FACULTY OF

DEPARTMENT OF INFORMATION TECHNOLOGY

Diploma in Information and Communication Technology in Applications Development

PROGRAMME CODE
DIIAD1

Study Guide

2020

Applications Development Projects 3B

MODULE CODE : ADPB301
HEQSF / SAQA CREDITS : 24

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Lectures	**:** As per group time table.
Practicals	**:** There are no dedicated Labs for this module. Students are required to use the general Labs.
Tutorials	**:** There are no formal tutorials for this module.
Lecture Venue	: As per time table
Practical Venue	**:** Computer Laboratories
Relevant Policies and rules	**:** See sections 5.5 and 5.6 below

1. Welcome

Welcome to Applications Development Project 3B.

The aim of this course is to continue the design and development of a web based software application using current development methodologies and tools for an industry based problem in KwaZulu Natal (KZN). Such an application should include a mobile component. This module provides opportunities for students to participate in the development of a real-life ICT based system.

Students will apply their knowledge of software engineering and project management best practices, methodology and technologies to develop software design solutions for contemporary, complex real-life problems and opportunities.

This course promises to be challenging and rewarding as students develop pertinent ICT skills in team dynamics, communications, problem solving and technology application. Students will develop an understanding of complex business processes that drive organizations in various sectors of the South African economy. Development of these skills is vital for the ICT graduate in any part of the world.

The purpose of this learner guide is to provide you with knowledge and guidance regarding the logistics (both administrative and academic) of this course. This is to ensure that you are aware, in advance, of the subject's content and the manner in which it will be assessed.

The guide will provide information regarding the purpose of Applications Development Project 3B and its role in the Diploma. A description of the Outcomes and Assessment Criteria is provided below. Information regarding the learning and teaching strategies to be employed, as well as the process of assessment and class mark calculation is outlined. Added to this you will get a list of reading resources that will assist you, as well as a scheme that provides the work plan or calendar of the curriculum for the module.

2. Using your online classroom

This course has its online classroom on Moodle. All official communication will be obtained from this platform.

3. Introduction to the module

Applications Development Project 3B is a compulsory 3rd level subject in the Diploma in Information and Communication Technology in Applications Development. It is a follow on from Applications Development 3A wherein you were required to design a solution architecture and complete a few increments of the development.

The purpose of this module in the diploma is to design and develop a software application for an industry based problem in KwaZulu Natal (KZN) on a **cloud-based solution in a web** using current application development methodologies and tools. A **mobile** component is recommended.

This subject prepares the learner for a career in applications development by allowing the learner to participate in the applications development process. The course is structured to take the learner through the entire development life cycle from identifying a real-life problem/opportunity to designing and implementing an application solution. This project requires extensive group work and develops the learner's intra and interpersonal skills. This is an interactive course that emphasizes "hands on" practical tasks.

4. Learning outcomes

4.1. Ability to use Project Management principles to complete the project.
4.2. Demonstrate an understanding of time management.
4.3. Ability to organize what are the tasks that need doing, and in what order do they get done.
4.4. A solid knowledge of how to conduct research on a business problem.
4.5. Application of a current software development methodology to develop the application.
4.6. Ability to use software development tools to develop the software application.
4.7. Demonstrate independence, originality and evidence of professional practice.
4.8. Present a portfolio of evidence and research report with recommendations.
4.9. Oral presentation to lecturers and evaluators on the solution of the business problem.

5. Learning, teaching and assessment strategies

5.1. Learning

An integrated teaching and learning approach is followed in this subject. Learning is facilitated by face-to-face contact, self-learning, research of software engineering techniques and tools.

Groups are required to attend classes in their designated time slots. Groups are required to perform the necessary tasks allocated and engage in discussions on their projects in class.

5.2. Graduate Attributes

5.2.1 Ability to work in a team.
5.2.2 Solid knowledge of databases.
5.2.3 Logic and problem solving skills.
5.2.4 Designing and developing an application.
5.2.5 Testing and debugging and application.

