



**Level 7
Postgraduate Diploma in
Information Technology**

**Qualification Specification
2017/18**

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AIMS AND OBJECTIVES

EBMA Level 7 Postgraduate Diploma in Information Technology is a postgraduate qualification designed for experienced practitioners to acquire skills, knowledge and expertise in information technology and to develop solutions to information systems, mobile communications, programming, system management and security, robotics and automation, website design and database systems. This qualification will prepare learners for the intellectual, analytical and practical challenge of a career in Information Technology.

At the end of this qualification, learners will be able to:-

- Understand approaches to gather requirements for systems development.
- Compare methodologies for use in the organisation using standardised framework of system development.
- Understand the rationale of system development to prepare more relevant system.
- Understand and apply the principles of secure, effective communication over networks including mobile elements.
- Understand the issues introduced by ad-hoc networking.
- Design applications for mobile devices including use of wireless communication.
- Apply the basic data structures and algorithms to evaluate their appropriateness and limitations for a range of moderately complex problems.
- Evaluate the strengths and weaknesses of current software engineering methods and techniques.
- Choose an appropriate metrics to measure software quality and quantity in modern software engineering environment.
- Critically evaluate current methodologies and techniques for managing computer systems infrastructures, development and operations and their applicability.
- Understand the skills in managing user and technical aspects of computer systems.
- Create a security strategy that protects a system from possible security and treats to the hardware, software, data and the continuous operation of the system.
- Appreciate basis concept of automation and to understand geometries of industrial manipulators.
- Design the architectures of autonomous guided vehicles (AGVs).
- Critically explore the applications and implications of industrial automation.
- Explain fundamental web design concepts.
- Develop a web based project for a small scale case study.
- Design and develop visual elements for a web based project.
- Critically analyse and evaluate the results of a research task related to issues in current and/or future web development.
- Develop an enterprise data model that reflects the organisation's fundamental business rules.
- Develop and refine the conceptual data model, including all entities, relationships, attributes, and business rules.
- Identify data integrity and security requirements.
- Utilise prototyping as a rapid application development (RAD) method to implement a PC database (e.g., Microsoft Access® for the PC).

QUALITIES AND SKILLS

Postgraduate Diploma in Information Technology provides following qualities and skills to learners,

Cognitive:

- Critical analysis
- Conceptualisation
- Synthesis and integration
- Originality
- Intellectual inquisitiveness
- Innovation
- vision

Personal and Social:

- Knowledge and self-development
- Motive self and others
- Work with others and networking opportunities
- Respect others' views
- Negotiate
- Decision making
- Change management
- Ethical skills

Practical:

- Research development at an advanced level
- Professional research skills
- Analyse, evaluate and make judgements
- Advanced consultancy skills and to provide solutions to others based on professional research
- Systems development, programming and analysis
- Built conceptual models
- Construction of theories
- Testing theories and models
- Managing project
- Make original contribution to the sector

COURSE STRUCTURE

The overall structure of the course is based on 6 mandatory modules that cover a number of topics relating to learning outcomes. Each unit has the equivalency of 20 credits. Learners will be invited to attend lectures and workshops that will introduce the subject matter.

Learners must complete all units successfully and achieve 120 credits before the Diploma can be issued. Total Qualification Time (TQT) to complete the full qualification is 1200 hours. While, Guided Learning Hours (GLH) refers to the amount of study undertaken by learners under the direction of their tutors and it includes tutorials, seminars, workshops, directed research, project or assignment.

It is expected that a learner will need to complete following TQT against each unit to complete six units to achieve the full Level 7 Postgraduate Diploma in Information Technology.

Unit Code	Unit Title	TQT	Credits
EBMA310	Information Systems Methodologies	200	20
EBMA320	Mobile Communications and Programming	200	20
EBMA330	Advanced Software Engineering	200	20
EBMA340	System Management and Security	200	20
EBMA350	Robotics and Automation	200	20
EBMA360	Database Systems and Applications	200	20

ENTRY REQUIREMENT

The Qualifications have been designed to be accessible without artificial barriers that restrict access and progression. Entry to the Qualifications will be through centre interview and the candidates will be expected to hold the following:

- Learners who possess Qualifications at Level 6 and/or;
- Learners who have work experience in the business sector and demonstrate ambition with clear career goals;

In certain circumstances, students with considerable experience but no formal Qualifications may be considered, subject to interview and being able to demonstrate their ability to cope with the demands of the programme.

