Level 5 (OU)	Faculty Requirements (All Pathways)							
TM260 - Ethics, Law and the Governance in IT (8 CHs)									
Specialization/Core Requirements									
M251 Object-Oriented Programming using Java (8 CHs)		M251 Object-Oriented Programming using Java (8 CHs)	T216A Cisco Networking (CCNA)-A (8 CHs)	M251 Object-Oriented Programming using Java (8 CHs)	TM275 Parallel and Distributed Systems (4 CHs)	T216A Cisco Networking (CCNA)-A (8 CHs)	MT248 Analysing Data (4 CHs)	M251 Object-Oriented Programming using Java (8 CHs)	
M269 Algorithms, Data	M269 Algorithms, Data	T216B	TM254 Managing IT: the why, the	M269 Algorithms, Data	T216B	M269 Algorithms, Data	TM254		

	Structures and Computability (8 CHs)	Structures and Computability (8 CHs)	Cisco Networking (CCNA)-B (8 CHs)	what and the how (8 CHs)	Structures and Computability (8 CHs)	Cisco Networking (CCNA)-B (8 CHs)	Structures and Computability (8 CHs)	Managing IT: the why, the what and the how (8 CHs)
	TM255 Communication and Information Technologies (8 CHs)	TT284 Web Technologies (8 CHs)	TM254 Managing IT: the why, the what and the how (8 CHs)	M252 Internet Programming (8 CHs)	TM270 Artificial intelligence (8 CHs)	TT284 Web Technologies (8 CHs)	MST224 Mathematical Methods (8 CHs)	B207A Shaping Business Opportunities-A (8 CHs)
	T215B Communication and Information Technology B (8 CHs)	TM298 Operating Systems (4 CHs)	M251 Object-Oriented Programming using Java (8 CHs)	TT284 Web Technologies (8 CHs)	TM271 Machine Learning and Deep learning (8 CHs)	TM256 Cyber Security (8 CHs)	MT249 Practical Modern Statistics (4 CHs)	B207B Shaping Business Opportunities-B (8 CHs)
		TM240 Computer Graphics and Multimedia (4 CHs)			TM276 Software Development Processes and Methodologies (4 CHs)		M218 Relational Databases (4 CHs)	
							M238 Data Visualization (4 CHs)	
Elective Requirements								
Student can select from variety of elective modules								
Level 3 (AOU) = Level 6 (OU)	Specialization/Core Requirements							
	TM351 Data Management and Analysis (8 CHs)	TM351 Data Management and Analysis (8CHs)	T316 Advanced Networking (8 CHs)	TM352 Web, Mobile and Cloud Technologies (8 CHs)	TM340 Natural Language Processing (8 CHs)	TM311 Information security (8 CHs)	TM351 Data Management and Analysis (8 CHs)	TM351 Data Management and Analysis (8 CHs)
	TM354 Software Engineering (8 CHs)	TM354 Software Engineering (8 CHs)	T318 Applied Network Security (8 CHs)	TM354 Software Engineering (8 CHs)	TM341 Computer Vision (8 CHs)	T318 Applied Network Security (8 CHs)	M348 Applied statistical modelling (8 CHs)	TM354 Software Engineering (8 CHs)
	TM355 Communications Technology (8 CHs)	TM358 Machine learning and artificial intelligence (8 CHs)	T321 Operating System Server Administration (8 CHs)	TM356 Interaction Design and User Experience (8 CHs)	TM351 Data Management and Analysis (8CHs)	TM359 System penetration testing (8 CHs)	TM358 Machine learning and artificial intelligence (8 CHs)	BUS310 Strategic Management (8 CHs)
	TM471 Graduation Project (ITC pathway) (8 CHs)	TM471 Graduation Project (CS pathway) (8 CHs)	TM471 Graduation Project (NS pathway) (8 CHs)	TM471 Graduation Project (WD pathway) (8 CHs)	TM471 Graduation Project (AI pathway) (8 CHs)	TM471 Graduation Project (CyS pathway) (8 CHs)	TM471 Graduation Project (DS pathway) (8 CHs)	TM471 Graduation Project (CwB pathway) (8 CHs)
	Electives							
Student can select from variety of elective modules								

5. Support for students and their learning.

(For apprenticeships this should include details of how student learning is supported in the work place)

AOU provides various services to ensure that all students enjoy peaceful and calm stay, and assists them in dealing with any psychological, behavioural, social, educational, financial, health and safety. Students at AOU, including FCS students, are offered various methods of student support. These include:

Learning Management System (LMS)

LMS is a software application / Web-based technology that is used as the major media of communication between students and tutors. LMS main page gives up-to-date information about AOU branches to students from concerned programmes.

