



UNIVERSITY  
of  
TECHNOLOGY,  
MAURITIUS

**School of Innovative Technologies and Engineering**  
**Department of Business Informatics and Software Engineering**

## BSc (Hons) Web Technologies

PROGRAMME DOCUMENT

*Version 4.0*  
*BWT v 4.0*  
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**University of Technology, Mauritius**

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**A. PROGRAMME INFORMATION**

This programme aims at producing graduates with a view to further develop our Information Technology industry in Mauritius, thus increasing our capacity to export Information Technology services. It focuses on web development since computer applications increasingly rely on the use of the internet and web technologies. There is a growing need in the country for graduates with skills geared towards developing, deploying and maintaining such applications.

The programme targets students with a higher school certificate and professionals already working in the IT sector and willing to specialise in the field of web technologies.

Students will have to undergo a work placement in the second semester of level 3 so as to obtain a greater understanding of the practical applications of elements learned in the courses and to gain experience in a workplace industrial environment.

This programme is designed to prepare students for professions and careers in the software and web applications development industry.

**B. PROGRAMME AIMS**

The BSc (Hons) Web Technologies aims at providing specialised skills for those wishing to become a specialist in the design and development of computing applications for the web and related technologies. Students will also have hands-on experience in all areas of web development from design, programming, media and enterprise.

The programme starts with a broad coverage of basic technical topics in level one. However, as from level 2, the student focusses on more advanced specialised topics. Those specialised subject areas will ensure that the student receives a deeper practical exposure to various latest technologies thus helping to bridge the gap between university output and corporate requirements.

Students graduating from this programme are expected to take employment as web developers, web designers, mobile application developers, web application architects, web masters and web server administrators amongst others. Students will also have the necessary skills to opt for more general IT positions. The programme has also been designed to cater for students willing to launch their own business in the web technologies sector.

## C. PROGRAMME OBJECTIVES

After successful completion of the programme, the graduates should:

- have a solid foundation in computing for web development
- gain in-depth knowledge in programming in latest web technologies.
- be skilled in designing and developing web-centric software.
- have acquired a broad understanding of security measures for web servers
- be conversant with development of mobile-based application
- manage web-based software development projects.
- understand the core aspect of emerging technologies

## **PART I - Regulations**

### **D. GENERAL ENTRY REQUIREMENTS**

As per UTM'S Admission Regulations, and 'Admission to Programmes of Study at First Degree Level' or APL / APEL requirements.

### **E. PROGRAMME ENTRY REQUIREMENTS**

As per General Entry requirements.

### **F. PROGRAMME MODE AND DURATION**

Full Time: Minimum 3 Years, Maximum 6 Years (Minimum 6 Semesters, Maximum 12 Semesters)

Part Time: Minimum 4 Years, Maximum 7 Years (Minimum 8 Semesters, Maximum 14 Semesters)

### **G. TEACHING AND LEARNING STRATEGIES**

- Lectures, Tutorials and Practical Laboratory Sessions;
- Class Tests and Assignments;
- Structured Discussions and Self-Directed Study;
- Workshops and Seminars;
- Case Study of real world problems;
- Work Placement (full time mode only).
- Mini Project (part time mode only).

### **H. STUDENT SUPPORT AND GUIDANCE**

Each cohort of the programme is allocated a Programme Coordinator who acts as a liaison between the students and school management and provides support for academic management of the programme.

### **I. ATTENDANCE REQUIREMENTS**

As per UTM's Regulations and Policy.

## J. CREDIT SYSTEM

For the award of a Certificate, 35 credits are required.

For the award of a Diploma, 70 credits are required.

For the award of an Ordinary Degree, a minimum of 96 credits are required.

For the award of a Honours Degree, 105 credits are required.

## K. STUDENT PROGRESS AND ASSESSMENT

For the award of an honours degree, all modules must be passed overall with passes in the examinations, coursework and other forms of assessment. To clear a module, students must secure at least 40% overall.