REQUIREMENTS FOR THE LEARNER – REGISTRATION

Registration is a process where a learner intends to complete units towards the achievement of qualification. We look forward to welcoming you as a registered student of our qualification.

It is your responsibility to ensure that you are a 'registered candidate'.


Who are registered candidates?

You are a registered candidate only if:-

- EBMA allocates you a unique registration number, And
- your registration information is verifiable online.

How to become a registered candidate?

If you are not a registered candidate, you should consider yourself as 'High Risk' category learner with lots of disadvantages as compared to Registered Candidate. Therefore, you should register yourself as soon as possible by submitting Registration Form and supporting documents to EBMA. Follow simple steps:-

- Download  [Learner Registration Form](#)
- Complete all sections and submit to info@ebma.org.uk

Can I get registration via my study centre?

Yes, your centre is fully authorised to register you with EBMA. However, it is your responsibility to ensure that you are a registered candidate and your registration details are verified online.

When to Register?

You can register yourself before starting EBMA course with approved centre or during your study with approved centre. If you delay your registration, you may pay an extra fee to register yourself with EBMA or we may not accept your registration.

Register Online

You can register Online by visiting the page
<http://www.ebma.org.uk/apply-for-registration.html>

REQUIREMENTS FOR THE CENTRE

Resources

Centres should provide following resources to learners:

- Study resources to learners e.g. Journals, Articles, EBooks, and Study Handbooks.
- Suitable premises or online learning, teaching and assessing platform
- Career guidance and advice.

Head of the Centre Roles and Responsibilities

This section gives details of the requirements and responsibilities of each role involved in the assessment and examination process. You will need to identify suitable member of staff to fill each role described below:-

- The head of centre is the person responsible for ensuring that the overall management of the centre including services, reputation, and maintaining the quality assurance standards of qualifications and assessments.
- Head of centre must have a secure email address to login to web-portal and for all correspondence with .
- Head of the centre is responsible to ensure that the centre will demonstrate its on-going fulfilment of the centre recognition criteria over time and across all qualifications. Centres will be given the opportunity to present evidence of the on-going suitability and deployment of their processes and systems to carry out the required functions as per centre agreement. The centre agreement clearly explains the centre role to maintain compliance with centre agreement.
- In the case of suspected malpractice or maladministration, the head of centre must report incident to at the earliest opportunity all suspicions or actual incidents of malpractice.

Centre Contact / Coordinator Roles and Responsibilities

The Centre coordinator is responsible for ensuring that the management, administration and quality assurance systems for all qualifications and assessments are properly maintained throughout the centre and that communication between and centre is efficient and effective. Centre coordinator must have a secure email address to login to web-portal and for all correspondence with . Centre coordinator must inform about any changes within the Centre.

The person undertaking this role:-

- Have relevant experience and expertise in assessment management and quality assurance;
- Possess the necessary authority and time to ensure that management, assessment, administration and internal quality assurance procedures are implanted correctly and consistently across the centre;
- Have a regular contact with teachers, assessors and internal moderators;
- Liaise closely with staff members within the centre to provide guidance and instructions provided by ;
- Inform for any risk that could have an adverse effect in the delivery of qualifications and assessments;
- Register learners with in accordance with registration policy;
- Ensuring invoices are paid within agreed terms;

- Ensuring centre staff attend standardisation events and participate in Continuous professional development trainings.
- Sufficient and effective support is available to centre staff (e.g. teachers, assessors and moderators) for the confirmation of decisions of assessors and internal moderation;
- Ensuring appropriate record is maintained within the centre to comply with centre agreement and to facilitate on-going awarding organisation visits.
- Ensuring security arrangements for confidential information are accordance with security policy.
- Ensure administration of assignments are accordance with instructions for coursework;
- Ensure certificates issued by are securely stored prior to issue to learners;
- Ensure all general correspondence with is disseminated promptly to all relevant people within the centre.

Internal Quality Assurer (IQA) Roles and requirements

Internal Quality Assurers must have a secure email address to login to web-portal and for all correspondence with .

Internal Quality Assurers will monitor assessment activities and provide feedback to assessors, coordinate standardisation and provide guidance to assessors.