LMS features help students to post queries, search for information over a certain topic, read daily posts and comments. Some of the LMS features are as follows:

- Assignment submission through the TMAs submission links
- Discussion forum between all users
- Downloading and uploading processes
- Getting marks
- Using Moodle Instant Messages
- Doing online quizzes
- Accessing mock up exams
- Having access to the E-Library
- adding course page for student/tutors (introduction, communication tools, announcement section, TMA & MTA grades section, contact your teacher section)
- Providing a free plagiarism online checker website on the LMS to help students in checking their TMA similarity.
- Check all university announcements through the LMS Home Page
- Joining LMS online training link
- Having access to all official social media accounts and YouTube channel through the LMS
- Availability of exams schedule and semester calendar etc.
- Availability of E-Books materials are available for all courses as a PDF files

SIS (Student Information System)

AOU established a centralized SIS that integrates data obtained from the branches' student databases. The SIS comprises security, student information, financial services, academic advising and online registration.

The system allows the student to benefit from various electronic services, which include:

- **Online Registration:** to register, update and delete course to be studied at AOU.
- **Online Payment:** to view and pay the fee online.
- **View/Print Semester Timetable:** to view a detailed timetable whenever needed
- **View/Print Student Schedule:** to view a detailed schedule whenever needed

- **View/Print Academic Plan:** to view or print academic plan which is reflective of the studied courses and the remaining courses.
- **View/Print Examination Results:** to view or print unofficial slip of the academic performance (transcript).
- **Create a Student Personal Development Plan (PDP):** to facilitate the achievements of academic and career goals.
- **Edit Students' Contact profile:** to update the contact details at any time assuring appropriate channel of communication with AOU.
- **View student Exam Slip:** to view the location of the exams.
- **View Advising details:** to view the advising details logged by the advisor.

Student Support Services:

- **Exam Postponing System:** To submit a request to postpone a midterm or final exam with attaching the excuse.
- **Appeal System:** To submit a request for formal review of an academic decision regarding course final examination grade or course continuous assessment marks.
- **Complaint System:** To submit any claim unrelated to academic grades.
- **Inquiries System:** To submit an inquiry related to subject other than appeal and complaint.
- **Disability and Dyslexia Support System:** To submit a description of any disabilities or learning difficulties, so the university can take it in consideration and to provide the necessary services to enable the student to fulfil the intended learning outcomes of their study in a friendly educational and social environment.
- **Induction Programme/Orientation Day:** Students Affairs Department organizes an induction program/orientation day for the new students, in coordination with all administrative and academic departments at the beginning of each semester.
- **Practical laboratory sessions for programming courses.**
- **The university website www.arabou.edu.kw** embodies a lot of guidance and support materials such as: Course Guides, Study Calendars etc.
- **Tutor Contact:** Tutors hold weekly office hours. Tutors are committed to helping students with their problems. All tutors have regular office hours to meet students. The tutors can also be contacted through email. All part-time and full-time tutors are requested to hold two weekly office hours for each taught section. There are also chat sessions online with tutors, and face-to-face feedback sessions. Additionally, emails are constant means by which tutors and students can discuss important ideas related to course material. Furthermore, tutors are available via phones, as well, to answer any urgent queries and offer support.
- **Academic Advising:** Proper academic advising is regarded as a very critical factor affecting student's success and retention and is given exceptional attention in all branches. Each student is assigned to an advisor. Each advisor should show his advisee the ultimate way to achieve his/her goal while taking into account his strengths, weaknesses, and past performance.

Given that, AOU adopts a blended learning approach that fosters flexibility for the students; two types of advising are offered at the AOU: Face to face advising and E-Advising. Both are offered within certain context and in accordance to specific criteria and

guidelines. Advising usually starts at the beginning of the semester, before registration, but continues throughout the semester, where students can meet their advisors in their office during the semester. Face to face advising is mandatory for new comers, and for old students who are not eligible for e-advising. The advisor takes into consideration several factors, among these factors, the financial situation of the student, his workload (part time/full time job), and the student's results in the placement test. The e-advising is offered for continuing students with good GPA and according to the academic advising policy.

Student Counselling Unit: The unit, available at some branches and being adopted for future implementation in many, provides a range of services and activities that help the student to achieve social and psychological adaptation. Individual sessions in which the student meets with the Psychological Counsellor. These sessions help the students to identify the problems facing them or the difficulties that prevent them from achieving their objectives. The Psychological Counsellor helps them to develop skills and capabilities which can help them to handle all kinds of problems.

Written guidance including:

- Student Handbook
- Teaching and Learning policy <https://www.arabou.edu.kw/blended-learning/Pages/about.aspx>
- The Bachelor Degree Award Requirements Bylaws
- <https://www.arabou.edu.kw/university/Documents/Regulations/student/en/The%20Bachelor%20Degree%20Award%20Requirements%20Bylaws.pdf>
- The Bachelor Award Examinations and Assessment Bylaws,
- <https://www.arabou.edu.kw/university/Documents/Regulations/student/en/The%20Bachelor%20Award%20Examinations%20and%20Assessment%20Bylaws.pdf>
- Equal opportunity policy
- <https://www.arabou.edu.kw/university/Documents/Regulations/aou/en/Equal%20Opportunity%20and%20Respect%20for%20Diversity.pdf>
- Student Guide on Plagiarism
- <https://www.arabou.edu.kw/students/guide/Pages/cheating.aspx>
- Plagiarism Policy
- <https://www.arabou.edu.kw/university/Documents/Regulations/academic/en/Scheme%20of%20penalties%20-%20%20AUG%202020.pdf>
- Appeals and complaints
- <http://www.arabou.edu.sa/students/examinations/Pages/student-appeal-system.aspx>
- https://mdl.arabou.edu.kw/oman/pluginfile.php/38519/mod_folder/content/0/7.%20Academic_Appeal_Complaints%20June-2018.pdf?forcedownload=1

ICT facilities:

- IT Help Desk
- Student email
- Wireless Internet access most of the AOU country campuses.
- Student representatives in the Student Council and Branch Council allowing students to share in the decision making process.