The programme is delivered mainly through lectures, tutorials, and practical laboratory sessions. Each module carries 100 marks and unless otherwise specified will be assessed as follows:

- Written and/or practical examination, and continuous assessment carrying up to 50% of total marks.
- Continuous assessment can be based on a combination of assignments, workshops, practical and class tests.
- Seminars are evaluated on continuous assessment only. Each seminar must consist of a **minimum of two** assessments.
- Modules which are evaluated on continuous assessment only (100% coursework) must consist of a **minimum of three assessments, inclusive of one class test**. The following list of modules are evaluated by continuous assessment only: Language & Communication Seminar, Management Seminar, Service Oriented Architecture Essentials, Mobile Web Application Development, Enterprise Web Application, Native Mobile Application Development and Emerging Web Technologies.
- The system development project will carry 300 marks (9 credits).

### Module grading structure:

Grade	Marks x (%)
A	$70 \leq x \leq 100$
B	$60 \leq x < 70$
C	$50 \leq x < 60$
D	$40 \leq x < 50$
F	$x < 40$
A-D	Pass
F	Fail

### L. EVALUATION OF PERFORMANCE

1. The % mark at Level 1 contributes a 20% weighting towards the degree classification.
2. The % mark at Level 2 contributes a 30% weighting towards the degree classification.
3. The % mark at Level 3 contributes a 50% weighting towards the degree classification.

### M. AWARD CLASSIFICATION

Overall weighted mark y (%)	Classification
$70 \leq y \leq 100$	1 <sup>st</sup> Class Honours
$60 \leq y < 70$	2 <sup>nd</sup> Class 1 <sup>st</sup> Division Honours
$50 \leq y < 60$	2 <sup>nd</sup> Class 2 <sup>nd</sup> Division Honours
$45 \leq y < 50$	3 <sup>rd</sup> Class Honours
$40 \leq y < 45$	Pass Degree
$y < 40$	No Award

### N. PROGRAMME ORGANISATION AND MANAGEMENT

Programme Director: Mr. P. Kanaksabee

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## PART II -Programme Structure

### O. BSc (Hons) WEB TECHNOLOGIES – FULL TIME (version 4.0)

YEAR 1 (Level 1)							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L+T/P	Credits	Code	Modules	Hrs/Wk L+T/P	Credits
CAN1104C	Networking Essentials	2+1	3	PROG1119C	Object Oriented Software Development	2+2	4
PROG1101C	Programming Concepts	2+2	4	WAT1120C	Web Scripting	2+2	4
MATH1103C	Decision Mathematics	2+1	3	OSS1112C	Operating System Concepts	2+1	3
WAT1119C	Web Design and Development	2+2	4	DBT1101C	Database Management Systems	2+2	4
ITE1107C	Language & Communication Seminar	2+1	3	MGMT1101C	Management Seminar	2+1	3

YEAR 2 (Level 2)							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L+T/P	Credits	Code	Modules	Hrs/Wk L+T/P	Credits
WAT2108C	Open Source Web Technologies	2+2	4	WAT2109C	Service Oriented Architecture Essentials	2+2	4
SECU2121C	Web Application Security	2+2	4	DBT2105C	Advanced Web Database Management Systems	2+2	4
MULT2116C	Games and Interactive Systems	2+2	4	SEM2121C	Agile Project Management	2+1	3
WAT2107C	Web Server Administration	2+2	4	WAT2129C	Mobile Web Application Development	2+2	4
SDT2102C	Analysis and Design	2+2	4				

YEAR 3 (Level 3)							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L+T/P	Credits	Code	Modules	Hrs/Wk L+T/P	Credits
COMP2111C	Data Analytics for the web	2+1	3	WAT3125C	Emerging Web Technologies	2+2	4
WAT2121C	Enterprise Web Application	2+2	4	UTM2101C	Life Skills & Good Practices	2+2	4
MCT2106C	Native Mobile Application Development	2+2	4				
ENTR3115C	Entrepreneurship and Ecommerce	2+1	3	PROJ2119C	Work Placement		4
PROJ3105C	System Development Project						9