Internal moderators are expected to provide appropriate feedback to assessors whether unit assessed are:

- **Authentic**:- the work is learner’s own work;
- **Valid**: the evidence meets all assessment criteria and all learning outcomes;
- **Reliable**: evidence is consistent and generates outcomes that would be replicated were the assessment repeated;
- **Current**: up to date evidence is used;
- **Sufficient**: enough work is available to justify credit value and to enable assessors to make a consistent and reliable judgements about learner’s achievement;
- **Comparable**: evidence is comparable in standard between assessments within a unit or qualification, between learners of the same level, between different assessors, site/centres and comparable over time;
- **Manageable**: the assessment places reasonable demands on learners;
- **Fair and minimises bias**: assessments are fair to all learners irrespective of their characteristics (age, gender, race etc.).

Internal moderators must meet the following requirements –

- Demonstrate sufficient and current understanding of the qualifications to be internal moderated, and know how they are applied in the relevant sector area(s) concerned, to the satisfaction of . Moderators must demonstrate occupational competence in all the mandatory units and a significant proportion of the optional units in qualifications.
- Internal moderators must have one of the following qualifications:-
 - D34/V1
 - Level 4 Award in the Internal Quality Assurance of Assessment Process and Practice
 - Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice.
- Demonstrate their continuing professional development to ensure they are up to date with moderation practices in their sector and developments in the qualifications they moderate/verify.

- Have a thorough understanding of the National Occupational Standards for the qualification at the unit(s)/level(s) they are moderating.

Assessors' Roles and Requirements

- The primary role of assessors is to assess learners' performance and/or related knowledge in a range of tasks and to ensure that their competence/knowledge demonstrated meet the requirements of standards.
- Assessors must have a secure email address to login web-portal.
- Assessors must have following occupational competence –
 - Provide current evidence of competence, knowledge and understanding in the areas to be assessed, to the satisfaction of . This will normally be achieved through demonstrating competence in the role which is to be assessed, which may be recorded in organisation training records. Alternatively, this can be demonstrated by relevant experience and continuing professional development which may include achievement of qualifications relevant to the areas being assessed.
 - They must have an accredited assessor qualification e.g. A1, D32 and/or D33 or related qualification in assessment that has been mapped to the national occupational standards for assessment.
 - Demonstrate their continuing professional development to ensure they are up to date with assessment practices in their sector area of expertise and developments in qualifications they assess.
 - Have full and current understanding of the units of assessment and requirements of the qualifications being assessed.

Assessing Learners' Evidence

- The Assessor will make valid assessment judgement on learners' work according to the expectations from a learner for the assessment at a particular level. Assessors will record their judgements using the **Unit Assessment Form**.
- Each unit is made of learning outcomes and assessment criteria. The centre will apply a range of assessment methods to require the learner to produce the evidence to meet all assessment criteria in a unit. Once the learner will produce evidence, the Assessors will make judgements that learner has fully achieved/not achieved (on the basis of Pass/Fail criteria) the expected assessment standard specified by the assessment criteria related to the learning outcomes in a unit of 's qualification.
- To assess the learners' work, the Assessor must make valid assessment judgement that the learners meet/not meet the expected assessment standard specified by the assessment criteria related to the learning outcomes at the Postgraduate level. Such expectations from learners for assessment will be based on the learner's following demonstration as specified in the Postgraduate Level Descriptor:-
 - Research
 - Focus on the assessment task to achieve Learning Outcomes
 - Use of Literature
 - Subject Knowledge and Understanding
 - Analysis, Argument and Reflection
 - Clarity of Expression and Academic Style
 - Integration of Theory and Practice
 - Organisation and Presentation

- Personal and Professional development

Postgraduate level Descriptor

At this level, EBMA expects assessors' judgement must be based on the learner's following demonstration:-

Knowledge (where the learner can)	Understand different theoretical and methodological perspectives and how they affect the area of study or work. Demonstrate an understanding of specialised knowledge on the basis of original thinking and/or research and/or critically analyse, interpret and evaluate complex information, concepts, ideas and theories to produce modified conceptions.
Skills (where the learner can)	Be critical, innovative and highly specialised in problem solving skills to develop new knowledge and procedures and to integrate knowledge from different fields
Competence (where the learner can)	Be highly specialised in management techniques, tools, tasks, processes and approaches and capable of leading and managing complex, unpredictable data and information, where relevant, proficient to manage for the work and roles of others.