- Career planning guidance and services.

6. Criteria for admission

(For apprenticeships this should include details of how the criteria will be used with employers who will be recruiting apprentices.)

AOU, based on its belief in equal-opportunity education and the two interconnected principles of lifelong learning and education for all, tries to reach out to as many learners as possible. This is why it tries – in those branch countries where there are interested learners – to open, in addition to the main branches themselves, centres in remote areas, making education available to those who may not have an opportunity otherwise.

The standard criterion for admission to FCS programme is a high school certificate or its equivalent in the scientific pathway. The FCS follows the AOU's policies and Rules and Regulations, considering the students' entry into the undergraduate AI programme. The main Entry Requirement into the AI Programme is a valid High School certificate.

Nevertheless, it is worth noting that the admission criteria should fulfil any other conditions determined by the university or competent authorities of the offering branch countries. In all AOU branches students will find the same process of admission through the following link: <https://www.arabou.edu.kw/students/pages/apply-to-aou.aspx>

[Note: This link contains all the details on the admission policies and procedures at the nine branches, as well as the application process.

7. Language of study

Language of study is English Language.

8. Information about non-OU standard assessment regulations (including PSRB requirements)

AOU assessment strategy is based on general principles and procedures aiming to organize and monitor the examinations at all AOU branches. AOU regulations include validation (pre-assessment moderation) of examination questions and answer keys by external examiners (EE), audit tutors' marking, post-assessment moderation; and 4 tiers of examination committees.

Below is a brief about the major assessment principles, policies, and procedures adhered to by FCS.

1. Main principles underpinning the processes of assessment at AOU

AOU has explicit procedures for ensuring that student performance is properly judged and for evaluating how academic standards are maintained through assessment practice. The following are some of the procedures which FCS implements:

- All forms of assessment must aim to test the Learning Outcomes (LOs) associated with the module.
- The creation and administration of all types of assessment is a team work (e.g. branch module coordinators (BCCs), module chairs (GCCs), programme coordinators (PCs), Deanship team, and External Examiners (EEs)).
- All assessment components are reviewed and approved by EEs.
- Strict quality measures take place to guarantee fair/correct marking at all branches and across them through Cross branch marking (CBM)
- Sample of students' marked work/scripts from all the modules per branch as well as the CBM are review by EEs.
- There are four tiers of Examination Board structure to approve the final students' results at the end of each semester.

The FCS maintains contact with EEs throughout the semester, and informs them about any issues that arise concerning student assessment. The EEs and the OU Academic Reviewer are involved in establishing the quality of the academic delivery, academic material preparation, assessment and guidance throughout the semester.

2. Composition of the examination's committees

AOU has a four-tiered Examination Board structure consisting of the following:

- Branch Examination Committee (BEC)
- Module Assessment Committee (CAC)
- Faculty Examination Committee (FEC)
- Central Examination Committee (CEC)

All EEs are members of CAC and FEC. The Chief External Examiner is a member of CEC. The composition of all examination boards has been clearly spelled out in the AOU Examination Rules and Regulations. The composition of all examination boards is appropriately maintained by the AOU administration. Marks submitted by branches are considered at HQ by CAC, FEC and ultimately by the CEC. In this way, cross-branch review is achieved.

3. Assessment Components, Weights, and Criteria

The FCS follows the AOU's assessment policies, rules and regulations. The assessments at AOU comprise of 3 essential components with their relative weight as follows:

- Tutor Marked Assignment (TMA) □ 20%
- Mid-Term Assessment (MTA) □ 30%
- Final Exam □ 50%

Weightages of Assessment Components for TM471 Graduation Project module:

For the graduation module TM471 the assessment components and the associated weightages are as follows:

- Preliminary presentation: 5 %
- Project Report Part-1: 25%
- Project Presentation (Final): 10%
- Project Report (Final): 35%
- Project deliverable: 25%

Formative and Summative parts of Assessments:

The TMA and the MTA parts of the assessment form the Continuous Assessment component at AOU. The TMA assessment component is part of the Formative Assessment at AOU and detailed feedback is provided to students on their TMA work. The MTA and Final Examinations are part of the Summative Assessment at AOU.

Feedback on Assessment:

The students are provided detailed feedback on their TMA work and this is an essential part of learning at AOU. Tutors use a detailed form for this purpose in which marks for each part of the TMA are clearly distributed. The feedback form also has specific area for the tutors to provide feedback to students concerning their strengths, weaknesses and steps for improvement. The tutor uses this form to provide detailed feedback to students and to suggest corrective and improvement actions. Feedback is also provided to students during in class face-to-face tutorials and during laboratory and office hours maintained by the tutors.