5.3. Module Content

5.3.1 Understanding and application of concepts in application development
5.3.2 Application of an agile Development Methodology
5.3.3 Application of Project Management principles
5.3.4 Implement a relational or object oriented database
5.3.5 Application of frameworks in software development
5.3.6 Share and manage source code within a team
5.3.7 Implement best practices in the software development process.

5.3.8 Optimize code for performance and implementing intelligent error handling.
5.3.9 Integrate with cloud services.
5.3.10 All applications must be developed as either web/mobile based using the latest technologies.

5.4. Assessment

All dates and the number of assessments may be reviewed and are subject to change. The coordinator reserves the right to change these dates.

Deliverables are due by 12 noon on the due date unless otherwise stated. All code must be checked in and deployed to the required environment on a daily basis.

This subject is classified as continuous assessment and as such does not have a final exam. If the project assessment is awarded a failed mark the assessment will be followed by ONE makeup assessment to improve the mark of this assessment. Each makeup assessment will be awarded a MAXIMUM of 50%. There will be no further make up and / or supplementary assessment for this subject. Once marks are finalized no correspondence will be entered into.

The examiners and / or moderator have the right and sole mandate to request a student or project group to write a practical exam in a controlled laboratory under examination conditions for reasons including but not limited to the following:

1. The student or group has performed poorly and has failed to meet the minimum requirement to pass the subject.
2. Copyright has been infringed
3. The student and / or group has outsourced the design and / or development or the system to a third party.

There are two categories of mark allocation i.e. Individual and Group Project. An individual mark will be allocated for the following categories: Peer Assessments and Delivered Use case assigned. The project mark will be allocated for deployed working applications.

Continuous Assessment Weightings

Type	Increment	Name	Due date	%
Individual	1	Peer assessment	26-Oct	10
Individual	1	Delivered use case	26-Oct	10
Group	1	Project developed and deployed, SRS document	26-Oct	30
Individual	2	Peer assessment	23-Nov	10
Individual	2	Delivered use case	23-Nov	10
Group	2	Project developed and deployed, SRS document	23-Nov	30
		Total		**100**

Due dates are subject to change. Please regularly check the notices published on Moodle for this module.

5.5. Activities to promote learning

5.5.1. Research to solve selected business problems.
5.5.2. Hands on learning from developing a solution for a real world business.
5.5.3. Delivery of content using a practical approach with industry related examples.
5.5.4. Working in a team.

5.6. Communication Protocol

All questions, queries or concerns must be raised by team members in the following order of precedence. A team member must bring the issue to the attention of the project leader. The project leader, will in turn raise the issue with the lecturer. Should the issue require further attention, the project leader may then raise the issue with the subject co-ordinator. Any further appeals must be raised with the Head of Department. Penalties may accrue for non-conformance. All communication must be handled professionally in writing.

5.7. Project Guidelines

5.7.1. It is the student's responsibility to identify, develop and implement an effective project for a real-life business. The learner is encouraged to pursue proposals that contribute to “Service Delivery and Responsible Citizenship” and the development of Durban and KZN. However, proposals from around the country may also be considered. This is a continuation of ADPA301, so the same project will be developed further.
5.7.2. A grouping strategy will be outlined by the coordinator. Groups will consist of approximately eight members or as outlined by the coordinator. The coordinator may increase group sizes. Students will continue to work in the same groups as in ADPA301.
5.7.3. Students may choose a development platform/s provided that the lecturer(s) approve such platforms. It is preferred that you endeavour to utilize the most recent versions of the development platforms.
5.7.4. No handwritten work is accepted as a final submission. All work must be typed, all use case and other diagrams must be completed using a diagramming tool (such as Microsoft Visio/Microsoft Projects).
5.7.5. Marks will be awarded for each increment, for the specified deliverables / shippable software. Marks will be deducted for not meeting deadlines.
5.7.6. Although students will work as a group, it must be noted that individual marks could be allocated for each student based on his/her performance. Each student will be held accountable for his/her contribution to the group.
5.7.7. Students are required to implement good software engineering practices and actively participate in the coding process in ALL increments.
5.7.8. Each group will need to assign one member as a project leader.
5.7.9. Applications must include the use of either a relational model database server or an object-relational database. Examples of these database servers are
    5.7.9.1. MS SQL
    5.7.9.2. MY SQL
    5.7.9.3. DB4Objects