**P. BSc (Hons) WEB TECHNOLOGIES – PART TIME (version 4.0)**

YEAR 1							
→ Start of Level 1							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L+T/P	Credits	Code	Modules	Hrs/Wk L+T/P	Credits
CAN1104C	Networking Essentials	2+1	3	ITE1107C	Language & Communication Seminar	2+1	3
PROG1101C	Programming Concepts	2+2	4	PROG1119C	Object Oriented Software Development	2+2	4
MATH1103C	Decision Mathematics	2+1	3	WAT1120C	Web Scripting	2+2	4
WAT1119C	Web Design and Development	2+2	4				

YEAR 2							
→ Start of Level 2							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L+T/P	Credits	Code	Modules	Hrs/Wk L+T/P	Credits
OSS1112C	Operating System Concepts	2+1	3	WAT2108C	Open Source Web Technologies	2+2	4
DBT1101C	Database Management Systems	2+2	4	SECU2121C	Web Application Security	2+2	4
MGMT1101C	Management Seminar	2+1	3	MULT2116C	Games and Interactive Systems	2+2	4
End of Level 1 →							

YEAR 3							
Semester 1				Semester 2			
Code	Modules	Hrs/Wk L+T/P	Credits	Code	Modules	Hrs/Wk L+T/P	Credits
WAT2107C	Web Server Administration	2+2	4	DBT2105C	Advanced Web Database Management Systems	2+2	4
SDT2102C	Analysis and Design	2+2	4	SEM2121C	Agile Project Management	2+1	3
WAT2109C	Service Oriented Architecture Essentials	2+2	4	WAT2129C	Mobile Web Application Development	2+2	4
End of Level 2 →							

YEAR 4								
→ Start of Level 3								
Semester 1				Semester 2				
Code	Modules	Hrs/Wk L+T/P	Credits	Code	Modules	Hrs/Wk L+T/P	Credits	
COMP2111C	Data Analytics for the web	2+1	3	WAT3125C	Emerging Web Technologies	2+2	4	
WAT2121C	Enterprise Web Application	2+2	4	ENTR3115C	Entrepreneurship and Ecommerce	2+1	3	
MCT2106C	Native Mobile Application Development	2+2	4	UTM2101C	Life Skills & Good Practices	2+2	4	
				PROJ2118C	Mini Project		4	
PROJ3105C	System Development Project							9
End of Level 3 →								



## **PART III**

### **Module Outline**

#### **CAN 1104C: NETWORKING ESSENTIALS**

Physical/logical LAN topologies. Communication devices and technologies used in LAN. LAN extension: repeaters and bridges. Switched LAN. WAN. Communication devices and technologies used in LAN. TCP/IP and LAN/WAN interconnection. The Internet as the single global network of networks. LAN interconnection through WAN: Routing, VLAN, VPN, RAS and tunnelling. Mobile networking. LAN/WAN standards.

#### **PROG 1101C: PROGRAMMING CONCEPTS**

This module introduces the basic programming concepts using a problem solving approach. Writing Algorithms. Definition of Source Code & Compiler. Integrated Development Environments (IDEs). Data types & Variables. Conditional Statements. Arrays. Loops. Basic Input and Output System. Functions/Methods: definition, passing parameters/arguments, return types. Calling Methods.

#### **MATH 1103C – DECISION MATHEMATICS**

Digital Systems: number systems and codes, digital arithmetic operations, boolean algebra & logic gates and combinational logic circuits. Linear Programming Involving Two Variables: formulation, graphical solution, feasible and optimal solutions and integer-valued problems. Sets: set operations & identities and computer representation of sets. Functions. Probability: axioms of probability, discrete & continuous random variables, probability density function & cumulative distribution function and expectation & variance.

#### **WAT 1119C: WEB DESIGN AND DEVELOPMENT**

Basics of web design. Site development processes. Design principles; page layout navigation. Managing Templates and content. Typography, Visual Elements and graphics. Site management; directory structure; versioning. Testing and publishing. Browser and platform compatibility. Web accessibility issues. Usability Principles . Interface analysis and design. Responsive Web Design.