4. The Grade Point Average and Equivalent Letter Grades:

AOU follows the Grade Point Average (GPA) on a scale of 0 to 4 in its grading processes, i.e., the different categories of achievement are distinguished by awarding students grades on a scale from 0 to 4.

5. Quality of Assessment:

QAA defined Benchmark standards and the excellence level are taken into consideration in the preparation of the assessment materials. The assessment materials contain questions of appropriate difficulty level standard in order to differentiate students according to their knowledge level and skills. The assessment materials are subject to External Examiners' scrutiny to ensure that standards are compatible to institutions of similar standings in the UK.

6. Marking, Double-marking, and Cross Branch Marking.

The FCs adopts transparent and fair mechanisms for marking and for moderating marks. All tutors responsible for marking are provided with model answers (approved by EEs) to the questions they will be marking. In addition, grades given by branch tutors are audited by internal staff member to ensure correct marking process.

There is appropriate arrangement for Group Marking and Double Marking. During Group marking under the supervision of the BCC, internal review is undertaken. Double-marking is undertaken as part of the tutor monitoring process in which the BCC evaluates the performance of the tutors.

Cross Branch Marking (CBM) is performed in FCS to ensure uniformity of script marking. The Deanship collects scripts from branches for various modules and these are distributed to other selected branches for the purpose of CBM. CBM reports are generated by the concerned tutors and the Deanship ensures that marking across branches is standardised and uniform.

7. The Assessment Procedures

The assessment procedures are secure and we have full confidence in their integrity and trustworthiness. The following steps are implemented to ensure the security and integrity of the assessment procedures:

- A secured web-based framework is created and organized by the Deanship at the beginning of each semester to exchange the assessment documents. Through such framework, the Deanship centrally control and organize the whole flow of the assessments and documents with all the members involved in the assessment process, where a personal account is created for each GCC, EE, Exam officer of each branch.
- Each GCC prepare the assessment components of his/her module (i.e., TMA, MTA, Final with the model answers and marking guide) and submit them through the aforementioned framework.
- The FCS Deanship communicates the EEs to start their review/feedback on examination papers (through the framework).
- Once the examinations are finalised the Deanship sends them to the Exam Officer at each branches (through the framework)
- The examinations officer prints and keeps them in sealed envelopes under lock and key in a safe storage place at his/her branch.
- The examination officer takes out the examination papers about half-an-hour prior to the start time to give them to invigilators.
- All examinations across all branches are time-synchronized to avoid students of one branch leaking exams to students of other branches.
- Branch directors and branch programme coordinators supervise the administration of the examinations.
- All stages of test administration, the marking of scripts, and the recording of marks are regulated by explicit written instructions and monitored by concerned bodies (programme coordinators, course coordinators, examination committees).

- To guarantee objectivity in marking, students' names and registration numbers do not appear on final examination scripts. Furthermore, in courses taught by more than one tutor, the principle of 'group marking' is applied in the marking of all scripts
- For TMAs, the integrity of the solutions is ensured by providing the solutions to tutors very close to the cut-off date to avoid leakages of solutions due to intentional or unintentional means.
- Plagiarism on TMAs is an issue which all education institutions are grappling with. We now have Turnitin plagiarism detection software to address the issue.
- Once each assessment is marked at each branch, samples of students marked work/script is uploaded along with the audit-trail forms (for finals and MTAs), similarity report (for TMAs), feedback forms (for TMAs) on a secure shared space in order to be reviewed by the EEs.
- The samples of the final exams are subject for Cross branch marking to ensure the fairness of the marking process. The output of the CBMs are made available for the EEs.
- The final results for each course are reviewed by the course assessment committee (CAC), then by the faculty examinations committee (FEC), and finally by the central examination committee (CEC).

The assessment process is objective in nature since the entire process is open and accessible to EEs' scrutiny.

9. For apprenticeships in England End Point Assessment (EPA).
(Summary of the approved assessment plan and how the academic award fits within this and the EPA)

N.A.

10. Methods for evaluating and improving the quality and standards of teaching and learning.

As a partner of the OU, UK, AOU is required to meet all academic standards required for validation and accreditation set for UK universities and institutes of higher education. This includes engagement with the QAAD Academic Infrastructure and guidelines provided by the OU, UK. AOU offers its programme in 9 Arab countries, it is crucial to meet the local quality assurance requirements in the offering countries as well.