Teachers' Roles and Responsibilities

Teacher roles are to prepare learners for the assessment for a qualification, engage learners with classroom and group discussion or presentation, and motivate them.

Teachers are responsible for ensuring that:-

- They are qualified to deliver units/qualification.
- They have teaching related qualification.
- Obtain guidance, feedback and support from to provide extra ordinary guidance to learners.
- Visit centre portal on daily basis to see any instructions, and to obtain any guidance or support for effective delivery of qualifications.
- Plan the delivery of unit/qualification to meet the needs of learners and syllabus outcome.
- Design lecture and use information technology tools in the development of slides, notes or handouts.
- Provide guidance to learners about the assessment of units/qualification.
- Be familiar with the centre policies and procedures.
- Do not discriminate learners during centre internal assessment or marking of assignment.
- Make sure that learners' performance is updated in learner logbook accurately and fairly.
- Liaise with centre assessors and internal moderator to ensure that learners' assessment meets the requirements of and to provide constructive and supportive feedback to learners so that they meet the assessment standards.
- Prepare lesson plan and scheme of work to ensure that relevant topics are covered while teaching learners.
- Make sure that learners are aware about the reasonable adjustment or special consideration policies and procedures that they will not be given any disadvantage during their assessment.
- Encourage learners to register with on time.
- Do not perform malpractice or maladministration activity within centre which can create risk for qualifications.
- Attend meeting of teachers or assessors within centre and provide feedback to .
- Provide feedback to about units/qualification.
- Do not discriminate learners and provide equal opportunity to all learners during your teaching activities within the centre.
- Report any malpractice or maladministration activity going on within the centre to .
- Attend training sessions/programmes provided by for your continuous professional development.
- Liaise with centre staff (i.e. head of centre) for resources for the delivery of units/qualifications.

Teachers' Requirements

We expect teachers to be *occupational competence* to teach qualifications.

Teachers must hold qualification and training:-

- A postgraduate degree in a relevant subject sector (or equivalent)
- Membership of a relevant professional body or relevant teaching qualification.

Teachers must hold following experience:-

- Must have suitable expertise to deliver a relevant subject.
- Previous teaching experience.
- Experience of enhancing learners experience in the relevant subject.
- An ability to support students throughout their journey towards the achievement of the qualification.
- Relevant industry, management or commercial experience;

Teachers must hold following knowledge, awareness and ability-

- Knowledge of Regulated Qualification Framework or equivalence;
- Knowledge of Equal Opportunity Issues;
- Ability to use MS Office applications such as Excel, PowerPoint and word.
- Commitment to team working and able to motivate others.
- Excellent organisational and administrative skills.

ASSESSMENT

- The methods for assessing student performance can be broadly summarised under coursework by following instructions for coursework. Both categories of assessment tool have particular functions within the learning experience of students and can be used to evaluate different aspects of learning outcomes.
- Learners are required to develop an assignment of each unit minimum 1500 words in length. Assignments are important part of learners' work at the Centre. There are strict rules about:-
 - **plagiarism** – using another person's words out of a book/ journal article/ conversation/ lecture without formally acknowledging it,
 - **referencing** - how to reference and refer to another person's work in your written work so you avoid plagiarism,
 - **word length** of essays and reports,
 - **Presentation and style** of a report, including the style of language used, and
 - Learners are required to sign a **declaration of authentication** to confirm that the work is their own and that any assistance given and/or sources used have been acknowledged.
- All learning outcomes must be assessed using assignment appropriate to the assessment of knowledge, understanding and skills. The Qualifications within this suite are vocational because they support a Learner's career progression. Assessments will contain a question strand for each of the given unit's Learning Outcomes. The assignment tasks will address the LO (Learning Outcome) and AC (Assessment Criteria) requirements. Within assignments there will always be requirements for Learner's to engage with important and relevant theory that underpins the subject area
- There must be valid, sufficient, and authentic evidence of all the assessment criteria.
- Submitted assignments should be marked by an assessor. In order to pass a unit, a learner must achieve 50% marks in each assignment.
- Assessors must plan, gather and then assess learner's evidence according to Postgraduate level descriptors' requirements and on the basis of Pass/Fail criteria. These should be made available for internal moderation to the centre Internal Quality Assurer (IQA).
- Assessors must plan, gather and then assess learner's evidence according to Postgraduate level descriptors' requirements and on the basis of Pass/Fail criteria. These should be made available for internal moderation to the centre Internal Quality Assurer (IQA).
- EBMA External Quality Assurer (EQA) undertakes external moderation to monitor the assessment, internal moderation processes within the centre to make sure the assessment remains fit for purpose, and that the assessment process and practices by the centre continue to meet assessment standards requirements.