5.7.9.4. No SQL (Key Pair/Document)

5.7.10. All applications must be developed as either web/mobile based and designed to incorporate the following functionality:
- 5.7.10.1. Use of Asynchronous JavaScript and XML (Ajax) Technology or the use of any one of the following libraries:
  - 5.7.10.1.1. jQuery (http://jquery.com/)
  - 5.7.10.1.2. Moo Tools (http://mootools.net/)
  - 5.7.10.1.3. ASP.NET Ajax (http://www.asp.net/ajax)
  - 5.7.10.1.4. Ext (http://www.ext.net/)
  - 5.7.10.1.5. Dojo Toolkit (http://dojotoolkit.org/)
- 5.7.10.2. Appropriately use design patterns and dependency injection to create a robust, testable design.
- 5.7.10.3. All applications must use source or version control.

5.7.11. The learner is encouraged to pursue proposals that contribute to the vision and goals of the National Development Plan 2030. Furthermore, proposals that contribute to the development of Durban and KwaZulu-Natal are highly recommended.

5.7.12. Teams must engage in good Software Engineering practices. These include:
- 5.7.12.1. Paired Programming
- 5.7.12.2. Automated unit test
- 5.7.12.3. Continuous Integration and Source Version Control
- 5.7.12.4. Design Patterns and Principles
- 5.7.12.5. Code Comments

5.7.13. Penalties will be applied to teams that do not use good Software Engineering practices. These penalties are at the discretion of the examiner and / or moderator.

5.7.14. Increment assessments will be handled as follows:
- 5.6.18.1 Marks will be published within 20 days after the presentation.
- 5.6.18.2 Students have a maximum of five (campus) days to query results either in person or in writing with their respective examiners. No queries will be entertained thereafter.
- 5.6.18.3 Students / groups requesting a re-mark will need to apply in writing (Refer to Rule G13 in the General Handbook) to the subject coordinator within seven (campus) days of each Increment's mark publication. The coordinator reserves the right to reject / accept any application. The marks will be reviewed and the student will be notified of the outcome.
- 5.6.18.4 Strictly no queries will be considered after the current (applicable) examination sitting results are published.
- 5.6.18.5 This is a continuous evaluation subject and as such there are no remarks, no scans nor supplementary examinations.

5.7.15. Software will be developed using the SCRUM model. Software development has been divided into two Increments of roughly 4 weeks each.

5.7.16. Groups need to submit **comprehensive** minutes of **all** meetings. Failure to submit detailed minutes will result in a penalty.

5.7.17. Marks will be awarded for each Increment which will accumulate towards a student's final mark.

5.7.18. Reviews (Presentations) will occur at the end of each Increment and teams are required to demonstrate the progress that has been made during the increment.
5.7.19. The student is required to fully understand the different licensing agreements for the use of open source code / software.
5.7.20. Although the use of third-party tools is allowed the student is required to obtain full understanding of its application so that it can be applied to the project and not merely incorporating chunks of code.
5.7.21. Any open source code, tools, and /or third-party features used must be clearly documented and acknowledged as such.

6. Scheme of work

This module is a continuous assessment module. You are required to seek guidance from the lecturer with regards the iterative and incremental model in order for you to complete the required deliverables.

The following is a high level work schedule that you are required to follow to achieve the outcomes of the subject.

Week	Week Commencing	Activity	Description
1	28-Sep-20	Increment 1 SRS	Identify business use cases, create use case descriptions
2	05-Oct-20	Prototyping	View layer of the business use cases
3	12-Oct-20	Implement Use cases	Progress on implementation - 50 % of the business use cases complete
4	19-Oct-20	Implement Use cases	Progress on implementation - 100 % of the business use cases complete
5	26-Oct-20	Assessment	**Presentation** of fully deployed application
6	02-Nov-20	Increment 2 SRS	Identify business use cases, create use case descriptions
7	09-Nov-20	Prototyping	View layer of the business use cases
8	16-Nov-20	Implement Use cases	Progress on implementation - 50 % of the business use cases complete
9	23-Nov-20	Implement Use cases	Progress on implementation - 100 % of the business use cases complete
10	30-Nov-20	Assessment	**Presentation** of fully deployed application
11	07-Dec-20	Assessment	**Recalled** groups presentation of fully deployed application max mark of

As per the module descriptor, the average student is required to spend 240 notional hours on this module. The following is a proposed breakdown on the notional hours for each student.