FCS continuously evaluates the quality and standards of teaching and learning of the programmes and its delivery using different well-designed appraisal and evaluation systems that include key indicators for assessing the performance of the offered programmes. Following are the methods for evaluating and improving the quality and standards of teaching and learning adopted in AOU

10.1 Programme

1. **Periodic review and revalidation of programme by an external panel** (Revalidation every 5 years)
2. **Programme review by the Quality Assurance agency in the offering countries.**
3. **Annual Monitoring Report (AMR):** AMR is a comprehensive document produced at the end of every academic year. The AMR focuses on the developments and challenges related to all matters of teaching and learning environment. The evidence it contains is both qualitative and quantitative in nature. Academic programmes give a detailed account of student enrolment, withdrawal, progression, achievement trends. It also includes an analytical commentary related to the course material, assessment designs, students' learning outcomes, tutor performance, appeals and complaints, grievance systems, student and tutor feedback. This takes account of the views of tutors, students and any issues raised by the external examiners. A detailed action plan is produced accordingly and communicated to all programme coordinators at the eight branches to leverage the strengths and address the weaknesses of the faculty.
4. **Annual Programme Evaluation (APE):** The programme management team at the branches completes an annual programme evaluation report which is submitted as part of the AMR at the end of every academic year. The report consists of analytical commentary of the course material, assessment design, student and tutor feedback, external examiners' comments and responses to external examiners' reports in addition to programme achievements and good practices.
5. **External Verifier/Examiner**
6. **Quarterly Periodic Reports (QR)**
7. **Subject areas committees at FCS**
8. **Internal Moderation**
9. **Academic reviewer's involvement in the programme review**
10. **Reviews made by local ministries of Higher Education and Quality Assurance agencies.**
11. **Feedback from students:** AOU recognizes the importance of student views and feedback. For this purpose, student's views survey is circulated during each semester where students are expected to give a formal feedback on the tutorial, content, delivery style, clarity of learning outcomes, and helpfulness of the tutor towards the student. Student feedback will duly be communicated to the respective module tutor and appropriate measures will be taken, if necessary.
12. **Feedback from employers:** A feedback is gathered through the survey that is conducted at various interval to collect the expectation and feedback of the employers.
13. **Feedback from Alumni:** A feedback is collected about the graduates of AOU by Students Affairs departments in the respective branches at the end of every academic semester. The survey inquires about various aspects such as: employment status, field of employment, relation of employment to the student programme, etc.
14. **Academic standards committee involvement in programme updates**
15. **Industrial Advisory Board:** Keeping abreast of industry developments is an essential aspect of preparing students for their future careers. IAB has been functioning in all the branches at FCS. IAB creates a strong link between industry and the FCS and is contributing in achieving the FCS's goals and objectives. Members of this board are professionals in industry and government who collaborate and build cooperative efforts

with the FCS, advice on academic programs, and help in building future faculty direction. FCS alumni are members of this board in all the branches.

10.2 Teaching and Learning

- **Feedback from students** (through Questionnaires, meetings with PCs, Deans, and VPAA)
- **Tutorial/peer monitoring:** Peer monitoring is a collegiate approach to identifying tutor's strengths and weaknesses in delivering the course content during tutorials
- **General Module Chair (GCC) and Branch Module Coordinators (BCCs)** monitor the delivery of their respective modules.
- **Exit surveys**
- **Feedback from AOU Alumni**
- **Annual staff appraisal**
- Tutor development activities such as faculty development forum, workshops and research seminars
- Best tutor awards encourage excellence in tutoring
- **Academic Appraisal:** is an appraisal system used to evaluate the soundness of academic staff knowledge and skills in delivery. This appraisal system is crucial to deciding the efficacy of their services rendered to the University in terms of the continued need for your services or otherwise. This appraisal process also helps you and the university identify your training needs. The academic appraisal is conducted once a year.

10.3 Assessment

- Quality assurance and oversight by the deanship
- External examiners involvement in module assessment committees (CACs)
- External examiners reports
- Feedback from tutors
- Prompt feedback on student's formative assessment (TMAs, MTA)

10.4 General feedback

- Cross-programme discussions with all branches through the members of the academic committee
- Faculty Council meetings.
- Implementation of best practices in 9 different branches with 4 different Faculties.

10.5 Committees for monitoring and evaluating quality and standards:

- Module Assessment Committee (CAC)
- Faculty Board (FB)
- Academic Committee (AC)
- Academic Standards Committee (ASC)
- AOU's Quality Assurance Committee (QAC)
- Revalidation Panel
- Student-Staff Liaison Committee (SSLC)

10.6 Local recognition by the local Authorities of Higher Education and Validation Agencies

It is worth mentioning that the programme offered at FCS is subject to the conditions and criteria of accreditation in the branch countries where the programmes are offered. Local accreditation and re-accreditation of the programmes always goes smoothly, as they always meet the standards applied by the accrediting bodies in the branch countries. Nevertheless, the critical recommendations received from these authorities are always taken care with highest importance and FCS use them as an opportunity for further improvement

10.7 Key performance and quality Indicators

- Continuous recognition by local ministries of higher education in 9 countries
- Acceptable student retention, progression and graduation rates.
- High proportion of our Alumni find jobs immediately after graduation
- Examination results are comparable with HESA data provided by OUVV
- Research informed tutoring
- Fund raising for research projects by our tutor's team

All parties of the FCS and each in its own capacity, contribute significantly to the improvement of the FCS programme in the following areas:

- Encouraging examples of good practice among the different branches to enhance the FCS programme and disseminating them across AOU branches.
- Preparing the Self Evaluation Document (SED)
- Conducting Faculty Development Workshops

Along the last 4 years [2017-2021], the External examiners team reports indicating the high quality of the learning material and delivery (**Extracts of External Examiners Reports**)