ENQUIRIES AND APPEALS

EBMA is committed to ensure all Learners are provided with fair assessment, accurate and correct results.

This policy aims to support those who wish to raise an enquiry or make an appeal. This policy applies to Learners and Centres and it is to be used in the following circumstances:

- to enquire about results of assessments;
- to enquire about decisions on Reasonable Adjustments and Special Considerations;
- to enquire about decisions and any actions to be taken following a malpractice or maladministration investigation.

A Learner or Centre must initially follow the Enquiry process. If dissatisfied with the result of an Enquiry they may then pursue an Appeal.

Both Learner and Centre Enquiries and Appeals are taken seriously by .

We will

- Acknowledge Enquiries within 5 working days after the Enquiries Form has been received at 's office; and issue an invoice.
- Do all necessary checks and reply to any Enquiries within 15 working days of receiving an Enquiry.
- Accept an Appeal from an individual Learner or a Centre after the Enquiries process has been completed.
- Acknowledge an Appeal within 5 working days after the Appeal Form and fee has been received at 's office; and issue an invoice.
- Investigate the Appeal and reply with the outcome within 20 working days.

We will consider an appeal based on:

- the enquiry process that has been completed;
- the grounds for the appeal provided by the Centre or Learner;
- the timescale of the application.

We will

- Provide reason(s) for an appeal if it is rejected.
- Amend original results or decisions where appropriate, informing the Learner and Centre.
- Review Centre arrangements where appropriate.

Please note that the findings of 's appeal process will be final.

If you are a Learner

Enquiries and appeals about any of the above matters should be raised in the first instance with the Centre following their Enquiries and Appeals policy and procedure.

If you are a Centres

You must

- Have an Enquiry and Appeals policy and procedure.
- Give Learners a copy of the Centre's Enquiries and Appeals Policy.
- Investigate and report on any Enquiries or Appeals from Learners.
- Make sure that the result and advice given to the Learner is accurate and complete.
- If a Centre finds an incorrect result has been given they must tell .

Centres must keep information and evidence on Enquiries and Appeals and provide this when asked for by . A Centre may also make an Enquiry for themselves or on behalf of a Learner(s). The Enquiry Form must be used.

Complaints

If the individual Learner or Centre is dissatisfied the Appeal process they should follow 's Complaints Procedure.

QUALIFICATION SYLLABUS

Level 7 Postgraduate Diploma in Information Technology is a 120-credit programme comprising six units. All units in the qualification have a standard format. The unit format is designed to give guidance on the requirements of the qualification for learners, assessors, tutors, and those responsible for monitoring standards. Each unit has following sections;

Unit aim

Aim indicates the general direction or orientation of a unit, in terms of its content and sometimes its context within a programme.

Unit level

Level describes of what a learner is expected to achieve at the end of a level of study. Levels are hierarchical stages that represent increasingly challenging learning to a learner.

Guided learning hours

Guided learning hours (GLH) are defined as all the times when a tutor, trainer or facilitator is present to give specific guidance towards the learning aim being studied on a programme. This definition includes lectures, tutorials, and supervised study in; for example, open learning centres and learning workshops. It also includes time spent by staff assessing learners' achievements.

Unit code

Each unit is assigned a unique code that appears with the unit title of the qualification.

Credit value

All units have a credit value. The minimum credit value that may be determined for a unit is one, and credit can only be awarded in whole numbers. Learners will be awarded credit for the successful completion of whole units to achieve the qualification.

Learning outcomes

These are statements of what a learner is expected to know, understand or be able to do at the end of the unit and of how that learning will be demonstrated. Unlike aim, they are couched in terms of what the learner is expected to learn.

Assessment criteria

These are statements that indicate, in more detailed manner than the learning outcome, the quality of performance that will show that the learner has reached a particular standard that is reflected in the learning outcome.