#### **ITE 1107C: LANGUAGE AND COMMUNICATION SEMINAR**

Review of grammar and punctuation. Prepare curriculum vitae. Write job applications, business letters and reports (in an ICT context). Formal writing using electronic media. Description of communication process. Barriers to communication. Oral communication: prepare for job interviews, carry out presentations on a theme, organise and participate in meetings. Electronic communication: emails, websites & social media.

#### **PROG1119C: OBJECT ORIENTED SOFTWARE DEVELOPMENT**

Introduction to object programming paradigm. Object & Class Concepts. Inheritance. Interface and Polymorphism. Casting. Collection Classes. Exception Handling. Streams & File Manipulation.

### **WAT 1120C: WEB SCRIPTING**

Control Structures. Functions. Data types, constants, and operators. Variables lifetime and scope visibility. Scripting objects. Browser objects. Object-based Programming. Graphical User Interface Components. Exception Handling. String manipulation. Code Reuse. DOM. Events. JQuery. Animation. Form validation. Working with libraries.

### **OSS 1112C: OPERATING SYSTEM CONCEPTS**

Evolution of Operating Systems. Overview of Computer System Structure. Building blocks of modern operating systems Process management, synchronisation, deadlocks. Threading & parallel processing. Memory management. Virtual Memory management. File management system. Input/Output.

### **DBT 1101C: DATABASE MANAGEMENT SYSTEMS**

Introduction to Databases. Database Environment. Database Architecture. The Relational Model. Relational Integrity Entity Relationship Modelling. Normalisation. SQL. Relational Algebra. (The Practical component includes: Microsoft Access & Select SSADM).

### **MGMT 1101C: MANAGEMENT SEMINAR**

Development of the firm. Management functions: planning, organising, staffing, directing, controlling, co-ordinating. Organisation structure. Change & innovation management. Human resource management process. Intellectual property rights – copyright and patents. Electronic transactions. Computer misuse. Data protection and privacy.

### **WAT 2108C: OPEN SOURCE WEB TECHNOLOGIES**

PHP / JSP. MySql. Apache Server. Interfacing between open source server side web applications and open source databases. Handling Form submissions and Validations. String Manipulation. Authentication. Error Handling. File Systems. Content Management Systems.

### **SECU 2121C: WEB APPLICATION SECURITY**

Security concepts (Anatomy of security attacks; malware; firewalls; intrusion detection systems). Using cryptography for securing web applications and data (symmetric, public key cryptography, digital signatures, digital certificates, access control). Security protocols such as SSL, VISA 3D-Secure, MasterCard SPA for e-commerce. Buffer overflow. SQL Injection attacks and prevention. Authentication of Users and secure session management. Same origin Policy security – browsers. Cross site request forgery (XSRF) attacks. Cross site scripting (XSS) attacks.

### **MULT 2116C: GAMES AND INTERACTIVE SYSTEMS**

Conventions of traditional and computer-based games. Multimedia technologies in 2D & 3D graphics modelling, animation and sound. Games development scripting tools and environments; Accessing libraries. Visual communication Animation with SVG and Canvas. Emerging techniques in games design and development. Psychology of Gaming.

### **WAT 2107C: WEB SERVER ADMINISTRATION**

Installation and configuration of Web Servers. Security Aspects. Deployment of Web Pages. IIS / Apache / Tomcat. JRUN. Maintenance and monitoring of Web Servers.

### **SDT2102C: ANALYSIS & DESIGN**

Large Scale Software Development. Methodologies. The RUP. UML. Requirements Modelling. Design Modelling. Implementation Models. Testing techniques. Importance of Modelling.

### **WAT 2109C: SERVICE ORIENTED ARCHITECTURE ESSENTIALS**

XML, DOM, XSL and XSLT. Service Oriented Architecture. Web Services using Microsoft technologies. Java Support for Web Services. SOAP, JAXP.

### **DBT 2105C: ADVANCED WEB DATABASE MANAGEMENT SYSTEMS**

Pre-requisites – The student should be familiar with data processing concepts and techniques. The student should be able to develop an ERD, be able to normalize tables and be conversant with relational algebra and SQL. Performance Tuning techniques. At the end of this course, a student should be able to design and develop a database application using tools such as Oracle 9i, My SQL, PostgreSQL and Informix.