- a) "I can confirm that the standards are comparable to similar programmes I am familiar with in the UK, and in line with the Computing Subject Benchmark as well as the UK Higher Education Qualification Framework".
- b) "It is encouraging to see that the programme put in place seems to be working. There is clear improvement in students' ability to critically analyse others' work and be critical of their own too. Referencing and plagiarism seem to be moving in the right direction too".
- c) "Overall, very encouraged by the clear improvements in almost all departments related to the quality of students' work".
- d) "As with previous reports, I can confirm that the programme uses a range of assessment types that cover the modules and Programme Learning Outcomes. All the information needed to scrutinize the assessment process was made available".
- e) "Greater use of the LMS system is commended".
- f) "Assessment material is designed in line with the learning outcomes, both at module and programme levels. I have had the opportunity to comment on these prior to the assessment being given to students. A new bank of questions is developed, which seems to help the processes of setting the assessment, marking and discouraging plagiarism".

- g)** “I can confirm, on behalf of my External Examiners colleagues that the assessment and standards are appropriate and that, in the main, the processes of assessment and determination of grades/marks are fair, consistent and sound across the provision”.

11. Changes made to the programme since last (re)validation

The ITC Programme has not experienced any major change since the last revalidation event in 2017. One minor change processing has been done for the T216 module since it required updating based on the updating of the CISCO curriculum on which it is based.

For the purposes of the current revalidation event planned for June 2021, the following updates have been proposed:

11.1 ITC Pathway:

- Replacing TM111 by M110
- T215A has been replaced by TM255

11.2 CS Pathway:

- Replacing TM111 by M110
- T227 has been replaced by TT284
- TM366 has been replaced by TM358

11.3 N&S Pathway:

- Replacing TM111 by M110
- T227 is replaced by TM254
- TM352 has been replaced by T321

11.4 WD Pathway:

- Replacing TM111 by M110
- T227 has been replaced by TM254
- M269 has been replaced by M252.

11.5 CwB Pathway:

- Replacing TM111 by M110
- M269 has been replaced by TM254
- TM352 has been replaced by TM354

11.6 3 New Pathways have been added to the ITC Programme:

- Data Science (DS)
- Artificial Intelligence (AI)
- Cyber Security (CyS)

The following tables summarize the abovementioned changes:

Level 1:

Before:

ITC	CS	N&S	WD	CwB
TM103	TM103	TM103	TM103	TM103

TM105	TM105	TM105	TM105	TM105
MT131	MT131	MT131	MT131	MT131
MT132	MT132	MT132	MT132	MT132
TM112	TM112	TM112	TM112	BUS110
TM111	TM111	TM111	TM111	TM111

After:

ITC	CS	N&S	WD	CwB
TM103	TM103	TM103	TM103	TM103
TM105	TM105	TM105	TM105	TM105
MT131	MT131	MT131	MT131	MT131
MT132	MT132	MT132	MT132	MT132
TM112	TM112	TM112	TM112	BUS110
M110	M110	M110	M110	M110

Level 2:

Before:

ITC	CS	N&S	WD	CwB
M251	M251	T216A	M251	M251
M269	M269	T216B	TT284	B207A
T215A	TM298	M251	M269	B207B
T215B	TM240	T227	T227	M269
	T227			

After:

ITC	CS	N&S	WD	CwB
M251	M251	T216A	M251	M251
M269	M269	T216B	TT284	B207A
TM255	TM298	M251	M252	B207B
T215B	TM240	TM254	TM254	TM254
	TT284			

Level 3:

Before:

N&S	CwB	CS
T316	BUS310	TM351
T318	TM351	TM354
TM471	TM471	TM471
TM352	TM352	TM366

After:

N&S	CwB	CS
T316	BUS310	TM351
T318	TM351	TM354
TM471	TM471	TM471

T321	TM354	TM358
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Annexe 1: Curriculum map

Annexe 2: Notes on completing the OU programme specification template

Annexe 1 - Curriculum map

This table indicates which study units assume responsibility for delivering (shaded) and assessing (✓) particular programme learning outcomes.

1.1 ITC Pathway

Level	Study module/unit	Programme outcomes																	
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6
Level 1 (AOU)	TM103	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	TM105	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Level 4 (OU)	MT131	✓	✓		✓	✓			✓	✓	✓	✓		✓	✓	✓		✓	
	MT132	✓	✓		✓	✓			✓	✓	✓	✓		✓	✓	✓		✓	
	M110			✓	✓				✓	✓		✓	✓	✓		✓		✓	✓
	TM112	✓	✓	✓		✓	✓		✓		✓	✓	✓	✓	✓	✓			✓

Level	Study module/unit	Programme outcomes																	
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6
Level 2 (AOU)	M251	✓			✓		✓		✓							✓	✓	✓	✓
	M269	✓	✓	✓	✓	✓	✓		✓	✓					✓	✓			
Level 5 (OU)	TM255	✓	✓				✓	✓			✓	✓		✓	✓				
	T215B		✓	✓		✓		✓			✓			✓				✓	

Level	Study module/unit	Programme outcomes																	
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6
Level 3 (AOU)	TM351	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓		✓
	TM354	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓		✓
Level 6 (OU)	TM355	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓
	TM471	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1.2 CS Pathway

