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| **Research and Innovation** |
| Module Syllabi Specification |

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| Bongani Siwela |

1. **General Information**
2. Module title: **Research and Innovation**
3. Module code: **CSE206**
4. Module type – compulsory, elective or optional: **Compulsory**
5. Programme title: **Computer Systems Engineering, Applied Business Computing**
6. Year of studies (**2**)
7. Terms in which taught (Sem 1 / Sem 2): **Sem 2**
8. Type of classes and the number of contact hours ( **lectures: 36 hrs; Supervision :24 hrs**)
9. Total credits: **20**
10. Name, surname, academic degree/title of the module lecturer/other teaching staff: **Mr RT Rabalone, MEng Computer Systems Engineering**
11. Language of classes: **English**
12. **Detailed Information**
13. **Module aim (aims):**

The module teaches students how to do Systems development as a team. Project management tools and techniques, such as scheduling are used to control the information systems project that students will be working on. A general approach to system reporting and documentation is introduced which students are expected to follow. Students are expected to be able to model business processes, produce logical and physical designs of the business system.

1. **Pre-Requisites** in terms of knowledge, skills and social competences (where relevant):
   * Introduction to Java/ Visual Basics
   * Object Oriented Analysis
   * Systems Development
2. **Module Learning Outcomes** in terms of knowledge, skills and social competences and their reference to programme learning outcomes

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| Learning outcomes symbol\* | Upon completion of the course, the student will gain some :  Knowledge | Reference to programme  learning outcomes |
| LO1 | Understand dynamics of team work |  |
| LO2 | Use project management scheduling tools |  |
| LO3 | Think innovation |  |
| LO4 | Understand researching for information systems solution |  |
| L05 | Documenting information systems |  |

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| Learning outcomes symbol\* | Upon completion of the course, the student will gain some :  Skills and Abilities | Reference to programme  learning outcomes |
| LO6 | Ability to use mind maps |  |
| LO7 | Professional typesetting using Latex |  |
| LO8 | Critical and creative thinking |  |
| LO9 | Using UML diagrams to model different components of an information system. |  |
| LO10 | Brainstorming information system solutions |  |
| LO11 | Technical writing styles |  |

1. **Learning Content**

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC1 | **Introduction to Research and Innovation projects.**   * Choosing relevant projects * Choosing a team * Supervision |  |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC2 | **Project Control**   * Time management * Working in teams * Dealing with problems | LO1, LO2 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC3 | **Project Planning**   * Work breakdown structure * Time estimates * Identifying milestones * Gantt chart * Scheduling | LO2 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC4 | **Reporting and documentation**   * Report structure * Modeling using UML * Type of Writing styles | LO11, LO5, LO9 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC5 | **Technical Report sections**   * + Carrying out a background literature   + System Design   + Implementation | LO5, LO11, LO4 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC6 | **Critical and Creative thinking**   * + What is critical thinking   + How to think critically   + Good critical thinking | LO3, LO8 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC7 | **Design thinking**   * + What is design thinking   + Design thinking process   + Design thinking as a strategy for innovation | LO3, LO8 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC8 | **Mind mapping**   * Thinking About Thinking * Mind Mapping Technique * Mind Maps At Work * Practical Mind Mapping | LO6, L010 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC9 | **Introduction to Latex**   * Latex Ide * Latex Packages * Example reports | LO7 |

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| Module title | | |
| Learning content symbol\* | Learning content description | Reference to module learning  outcomes |
| LC10 | **More Latex Packages**   * Tables * Listings * Formulas | LO7 |

1. **Learning Resources and Bibliography**
   1. **Reading list**

**Key texts**

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* 1. **Resources** *(teachers, support staff, funding, books/journals, IT support, teaching rooms)*

1. ***List of resources***

*1 lecturer, Supervisors*

1. ***Monitoring and evaluation procedures***

* ***Student feedback forms must be issued at the end of the semester,***
* ***Summative and Formative assessments will be used to monitor progress***

1. *Industry placement activities – N/A*
2. *Recruitment and selection procedures, including promotional materials N/A*
3. ***Student support and guidance mechanisms***