### **SEM 2121C: AGILE PROJECT MANAGEMENT**

Agile movement. Agile Values. Agile methodologies. Business Case. Roll-wave planning. Software estimation. User stories. Managing self-organising teams. Project Monitoring. Project Termination & Closure.

### **WAT 2129C: MOBILE WEB APPLICATION DEVELOPMENT**

Introduction to the Mobile Web. Types of Mobile Web Applications. Mobile Website Architecture & Design. Progressive enhancement technique. Geolocation, Maps & Device Motion. Working with Client Side Storage. Working with Canvas. Mobile Web Scripting (jQuery Mobile). Mobile Web Interface Design.

### **COMP 2111C: DATA ANALYTICS FOR THE WEB**

Data representation and preprocessing. Mining association rules and sequential patterns. Classification and Naive Bayes. Clustering. Partially supervised learning. Information retrieval and web search. Social network analysis. Web data extraction. Information integration. Opinion mining and sentiment analysis. Recommender systems and collaborative filtering.

### **WAT 2121C: ENTERPRISE WEB APPLICATION**

Overview of Web Servers. Introduction to MVC Framework. The Request Life Cycle. Creating a Data Repository; Controlling ViewState. Validating User Input. Debugging; Processing Unhandled Exceptions; Configuring Authentication. Code-Behind Files; Control Events and Page Events; Creating Classes & Components. ADO.NET. Ajax Toolkit. Design & implement data models, databases & data bound classes.

### **MCT 2106C: NATIVE MOBILE APPLICATION DEVELOPMENT**

Principles of Wireless Networks. Introduction to Native mobile application development with Android. Overview of the IDE (Eclipse for Android) and Platform. Interface Design: Layout and Views. Logic Design. Working with the Context and Intents and Activities. Local & Remote Data Access. Android APIs & Sensors (accelerometer, GPS, Camera).

### **ENTR 3115C: ENTREPRENEURSHIP AND ECOMMERCE**

The Nature of Entrepreneurship and its Foundations . The Vital Role of Entrepreneurship in the Economy. Understanding the entrepreneur: “Who” is the Entrepreneur?. Understanding the Nature of Opportunity. Evaluating Opportunity. Ethical Issues and the Entrepreneur. Innovation, Technology and the Entrepreneur. Expectations About Size, Growth, Returns and Risk. Financing a New Venture and the Economics of Start-up Ventures. Valuation and Deal Structure. Marketing, Strategy, and the Entrepreneur. Ecommerce and marketing. Demonstration of creative acumen, self management and self-development skills.

### **WAT 3125C: EMERGING WEB TECHNOLOGIES**

Semantic Web. Web 2.0 Concept. Overview of Social Networks, Blogs and Wikis, RSS. Overview of Web Application Programming Interfaces (APIs). Use open development platform/language (PHP/Python/JSP). Developing Web APIs. Design and implementing application for the social web. Developing Web application with Ajax, JQuery. Integrating Web applications with Web APIs using Ajax. Virtualisation. Cloud Computing Concept. Developing Applications for the Cloud.

### **UTM2101C: LIFE SKILLS & GOOD PRACTICES**

Employability development skills. Good Governance. Prevention of corruption. Personal development skills and role of youth in addressing societal challenges. Coping skills. Addressing Societal Challenges including Substance Abuse, Poverty, Climate Change, Social Media and Family problems.

### **PROJ 3105C: SYSTEM DEVELOPMENT PROJECT**

Run a full-fledge software development project: from concept, through logical modelling and up to physical implementation. Demonstration of core competencies acquired during the degree.

### **PROJ 2119C: WORK PLACEMENT**

Placement at company. On-site duties. Reporting to Supervisor.

### **PROJ2118C: MINI PROJECT**

Students will be required to work out the analysis & design of a real-world scenario and come up with appropriate design models using case-tools. The teaching strategy will be 45 hours of face-to-face contact hours over one semester.