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Level 1 (AOU)	TM103	✓		✓		✓	✓	✓			✓			✓	✓	✓	✓	✓	✓	✓		✓	✓
	TM105	✓	✓	✓	✓			✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	
Level 4 (OU)	MT131	✓		✓	✓			✓	✓	✓				✓		✓				✓	✓	✓	✓
	MT132	✓		✓	✓			✓	✓	✓				✓		✓				✓	✓	✓	✓
	M110	✓	✓	✓	✓			✓	✓				✓	✓	✓	✓	✓		✓	✓		✓	✓
	TM112	✓			✓		✓							✓				✓		✓	✓	✓	✓

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Level 2 (AOU)	M251			✓		✓		✓	✓		✓			✓	✓				✓		✓	✓	✓
	M269	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓				✓	✓	✓
Level 5 (OU)	TT284		✓	✓		✓	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓		✓	✓	
	TM298	✓				✓		✓						✓		✓				✓	✓		
	TM240		✓		✓	✓	✓	✓					✓	✓	✓	✓			✓	✓			

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Level 3 (AOU)	TM351		✓	✓			✓	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓	✓		
	TM354		✓	✓			✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓		
Level 6 (OU)	TM358	✓	✓		✓	✓	✓	✓		✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓
	TM471	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1.3 N&S Pathway

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6	D7
Level 1 (AOU)	TM103		✓			✓			✓	✓		✓	✓	✓			✓		✓				
	TM105	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓			✓	✓	✓	✓			
Level 4 (OU)	MT131	✓	✓				✓	✓	✓			✓	✓	✓				✓	✓	✓			
	MT132	✓	✓				✓	✓	✓			✓	✓	✓				✓	✓	✓			
	M110				✓				✓			✓	✓	✓			✓			✓	✓		
	TM112	✓				✓	✓					✓		✓			✓			✓			

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6	D7
Level 2 (AOU)	T216A	✓		✓			✓	✓	✓	✓			✓				✓	✓		✓	✓		
	T216B	✓					✓		✓	✓			✓	✓			✓						
Level 5 (OU)	TM254			✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓		✓		✓	✓	
	M251		✓						✓			✓	✓				✓		✓	✓	✓		✓

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6	D7
Level 3 (AOU)	T316	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓			✓	
	T318	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	
Level 6 (OU)	T321	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓				
	TM471	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1.4 WD Pathway

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	
Level 1 (AOU)	TM103	✓		✓											✓			✓	✓	✓	✓	✓	✓
	TM105	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓
Level 4 (OU)	MT131	✓	✓		✓			✓	✓					✓	✓					✓	✓	✓	✓
	MT132	✓	✓		✓			✓	✓					✓	✓					✓	✓	✓	✓
	M110	✓						✓					✓		✓			✓	✓	✓	✓		✓
	TM112			✓			✓						✓		✓			✓	✓	✓	✓		

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	
Level 2 (AOU)	M251	✓									✓	✓	✓	✓					✓	✓	✓	✓	✓
	TT284	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Level 5 (OU)	TM254	✓		✓	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓	✓	✓
	M252	✓		✓	✓	✓		✓	✓	✓		✓	✓	✓			✓		✓	✓	✓	✓	✓

Level	Study module/unit	Programme outcomes																					
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	
Level 3 (AOU)	TM352	✓		✓	✓		✓		✓	✓		✓	✓	✓	✓				✓	✓	✓		
	TM354	✓	✓	✓	✓			✓	✓		✓	✓		✓	✓	✓			✓	✓			
Level 6 (OU)	TM356	✓	✓		✓			✓	✓	✓	✓		✓	✓		✓			✓	✓			
	TM471	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1.5 CwB Pathway

Level	Study module/unit	Programme outcomes																				
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4	D5
Level 1 (AOU)	TM103	✓	✓			✓	✓			✓	✓				✓	✓	✓					✓
	TM105	✓	✓	✓	✓					✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
Level 4 (OU)	MT131	✓	✓		✓					✓	✓		✓		✓	✓			✓		✓	✓
	MT132	✓	✓		✓					✓	✓		✓		✓	✓			✓		✓	✓
	M110	✓		✓		✓	✓			✓	✓				✓		✓	✓	✓	✓	✓	✓
	BUS110	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Level	Study module/unit	Programme outcomes																				
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4	D5
Level 2 (AOU)	B207A	✓	✓				✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	✓	
	B207B	✓	✓				✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	✓	
Level 5 (OU)	M251			✓	✓					✓					✓			✓		✓	✓	✓
	TM254	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Level	Study module/unit	Programme outcomes																				
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4	D5
Level 3 (AOU)	BUS310	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	
	TM351	✓	✓	✓						✓	✓				✓		✓	✓	✓		✓	
Level 6 (OU)	TM354	✓	✓	✓						✓	✓				✓		✓	✓	✓	✓	✓	
	TM471	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