The assessment method

The assessment method is often confused with assessment criteria. It is a task that is undertaken by learners that is the subject of assessment. It provides the context for assessment criteria.

Teaching strategy

Teaching strategy is the support that needs to be given to learners to enable them to achieve the learning outcomes. There is recognition that the learning may be achieved without the involvement of teaching.

Unit content

The unit content identifies the breadth of knowledge, skills and understanding needed to design and deliver a programme of learning to achieve each of the learning outcomes. The content provides the range of subject material for programme of learning and specifies the skills, knowledge and understanding required of the unit.

Unit 01: Information Systems Methodologies			
Unit Aim	The aim of the course is to explore a variety of information system methodologies. Learners will be able to compare methodologies for use in organisation using standardised framework of system development.		
Level	7	Credit Value	20
GLH	80	Unit Number	EBMA310
Learning Outcomes The learner will		Assessment Criteria The learner can	
1- Be able to understand approaches to gather requirements for systems development.		1.1. Discuss system development process in information technology. 1.2. Discuss how can to classify system to develop methodologies 1.3. Discuss system development life cycle. 1.4. Discuss general system principles	
2. Be able to compare methodologies for use in the organisation using standardised framework of system development		2.1. Critically discuss methods under an agreed framework of system development. 2.2. Critically discuss taxonomy model for use in organisation 2.3. Discuss paradigmatic approach to methodology classification and how can you compare this approach to taxonomy model 2.4. Discuss concepts of NIMSAD & Fitzgerald's framework of analysis and comparisons of methodologies	
3. Be able to understand the rationale of system development to prepare more relevant system		3.1. Discuss the rationale behind the accurate system development 3.2. Discuss how to develop a system by using system development approach 3.3. Discuss the importance of process in system design and how to use improvement model for efficiency and effectiveness of model 3.4. Design a system by using an information system techniques and software engineering model	
Teaching and Learning Methods A range of learning and teaching methods will be employed including lectures, directed readings, case studies, group discussions and presentations.			
Suggested Reading <ul style="list-style-type: none"> • AVISON, D. E., & FITZGERALD, G. (2006). Information systems development: methodologies, techniques and tools. London, McGraw-Hill. • PAPADOPOULOS, G. A. (2008). Information system development: design and development. New York, Springer. • TILLEY, S. R., & ROSENBLATT, H. J. (2017). Systems analysis and design. • HOFFER, J. A., GEORGE, J. F., & VALACICH, J. S. (2015). Modern systems analysis and design. Boston, Pearson. 			

Unit 02: Mobile Communication and Programming			
Unit Aim	This unit aims to prepare learners with complexity of strategic decisions and global business environment. Learners will be able to conduct research which will help them to define, create and evaluate further strategic direction for the effectiveness of the organisation.		
Level	7	Credit Value	20
GLH	80	Unit Number	EBMA320
Learning Outcomes The learner will		Assessment Criteria The learner can	
1. Be able to understand and apply the principles of secure, effective communication over networks including mobile elements		1.1. Discuss fixed node IP routing and explain different techniques for conventional wired Networks. 1.2. Discuss mobile IP routing and explain routing for wireless mobiles to IP. 1.3. Discuss different kinds of security protocols including infra structure security. 1.4. Create an effective communication model by using designing and/or resolving problems associated with mobiles communication.	
2. Be able to understand the issues introduced by ad-hoc networking		2.1. Discuss the importance of networking in mobile communication process 2.2. Discuss different issues associated with mobile communication while designing system 2.3. Discuss how to use Ad hoc networks to resolve issues in communication problems	
3. Be able to design applications for mobile devices including use of wireless communication		3.1. Discuss the characteristics of small devices including screen size, memory, power consumption, and input mechanisms 3.2. Discuss the development process of tablet PC, mobile phone and PDA and explain characteristics of each of them 3.3. Discuss the applications development environments 3.4. Discuss the use of JAVA API, C# and .NET in development of application	
Teaching and Learning Methods			
A range of learning and teaching methods will be employed including lectures, directed readings, case studies, group discussions and presentations.			
Suggested Reading			
<ul style="list-style-type: none"> • LEE, W. C. Y. (2010). Mobile Communications Design Fundamentals. Hoboken, John Wiley & Sons, Inc. • MIAO, G. (2016). Fundamentals of mobile data networks. New York, Cambridge University Press. • KIM, K. J. (2015). Information science and applications. 			

