## Sheffield Hallam University

# **MODULE DESCRIPTOR**

TITLE	Statistical Process Control and Six Sigma
SI MODULE CODE	44-7793-00S
CREDITS	15
LEVEL	7
JACS CODE	N210
SUBJECT GROUP	Business, Operations and Financial Information Systems
DEPARTMENT	Finance, Accounting and Business Systems
MODULE LEADER	Dr. Arun Sukumar

MODULE STUDY HOURS (based on 10 hours per credit)*			
Scheduled Learning and Teaching Activities	Placement (if applicable)	Independent Guided Study	Total Number of Study Hours
30		120	150

## MODULE AIM

- to provide critical analysis skills on the philosophy and causes of variation
- to develop knowledge of the concepts and tools of Statistical Process Control (SPC)
- to develop skills on the application and interpretation of key SPC tools
- to facilitate learning of the fundamentals and methodologies of Six Sigma

## **MODULE LEARNING OUTCOMES**

By engaging successfully with this module a student will be able to

- to understand and critically analyse the philosophy of variation, causes of variation and the statistical concepts related to process variability
- to understand and critically analyse the concepts of Statistical Process Control (SPC) and the benefits of applying SPC
- to apply and interpret key SPC tools in relation to real world process variation scenarios and examples
- to understand and critically analyse the background and fundamentals of Six Sigma and the organisational structure and methodologies involved in the implementation of Six Sigma

## **INDICATIVE CONTENT**

#### These are examples of the content of the module

- Introduction to statistical process control (SPC)
  - Philosophy of variation
  - Stability vs. Capability
  - Statistical Process Control
  - Benefits of SPC
- SPC tools
  - Types of data
  - Distributions
  - Normal Distribution
  - Measures of central tendency

- Pareto Charts
- Check sheets
- Cause and effect diagrams
- SPC tools- Control charts and histograms
  - Process flow sheets
  - Control charts
  - Workflow diagrams
  - Histograms and process capability
- Six Sigma: History and concept
  - What is Six Sigma?
  - Why Six Sigma?
  - Six Sigma and other management frameworks
  - Limitations of Six Sigma
- Six Sigma and Organisational Structure
  - Organisational structure of Six Sigma
  - Six Sigma structure in some organisations
  - Six Sigma implementation methodologies
  - Six Sigma project management
  - Critical success factors for Six Sigma

#### LEARNING, TEACHING AND ASSESSMENT - STRATEGY AND METHODS

Students will be supported in their learning, to achieve the above outcomes, in the following ways

#### Lectures

There are weekly one-hour lectures for this module. Lectures will be used to introduce the major concepts, principles and theories relevant to each topic, and to identify and explain key terms and techniques. Visual aids, such as PowerPoint and videos, will be used in lecture sessions.

#### Seminars

There will be a series of weekly, two-hour seminars for this module. Seminars will be used to reinforce and expand upon the material covered in the lectures and provide students with the opportunity to demonstrate and develop their analytical, problem solving and numerical skills.

Students are required to prepare answers to a series of numerical / problem / case study and/or essay-based questions in advance of attending each seminar. These questions are set out in the module guide.

#### Virtual Learning Environment (VLE) - Blackboard

The module has a dedicated Blackboard site, which students are expected to access on a regular basis. The Blackboard site is used to communicate information to students outside of contact sessions (via the 'Announcements' page). In addition, the blackboard site includes:

- An electronic (PDF) version of the module handbook
- Links to lecture/PowerPoint slides
- Details regarding assessments
- Additional topical and contemporary information with direct links to external websites.

The students will have opportunities to test and evaluate their learning through formative and summative assessment. A variety of formative assessment methods will be used, e.g. presentations, analysis of case studies, mock online tests etc. Time will be allocated for staff and students to work through each other's expectations and understanding of the module's assessment tasks.

## **ASSESSMENT TASK INFORMATION**

Task No.*	Short Description of Task	SI Code EX/CW/PR	Task Weighting %	Word Count or Exam Duration**	In-module retrieval available
1	Individual Report	CW	50%	3000	Ν
2	Online Test	EX	50%	2 hrs.	N

## **FEEDBACK**

Students will receive feedback on their performance in the following ways

Formative feedback

- Formative feedback is to be provided to students through oral feedback relating to a written response to seminar questions and a comprehensive set of indicative answers.
- Formative feedback is to be provided by module tutors and peers. The seminar discussions and informal student presentations will enable the students to receive informal oral feedback from the tutor and other members of the seminar group.