No	App Dev Project 3B - Proposed student time allocation	Hours	Weeks	Total
1	Lecture	2	12	24
2	Tutorial	1	12	12
3	Meeting	5	12	60
4	Software requirements spec	4	4	16
5	Design and development	5	12	60
6	Testing	5	12	60
7	Assessment	4	2	8
	Total			**240**

7. Copyright and plagiarism

According to, the Merriam-Webster online dictionary, to "plagiarize" means:

- “to steal and pass off (the ideas or words of another) as one's own
- to use (another's production) without crediting the source
- to commit literary theft
- to present as new and original an idea or product derived from an existing source “

Original ideas and the expression thereof; is considered intellectual property and as such are protected by copyright laws. No form of plagiarism will be accepted and disciplinary action will be taken against any learner perpetrating this crime. All students are required to submit a plagiarism declaration when submitting their assignment (Refer to Appendix B).

Use of words and/or ideas that are not your own must be correctly referenced. No form of plagiarism will be accepted. Disciplinary action will be taken against any student perpetrating this crime. All groups are required to submit an undertaking letter at the end of each increment.

Students may not solicit the help of individuals, peers or professional software developers without completing the declaration template (Refer to the Appendix C). Any group that solicits help without declaring this to the examiner will be deemed to have engaged in plagiarism. Furthermore, all groups are required to submit a plagiarism declaration at the end of each Increment (Refer to Appendix B).

8. Student support

If you require further support relating to the subject content, schedule a consultation with your lecturer within the allocated consultation times. Your lecturer may refer you to one of the support services available.

You will be able to find a full list of services and comprehensive details for these services on the DUT website http://www.dut.ac.za/student_portal/

Below you will find a summarised list of the important support services available to you as students of DUT.

SUPPORT SERVICE	CONTACT DETAILS	WHAT THEY CAN HELP WITH
Faculty Office	East Wing, Hotel School Building, Ritson Campus **Ms Debbie Small (Faculty Assistant)** Tel: (031) 373 5418 Email: deborahs@dut.ac.za	Registration, remark/supplementary/special exam application, graduation
Student Counselling & Career Resource Centre Location	Lower Library Complex, Steve Biko Campus, next to financial Aid Reception Desk (031)373 2266 Career Resource Centre (031)373 2571	Individual counselling, career guidance, study skills support
HIV/AIDS Centre	Front Desk (031) 373 2260	Emotional support
Health Clinic	**Isolempilo**(Gate 5, opposite Sports Centre) 031 373 2223 **Ritson Campus**(Next to Hotel School Restaurant) 031 3736010	Primary health services, Family Planning, HIV Testing
Financial Aid Services and Scholarships	Lower Library Complex, Steve Biko Campus 031 373 2553 applications@nsfas.org.za NSFAS call centre on 0860 067 327	Application for financial support
Student Residence	Indira Khiramen Tel: 031 373 2494 Email: indirak@dut.ac.za	Application for residence whilst studying at DUT

9. Work Integrated Learning (WIL), community, and occupation-related information.

Each group of learners participates in the software development process from identifying a real-life problem/opportunity to designing and implementing a software solution. The design and implementation of this software project is a form of WIL, as each group interacts and works with a client to complete the project. There is close collaboration between the group and the client / stakeholder to give the group a practical experience.

10. Quality assurance and enhancement

Learners are encouraged to provide feedback to their lecturers regarding all aspects of this course. Feedback could also be emailed to the co-ordinator (details above).