- SHOTTS, K. (2014). PhoneGap 3.x Mobile Application Development Hotshot. Birmingham, Packt Publishing.
- MCCLURE, W. B., BLEVINS, N., CROFT, J. J., DICK, J., & HARDY, C. (2012). Professional Android Programming with Mono for Android and .NET/C#. Hoboken, John Wiley & Sons.
- STEPHENS, R. (2002). Visual Basic .NET database programming. Indianapolis, Ind, Que.

Unit 03: Advanced Software Engineering			
Unit Aim	This unit aims to develop an understanding of the concepts and methods required for the construction of large software intensive systems. It aims to develop a broad understanding of the discipline of software engineering.		
Level	7	Credit Value	20
GLH	80	Unit Number	EBMA330
Learning Outcomes The learner will		Assessment Criteria The learner can	
1. Be able to understand the basic data structures and algorithms to evaluate their appropriateness and limitations for a range of moderately complex problems		1.1 Discuss data structures by describing stacks, queue, list, binary trees 1.2 Critically discuss the design of algorithm in data structure programming by using C# language 1.3 Critically discuss the importance of data structure in resolving complex problems 1.4 Explain the limitation of data structure models/algorithms	
2. Be able to evaluate strengths and weaknesses of current software engineering methods and techniques.		2.1. Define software engineering and explain why software engineering practice has become important in information technology industry over the last decade 2.2. Discuss the concept of looping in data structure 2.3. Discuss the use of unified modelling language used as methodologies in software engineering practice 2.4. Discuss design patterns in software engineering practice 2.5. Discuss how to design an effective project by using looping, object oriented programming	
3. Be able to choose an appropriate metrics to measure software quality and quantity in modern software engineering environment		3.1. Discuss how to plan a project in software engineering process 3.2. Discuss management of project in software engineering and utilise planning in development of project management system 3.3. Discuss how to use agile and plan driven approaches to design an effective project 3.4. Discuss deployment of patterns in software engineering	
Teaching and Learning Methods			
A range of learning and teaching methods will be employed including lectures, directed readings, case studies, group discussions and presentations.			
Suggested Reading			
<ul style="list-style-type: none"> • Patil, V. H. (2012). Data structures using C++. New Delhi, India: Oxford University Press. • Shaffer, C. A. (2012). Data Structures and Algorithm Analysis in C++. Dover Publications. • SOMMERVILLE, I. (2016). Software engineering. • Blank, J., Drummen, H., & Gersteling, H. (1983). Software engineering: Methods and 			

techniques. New York, N.Y: Wiley.

- Schneidewind, N. (2009). Systems and software engineering with applications.

Unit 04: System Management and Security			
Unit Aim	This unit aims to provide an opportunity for learners to extend their knowledge and skills in information system management, information systems processes, and security at a postgraduate level. Learners will be able to understand current methodologies and techniques for managing computer systems infrastructures, development and operations and their applicability.		
Level	7	Credit Value	20
GLH	80	Unit Number	EBMA340
Learning Outcomes The learner will		Assessment Criteria The learner can	
1. Be able to understand current methodologies and techniques for managing computer systems infrastructures, development and operations and their applicability.		1.1. Discuss right, responsibilities, registration and resources to support services in system management process and development. 1.2. Critically analyse the importance of database in the management of system. 1.3. Discuss terms diary, external access and VPN and explain VPN in system management approach.	
2. Be able to understand the skills in managing user and technical aspects of computer systems.		2.1. Compare user and technical aspects of computer systems 2.2. Discuss how to use file backup, archive and recover files in service support management 2.3. Discuss how to manage capacity to produce maximum output in delivery of effective service 2.4. Discuss how to monitor performance, plan recover and change management in service delivery attributes management	
3. Be able to create a security strategy that protects a system from possible security and treats to the hardware, software, data and the continuous operation of the system		3.1. Discuss to control access by using tools of privacy, user authentication, protections, firewall and content filtering 3.2. Critically discuss hacking as a treat of security management and explain the solution to resolve this problem 3.3. Discuss encryption standard and deployment 3.4. Discuss how to handle applications and to overcome security threats	
Teaching and Learning Methods			
A range of learning and teaching methods will be employed including lectures, directed readings, case studies, discussions and presentations.			
Suggested Reading			
<ul style="list-style-type: none"> • O'Brien, J. A., & Marakas, G. M. (2011). Management information systems. New York, NY: McGraw-Hill/Irwin. • Laudon, K. C., & Laudon, J. P. (2017). Essentials of management information systems. • Implementing the ISO/IEC 27001 information security management system standard 			