* *Supervisors should closely monitor the progress of students they are supervising on weekly basis.*

1. **Information on where to find course materials**
   * *For each class a handout containing all necessary information (theory, tasks and instructions) will be provided.*
   * *All course materials including the handouts will be published on the course website, intranet etc...*
2. **Additional Information**
3. Reference of learning outcomes and learning content to teaching and learning methods and assessment methods
4. Student workload (Learning Hours as Credits)

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| Module Title | |
| Activity types | Mean number of hours*\** spent on each  activity type |
| Contact hours with the teacher as specified in the  Programme | 60 |
| Self-study | 64 |
| Assessments | 9 |
| Total hours | 133 |
| Total Credits | 20 | |

Self-*study – examples of activity types: (1) preparation for classes – 12hrs, (2) data analysis, (3) library based work – 10hrs, (4) writing a class report – 10 hrs, (5) exam preparation -12 hrs., (6) Lab work – 30hrs etc.*

1. Assessment criteria

The module will be assessed by **Prototype** (25%), **Final Report (55%)**, **Viva (20%)**

1. **Topics For Classroom Teaching**

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| **Week #** | **Intuitive Topic Content** | **Supervision Focus** | **Self-Study** |
| **Week 1** | **Introduction to Research and Innovation projects.**   * Choosing relevant projects * Choosing a team * Supervision | Selecting a team, Supervisor |  |
| **Week 2** | **Project Control**   * Time management * Working in teams * Dealing with problems | Researching on the topic chosen |  |
| **Week 3** | **A Project Planning**   * Work breakdown structure * Time estimates * Identifying milestones * Gantt chart * Scheduling | Identification of the tasks to be done in the project and agreeing on milestones |  |
| **Week 4** | **Reporting and documentation**   * Report structure * Modeling using UML * Type of Writing styles | Monitoring |  |

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| **Week #** | **Intuitive Topic Content** | **Supervision** | **Self-Study** |
| **Week**  **5** | **Technical Report sections**   * + Carrying out a background literature   + System Design   + Implementation | Monitoring progress |  |
| **Week**  **6** | **Critical and Creative thinking**   * + What is critical thinking   + How to think critically   + Good critical thinking | Monitoring progress and student relevance in the topic chosen |  |
| **Week**  **7** | **Design thinking**   * + What is design thinking   + Design thinking process   + Design thinking as a strategy for innovation | Evaluating critical thinking and creativity of the student |  |
| **Week**  **8** | **Mind mapping**   * + Thinking About Thinking   + Mind Mapping Technique   + Mind Maps At Work   + Practical Mind Mapping | Evaluating students design, models |  |
| **Week 9** | **Introduction to Latex**   * + Latex Ide   + Latex Packages   + Example reports | Evaluating mind maps and student design |  |
| **Week**  **10** | **More Latex Packages**   * + Tables   + Listings   + Formulas | Evaluating student report sections done using latex |  |
| **Week**  **11** | Monitoring and Evaluation | Monitoring and Evaluation |  |
| **Week**  **12** | Monitoring and Evaluation | Monitoring and Evaluation |  |

1. **Module Policies And Values**

What values will shape your teaching in the module and what policies will guide you?  Policies and values that you might want to communicate through your syllabus include:

* *Inclusiveness:* How can your syllabus help you create an inclusive atmosphere that welcomes all students?  Some instructors include statements inviting participation from all students, honoring student diversity and differing points of view, or inviting requests for disability accommodations.
* *Integrity:* What are policies and procedures regarding academic integrity and misconduct in relation to materials and assignment for this course?  For example, considering the types of work you are asking students to do, what do you want to communicate about working with data?  Representing original sources? Accountability for contributions to group projects?
* *Responsibility:* What do students need to know about your expectations regarding assignments, attendance, online participation or classroom interactions?  Other possibilities include policies regarding late work, make-up exams and preparation for class participation.
* *Expectations for success:* How can students learn most successfully in your course?  In your syllabus, you can express confidence that all students are capable of doing well and you can suggest strategies for success.  For example, what strategies for learning are particularly important for this material?  What resources — such as study centers, web tutorials or writing centers — are available to help students succeed in your course?