#### Summative Feedback

- Summative feedback is to be provided following the submission of the first assessment task. Specific, individual feedback on prepared assessment feedback sheets, along with comments from the tutor, will be presented to the students. The students will also have an opportunity to meet with the tutor(s), after the return of the individual reports, for feedback and guidance.
- Summative feedback will be available following completion of the online test if requested.

## LEARNING RESOURCES FOR THIS MODULE (INCLUDING READING LISTS)

The module leader will liaise with the university learning centre to ensure a wide variety of the latest books and articles are available to students studying this module. Students will also be able to utilise online journals and databases via the learning centre website. Electronic copies of all teaching materials will be placed on Blackboard along with sample assessments, formative work, web links and additional resources. A discussion board will be available so that students are able to communicate with fellow students and tutors.

#### Reading List (shorter version)

- 1) Cachon, G. P. & Terwiesch, C. Matching supply with demand: An introduction to operations management 3nd Ed. Boston, MA: McGraw Hill, 2011
- 2) Introduction to Quality Control, by Koaru Ishikawa 3A Corporation, 1990
- 3) Statistical Thinking: Improving Business Performance, by R Hoerl and R Snee Duxbury, 2002
- 4) Statistical Process Control (5th ed.), by John Oakland Oxford: Butterworth-Heinemann, 2003.
- 5) The Six Sigma way: how GE, Motorola, and other top companies are honing their performance, by Peter S. Pande, Robert P. Neuman, Roland R. Cavanagh McGrawhill, 2000
- 6) Implementing Six Sigma (2nd Ed), by F W Breyfogle III John Wiley and Sons, 2003

## SECTION 2 MODULE INFORMATION FOR STAFF ONLY

## **MODULE DELIVERY AND ASSESSMENT MANAGEMENT INFORMATION**

### MODULE STATUS - INDICATE IF ANY CHANGES BEING MADE

NEW MODULE	Υ
EXISTING MODULE - NO CHANGE	N
Title Change	Ν
Level Change	Ν
Credit Change	N
Assessment Pattern Change	Ν
Change to Delivery Pattern	Ν
Date the changes (or new module) will be implemented	01/2014

**MODULE DELIVERY PATTERN -** Give details of the start and end dates for each module. If the course has more than one intake, for example, September and January, please give details of the module start and end dates for each intake.

	Module Begins	Module Ends
Course Intake 1	27/01/2014	09/05/2014
Course Intake 2	27/01/2014	
Course Intake 3	DD/MM/YYYY	DD/MM/YYYY

Is timetabled contact time required for this module?

Are any staff teaching on this module non-SHU employees?	Ν
If yes, please give details of the employer institution(s) below	
What proportion of the module is taught by these non-SHU staff,	
expressed as a percentage?	

Y

#### MODULE ASSESSMENT INFORMATION

Indicate how the module will be marked	
*Overall PERCENTAGE Mark of 40%	Y
*Overall PASS / FAIL Grade	Ν

\*Choose one only – module <u>cannot</u> include both percentage mark and pass/fail graded tasks

#### SUB-TASKS

Will any sub-tasks (activities) be used as part of the assessment strategy for this module?	N

If sub-tasks / activities are to be used this must be approved within the Faculty prior to approval. Subtask / activity marks will be recorded locally and extenuating circumstances, extensions, referrals and deferrals will not apply to sub-tasks / activities.

#### **FINAL TASK**

According to the Assessment Information shown in the Module Descriptor,	Task No.
which task will be the LAST TASK to be taken or handed-in? (Give task	
number as shown in the Assessment Information Grid in Section 1 of the	2
Descriptor)	

## NON-STANDARD ASSESSMENT PATTERNS

MARK 'X' IN BOX IF MODULE ASSESSMENT PATTERN IS NON STANDARD, eg MODEL B, ALL TASKS MUST BE PASSED AT 40%.	
NB: Non-standard assessment patterns are subject to faculty agreement and approval by Registry Services - see guidance. notes.	