Unit 05: Robotics and Automation			
Unit Aim	This unit aims to equip learners with the necessary tools to develop an in-depth perspective of the operation and management of an automated laboratory and help them through the process of choosing and purchasing automated systems and robotics. Learners will appreciate basis concept of automation and to understand geometries of industrial manipulators.		
Level	7	Credit Value	20
GLH	80	Unit Number	EBMA350
Learning Outcomes The learner will		Assessment Criteria The learner can	
1. Be able to identify concepts of automation and geometries of industrial manipulators		1.1. Discuss the appreciation of manufacturing paradigms 1.2. Discuss adaptive control as a numerical control process management system 1.3. Identify how part programming and APT use for numerical control 1.4. Assess robot control system in industrial manipulators	
2. Be able to design the architectures of autonomous guided vehicles		2.1. Identify how programming play an important role in rebooting robots 2.2. Discuss how to create a map in automated guided vehicles 2.3. Identify how to plan a path in AGV 2.4. Create a map, path and navigate automated guided vehicles by using appropriate programming tools	
3. Be able to explore the applications and implications of industrial automation.		3.1. Critically automation process and discuss its steps and stages. 3.2. Create an organisation and communication system by using automation tools. 3.3. Discuss how to use sensory devices to create an automation system in an organisation. 3.4. Discuss how to create simulation of an industrial manipulator.	
Teaching and Learning Methods			
A range of learning and teaching methods will be employed including lectures, directed readings, case studies, group discussions and presentations.			
Suggested Reading			
<ul style="list-style-type: none"> • Unbehauen, H. (2009). Control systems, robotics and automation: Volume 10. Oxford: Eolss Publishers Co Ltd. • Kurfess, T. R. (2015). Robotics and automation handbook. Boca Raton: CRC Press. • Crane, C. D., & Duffy, J. (2008). Kinematic analysis of robot manipulators. Cambridge: Cambridge University Press. • Stevens, B. L., Lewis, F. L., & Johnson, E. N. (2016). Aircraft control and simulation: Dynamics, controls design, and autonomous systems. Hoboken, N.J: John Wiley & Sons. 			

Unit 06: Database Systems and Applications			
Unit Aim	This unit covers fundamentals of database architecture, database management systems, and database systems, principles and methodologies of database design, and techniques for database application development.		
Level	7	Credit Value	20
GLH	80	Unit Number	EBMA360
Learning Outcomes The learner will		Assessment Criteria The learner can	
1. Be able to understand the concepts of databases and database management systems.		1.1. Define data, database and database management system. 1.2. Describe features, advantages and disadvantages of database management system. 1.3. Identify difference between physical and logical database structures. 1.4. Explain the following database terms: (a) Data Sharing (b) Data Integrity (c) Data Security (d) Conflict Resolution (e) Relationships (f) Data redundancy	
2. Develop and refine the conceptual data model, including all entities, relationships, attributes, and business rules		2.1. Identify the use of data modelling and the entity relationship model 2.2. Define data elements for inclusion in the database and identify relationship between them. 2.3. Develop entity relationship diagrams 2.4. Identify the difference between bottom up and top down database design.	
3. Identify data integrity and security requirements		3.1. Define terms confidentiality, integrity and availability for applications security. 3.2. Identify data security requirements in the organisation. 3.3. Identify organisations policies, systems and processes to maintain integrity and security of the data.	
Teaching and Learning Methods			
A range of learning and teaching methods will be employed including lectures, directed readings, case studies, group discussions and presentations.			
Suggested Reading			
<ul style="list-style-type: none"> • Elmasri, R., Navathe, S., & Elmasri, R. (2011). Database systems: Models, languages, design, and application programming. Boston, Mass: Pearson. • In Hu, F. (2016). Big data: Storage, sharing, and security. • Azzalini, A., & Scarpa, B. (2012). Data Analysis and Data Mining: An Introduction. Oxford: Oxford University Press, USA. • Elmasri, R., & Navathe, S. (2016). Fundamentals of database systems. 			