### SUMMARY

This unit advances knowledge and competencies of students further in complex asset management. The unit focuses on development and application quantitative models that simultaneously evaluate an asset's:

- Technical performance
- Financial performance
- Customer satisfaction performance
- Environmental performance

The asset management models enable the analyst to consider significant internal and external factors and obligations to analyse asset management decisions across the whole value chain, preferred suppliers, specific asset configuration, favoured distributors and group of customers. Data sources concern:

- Business Strategy,
- Resources, Operating and Maintenance Requirements,
- Existing Legacy Systems, and
- Orphan data

Complex asset management models should facilitate studies of complex assets under conditions of uncertainty and discontinuity where multiple options are possible with different sets of criteria. Students work in teams during the project phase of this unit to model and analyse the asset management performance and practices of a selected business unit applying a multi-criteria and preference modelling approach. They also assess risk and develop contingency asset management plans for emergency response.

### OBJECTIVES

Students should gain expertise in the following areas:

- Modelling demands in utility sector
- Inputs and influencers in Enterprise Asset Management (AM): technical, financial, customer satisfaction and environment
- External factors in AM: value chain, suppliers, configuration of assets, distributors and customer groups
- Internal factors in AM: business strategy, human resources, operations, maintenance, and legacy systems
- Quantitative models for AM: behaviour under uncertainty and discontinuity
- Options for responding abrupt demand fluctuations
- Risk management and developing contingency plans in case of demand fluctuations
- Emergency response
- Forming asset portfolio
- Project-based portfolio management: Optimising utilisation of asset portfolio
### Target Competencies (Enterprise Systems and Business Process Integration)

Upon completion of the course, the student should demonstrate:

- Ability to model demand changes
- Developing models to accommodate demands changes with inputs and influencers, external and internal factors as their variables
- Developing quantitative formulae that simulate the behaviour of assets in case of emergency response
- Evaluating alternatives to respond to demand changes, and assessing their risks
- Developing contingency plans
- Formation of an asset portfolio
- Ability to make portfolio decision considering multi criteria
- Formulating project initiatives to optimise asset utilisations
- Employing criteria, similar to project selection, to asset portfolios

### Target Competencies (Personal and Socio-cultural)

- **Generic:** All competencies that are common to all professionals (including cognitive and communication abilities, problem solving and analytical mindset)
- **Leadership:** Ability to direct, motivate & manage individuals & teams.
- **Commitment:** Ability to dedicate to tasks & to project outcomes.
- **Attitude:** Ability to create the right frame of mind that promotes integrity & support for achievement of project goals within a social context.
- **Self Direction:** Ability to manage within and without guidelines & processes, and to work without supervision.
- **Learning:** Ability to commit to continuous improvement in knowledge, skills & attitude, & to creating new knowledge developing skills & approaches.
- **Cultural Empathy:** Ability to respect for & accommodation of individual lifestyle, beliefs & norms.
- **Creativity & Innovation:** Capacity to generate new ideas/approaches & make them happen.

### Modes of Delivery

- Upfront intensive workshop (4 days)
- Project and team based flexible work facilitated via the Internet (over 10 weeks)
- Face-to-face formal assessment (one week)

### Assessment

1. Formal knowledge test
2. Team project submissions (formatted as per specification for the same)
3. Formal assessment against competencies applicable to organisation unit strategy and design
4. Formal personal & socio-cultural competency assessment

### Prescribed for the Course

- Learning material (lecture notes, slides, case study and other material provided online).
- Case project (students’ own case project subject to endorsement)

### Selected References


### Printed Materials

- Online useful sources of references are: TBA

### Web Sites

- No single web site presents all the necessary knowledge that students need to learn and apply. However, opposite are some useful sites to visit.

### Software

- Not applicable

- Students may wish to use software for normal typesetting, graphic design and associated tasks
### Intensive Phase

**Day 1**
- Introduction to course aims, objectives, target competencies, learning strategies, resources available, timetable and deliverables, assessment methods and related briefings
- Briefing on how to conduct each phase and the entire unit of study
- Lecture: Review Enterprise Asset Management (AM) fundamentals
- Lecture: A close look at the industries with reliance on capital intensive assets and demand fluctuations
- Lecture: Effective asset management – doing it right to maximise the total value
- Tutorial: Importance of AM – cases and disasters from history

**Day 2**
- Lecture: Understanding the variables that shape AM, and their complexities
- Lecture: Modelling demand changes
- Lecture: Developing alternatives to meet changing demands and asset utilisation, and their comparisons with respect to risk and cost
- Tutorial: Example demand change models, assumptions, variables, and their accuracy

**Day 3**
- Lecture: What is asset portfolio?
- Lecture: Formulation and selection of assets in a portfolio
- Lecture: Quantitative models for portfolio selection; simulating behaviour under uncertainty and abrupt fluctuations
- Tutorial: Examining an asset portfolio, considerations for its formation, and real behaviour

**Day 4**
- Lecture: Project-based asset management – applying context from project management in asset management
- Lecture: Selecting and initiating projects to optimise asset utilisation
- Lecture: Future of AM
- Reinforcing learning outcomes and application of the same to forthcoming team project
- Conduct of written test on organisation unit strategy and design
- Students’ feedback on the intensive phase

### Teamwork Phase

For the purposes of developing expertise in an integrated and meaningful manner, students in teams of 4 to 6 will assume responsibility for developing a plan for optimising asset utilisation in a case organisation unit. The case organisation is individual to each team and will be sourced normally from one of the students’ employer organisations.

In summary the project phase will comprise:
- An overall process for studying organisation enterprise systems and for applying the relevant knowledge to a real life case organisation as per the relevant Brief that is downloaded from the unit’s web site;
- A program of the learning activities which are part of student’s Team Workplan and individual competency acquisition needs which each student needs to plan to conduct flexibly within the unit of study timeline as advised in the unit’s web site (detailed schedules are to be developed and submitted as part of the Team Work/QA Plan)
- The assignment Brief which is available as a downloadable file. Your team may develop your own Brief/project concept, and upon the Course Convenors’ endorsement use the same as the basis for learning and development. Your brief should be developed to be similar to that found on the unit’s web site.

The Learning activities are designed for each team to develop and evaluate a complete plan for their case organisation via the following activities:
### Team Formation, Case Project selection and team QA/Workplan

Activity 1: Literature Review Advanced Asset Management

Activity 2: Redesign of Case Organisation Asset Management Practices

Activity 3: Case Organisation Asset Management Plan

Activity 4: Evaluation, Formatting and Presentation of Team Report

Submit Case Study, QA/Workplan

Submit Assignment 1

Submit Assignment 2

Submit Assignment 3

Submit Assignment 4

**Continuous reflection, self and peer assessment and competency acquisition. Final Individual Report and Viva to validate competencies acquired versus target competencies**

### COMPETENCY VALIDATION (via evidence and professional interview)

**Final Report & assessment**

Each student is advised to progressively acquire, develop and document the relevant target competencies. The protocols on the web site for this purpose need to be followed carefully to prepare the required evidence of competency acquisition. The evidence for this unit to comprise a Final Report in two parts to validate individually the following: specific target competencies regarding asset management as well as personal and socio-cultural competencies. These will be assessed separately and both need to show the student’s development history using the student’s L&D plan as the basis.