Should learners experience any difficulties or have any complaints about this course, they can file their complaints as follows:

- The learner must bring the complaint or problem to the attention of his class representative or lecturer. Should the class representative be informed, he/she should raise the complaint with the lecturer. The lecturer would respond to the complaint within a period of 5 working days.
- Should the learner be unsatisfied with the response, he/she can then escalate the complaint to the co-ordinator (see details above). All complaints to the co-ordinator must be in writing. The co-ordinator would respond to complaints within a period of 5 working days.
- Should the learner still be unsatisfied with the co-ordinators response, the complaint can then be escalated to the head of department.

As part of quality assurance and improvement, evaluation forms for the subject and the lecturer would be handed out to learners before the end of the Semester. Feedback from these sources would give us invaluable input on how to improve our course.

Appendix A – Assessment deliverables

There are two (2) assessments for this module. Carefully peruse this guide so that you clearly understand the policies and requirements for these assessment. Each increment will consist of the following:

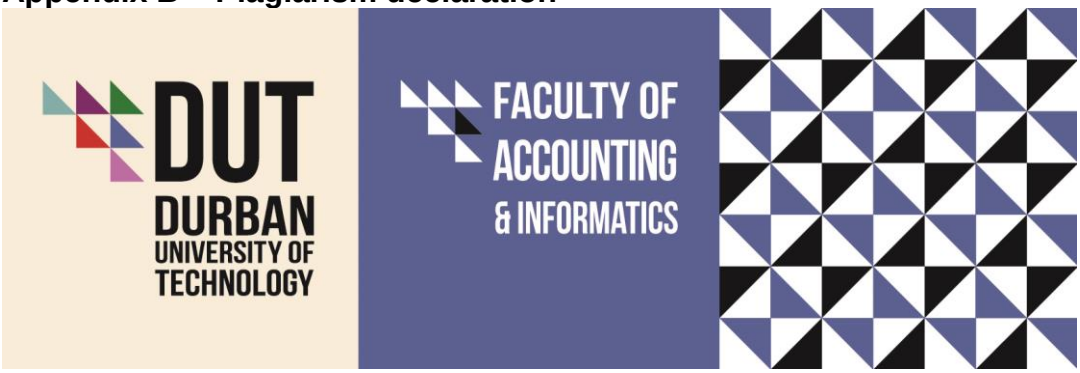
1. **Software Requirements Specification**
   This document will clearly specify the use cases that will be delivered. A detailed template will be available on Moodle. You are required to clearly specify the team member responsible for each use case(s). The individual use case delivered will be used to calculate the individual mark.

2. **Peer review**
   Each student is required to complete a peer review of all team members. This mark will contribute to the individual mark.

3. **Developed and deployed application**
   For this deliverable use the technologies outlined in project guidelines in section your learner guide. Notwithstanding the requirements outlined for Applications Development 3 (APDA301), the following minimum requirements must be met:
   - As proof of work/effort to assessors you are required to use version control software.
   - Use cases developed must be appropriate for the group size.
   - The application must be hosted in the cloud. It is the group's responsibility to manage the credit allocated appropriately.
   - Login, user control, and basic CRUD features will not be assessed.
   - The database must be deployed in the required environment.
   - Adequate evidence of testing must be provided.

   Be reminded that these are additional increments on the application assessed in semester 1 (as part of Applications Development Projects 3A).

Appendix B – Plagiarism declaration



PLAGIARISM DECLARATION

(TO BE SUBMITTED BY EACH MEMBER FOR EVERY SUBMISSION)

Increment _____

Group #: _____

DECLARATION

1. I know and understand that plagiarism is using another person's work and pretending it is one's own, which is wrong.
2. This assignment is my own work.
3. I have appropriately referenced the work of other people I have used.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

_____ _____

Signature Date

_____

Name (in capital letters)

_____

Student Number

Appendix C – Assistance received

DECLARATION

As a group we would hereby like to inform the examiner that we have received assistance from:

1) Name:
   Surname:
   Mobile:
   Email:
   Type of Assistance:

2) Name:
   Surname:
   Mobile:
   Email:
   Type of Assistance:

3) Name:
   Surname:
   Mobile:
   Email:
   Type of Assistance:

This assistance was received in Increment _____

_____ _____

Signature Date

_____ _____

Name (in capital letters) Group Number

_____

Student Number