

Liverpool John Moores University

Title: VALUE ENGINEERING
Status: Definitive
Code: **6144UG** (102667)
Version Start Date: 01-08-2011

Owning School/Faculty: Built Environment
Teaching School/Faculty: Built Environment

| Team | Leader |
|----------------|--------|
| Laurence Brady | Y |

Academic Level: FHEQ6
Credit Value: 12.00
Total Delivered Hours: 57.00
Total Learning Hours: 120
Private Study: 63

Delivery Options

Course typically offered: Standard Year Long

| Component | Contact Hours |
|-----------|---------------|
| Lecture | 42.000 |
| Tutorial | 12.000 |

Grading Basis: 40 %

Assessment Details

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|----------|-------------------|---------------------|---------------|---------------|
| Exam | AS1 | Choice of questions | 50.0 | 3.00 |
| Report | AS2 | Assignment | 50.0 | |

Aims

To develop a detailed understanding of the principles and practices of value engineering and its particular application to building services installations in a wide range of public sector, commercial or industrial buildings.

To provide students with the knowledge and skills necessary for them to assess the suitability of real world building services design scenarios for practical value engineering applications. These will typically encompass large scale: Heating, Ventilation, Air conditioning and refrigeration design proposals for commercial and industrial schemes.

Learning Outcomes

After completing the module the student should be able to:

- 1 Critically analyse the requirements of the FAST functional model in relation to: planning, organisation and the decision making processes involved in value engineering.
- 2 Evaluate the requirements and methodology of various financial modelling techniques including: NPV, (Net Present Value); IRR, (Internal Rate of Return); ROI (Return on Investment) and whole-life costing models to describe the financial implications of VE outcomes.
- 3 Undertake complex service life predictions of individual components and performance audits and reviews concerned with ensuring the effective implementation of service life planning.
- 4 Conduct complex capital investment risk management appraisals.
- 5 Critically examine sensitivity testing to assess the degree of risk of investment proposals and to be able to know when, and when not to apply the Value Engineering technique.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

| | | | | |
|--------|---|---|---|---|
| EXAM | 1 | 2 | 3 | |
| REPORT | 1 | 3 | 4 | 5 |

Outline Syllabus

Function Analysis:

Basics of function modelling with FAST; dimensioning techniques used to give the Functional Analysis Systems Techniques model greater meaning; FAST applications supported by business case studies including; Soft and Hard Process Analysis, Planning, Organization Effectiveness, Supply Chain models, Business System Re-engineering, Advanced Product Development, Project Management and Decision Analysis and others.

Life Cycle costing:

General Principles - methodology for whole-life costing of buildings, and their installations.

Financial modelling:

How to deliver results senior management expect. Communicating the worth of ideas to senior management. NPV, (Net Present Value), IRR, (Internal Rate of Return), ROA, Hurdle Rate, to describe VE outcomes. Use of ROI (Return on Investment) model.

Service life prediction principles:

service life predictions of individual components.

Performance audits and reviews:

Effective implementation of service life planning as a basis for internal reviews or for

formal third-party audits and compliance monitoring

Risk Management:

Major categories of risk in capital investment appraisals: Uncertainty, Optimistic Bias, Variability.

Sensitivity Testing:

Assessing the degree of risk in investment proposals.

Learning Activities

Lectures, tutorials, real world modelling scenarios and simulation.

References

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| Course Material | Book |
| Author | Audit Commission |
| Publishing Year | 1996 |
| Title | Just Capital: Local Authority Management of Capital Projects |
| Subtitle | |
| Edition | |
| Publisher | HMSO |
| ISBN | 0118864351 |

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|------------------------|--------------------------------------|
| Course Material | Book |
| Author | Best, R. & De Valence, G. (Eds.) |
| Publishing Year | 1999 |
| Title | Building in Value: Pre-Design Issues |
| Subtitle | |
| Edition | |
| Publisher | Arnold Design Publishers, London |
| ISBN | 0340741600 |

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|------------------------|--|
| Course Material | Book |
| Author | BRE |
| Publishing Year | 1997 |
| Title | Value from Construction: Getting Started in Value Management |
| Subtitle | |
| Edition | |
| Publisher | Building Research Establishment |
| ISBN | |

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|------------------------|-------------------------------|
| Course Material | Book |
| Author | Connaught, J.N. & Green, S.D. |
| Publishing Year | 1996 |

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|------------------|---|
| Title | Value Management in Construction: A Clients's Guide |
| Subtitle | |
| Edition | |
| Publisher | CIRIA |
| ISBN | 0860164522 |

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|------------------------|--|
| Course Material | Book |
| Author | CVCP (now UUK) |
| Publishing Year | 1996 |
| Title | Procurement Guidelines for Higher Education: Building and Engineering Projects |
| Subtitle | |
| Edition | |
| Publisher | Universities UK |
| ISBN | 0948890959 |

Notes

This module is a key component for those students wishing to complete the programme following a building services pathway. It aims to develop the student from a basic awareness of the principles and processes of value engineering to an in-depth understanding of the procedures involved in life cycle costing, risk analysis and decision making for installations in commercial and industrial buildings. This prepares students in readiness for a methodical analytical approach to the more specialised aspects of building services and especially HVAC system selection and optimisation.