1.6 DS Pathway

Level	Study module/unit	Programme outcomes																						
		A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Level 1 (AOU)	M140	✓			✓			✓	✓	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	MT131	✓	✓	✓				✓			✓		✓			✓	✓			✓	✓	✓	✓	✓
Level 4 (OU)	MT132	✓	✓	✓				✓			✓		✓			✓	✓			✓	✓	✓	✓	✓
	M110	✓		✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓			✓		✓		✓
	TM112			✓		✓	✓						✓					✓		✓	✓			✓

Level	Study module/unit	Programme outcomes																						
		A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Level 2 (AOU)	MT248	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	✓	✓	✓	
	M269			✓	✓			✓			✓			✓	✓		✓	✓		✓			✓	✓
Level 5 (OU)	MST224	✓	✓	✓				✓			✓		✓			✓		✓		✓	✓	✓	✓	✓
	MT249	✓		✓	✓			✓	✓	✓			✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
	M218			✓	✓		✓				✓	✓	✓		✓	✓	✓			✓	✓	✓	✓	✓
	M238	✓		✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓		✓	✓	✓		✓

Level	Study module/unit	Programme outcomes																						
		A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Level 3 (AOU)	TM348	✓			✓			✓	✓	✓			✓	✓	✓			✓		✓	✓	✓	✓	✓
	TM358	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓		✓		✓		✓
Level 6 (OU)	TM351	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
	TM471	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1.7 CyS Pathway

Level	Study module/unit	Programme outcomes																		
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5
Level 1 (AOU) = Level 4 (OU)	TM112	✓			✓		✓						✓	✓	✓		✓	✓	✓	✓
	MT131	✓	✓	✓				✓	✓				✓		✓	✓		✓	✓	
	MT132	✓	✓	✓			✓	✓	✓				✓		✓	✓		✓	✓	
	TM129	✓			✓		✓								✓	✓		✓	✓	✓
	M110			✓					✓					✓		✓	✓	✓	✓	

Level	Study module/unit	Programme outcomes																		
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5
Level 2 (AOU) = Level 5 (OU)	TT284	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓	✓		✓	✓		✓
	T216A	✓						✓					✓		✓			✓		
Level 5 (OU)	T216B		✓				✓					✓				✓				
	TM256		✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓			✓	✓	✓

Level	Study module/unit	Programme outcomes																		
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5
Level 3 (AOU) = Level 6 (OU)	TM311		✓	✓		✓	✓		✓		✓	✓	✓	✓		✓		✓		
	TM359		✓	✓		✓	✓	✓	✓			✓	✓	✓		✓	✓	✓		
Level 6 (OU)	TM318	✓	✓	✓			✓		✓	✓	✓		✓	✓	✓	✓		✓		
	TM471	✓	✓				✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	

1.8 AI Pathway

Level	Study module/unit	Programme outcomes																		
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4
Level 1 (AOU) = Level 4 (OU)	TM112		✓			✓		✓							✓	✓		✓	✓	✓
	MT131	✓	✓	✓			✓	✓		✓			✓				✓	✓		✓
	MT132	✓	✓	✓			✓	✓		✓			✓				✓	✓		✓
	TM103		✓			✓		✓								✓	✓	✓	✓	
	M110		✓		✓			✓				✓			✓	✓		✓	✓	✓
	MT141	✓		✓	✓		✓	✓	✓			✓		✓	✓	✓	✓	✓		✓

Level	Study module/unit	Programme outcomes																		
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4
Level 2 (AOU) = Level 5 (OU)	M269	✓	✓		✓		✓	✓	✓			✓	✓	✓	✓			✓	✓	
	TM270			✓	✓		✓	✓		✓		✓	✓			✓	✓	✓	✓	✓
	TM271			✓	✓	✓	✓	✓	✓			✓	✓	✓			✓	✓	✓	✓
	TM275	✓	✓	✓			✓	✓				✓				✓		✓		✓
	TM276		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓

Level	Study module/unit	Programme outcomes																		
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4
Level 3 (AOU) = Level 6 (OU)	TM351	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	✓		✓
	TM340	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Level 6 (OU)	TM341	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	TM471	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Annexe 2: Notes on completing programme specification templates

- 1 - This programme specification should be mapped against the learning outcomes detailed in module specifications.
- 2 – The expectations regarding student achievement and attributes described by the learning outcome in section 3 must be appropriate to the level of the award within the **QAA frameworks for HE qualifications**: <https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf>
- 3 – Learning outcomes must also reflect the detailed statements of graduate attributes set out in **QAA subject benchmark statements** that are relevant to the programme/award: [subject-benchmark-statement.pdf](https://www.qaa.ac.uk/docs/qaa/quality-code/subject-benchmark-statements.pdf).
- 4 – In section 3, the learning and teaching methods deployed should enable the achievement of the full range of intended learning outcomes. Similarly, the choice of assessment methods in section 3 should enable students to demonstrate the achievement of related learning outcomes. Overall, assessment should cover the full range of learning outcomes.
- 5 - Where the programme contains validated **exit awards** (e.g. CertHE, DipHE, PGDip), learning outcomes must be clearly specified for each award.
- 6 - For programmes with distinctive study **routes or pathways** the specific rationale and learning outcomes for each route must be provided.
- 7 – Validated programmes delivered in **languages other than English** must have programme specifications both in English and the language of delivery.