Specialist Diploma Supply Chain Management

Programme Information

UNIVERSITY of LIMERICK

OLLSCOIL LUIMNIGH

Contents

06/03/2015

Programme Title
Specialist Diploma in Supply Chain Management- Relationships & Systems

Award Type and Level on National Framework of Qualifications:

Postgraduate Diploma Minor Award Level 9

Rationale
The development of this programme was inspired by a specific demand from industry to meet the clear need to upskill current personnel who have shown the aptitude and track record of competence in supply chain operations to aspire to a Master level qualification. This programme represents the outcome of a close, respectful, responsive and productive collaboration with an industry partner who is a significant global player in the domain of high-technology supply-chains. This innovative work has received strong encouragement from IDA Ireland. It has strong potential to reach a broader supply-chain audience, both in Europe and in Asia.

Supply-chain enterprise's operate in a highly dynamic business environment characterised by three Cs – change in globalisation such as outsourcing, change in product possibilities and expectations such as product-service bundling, and change in ways of integrating businesses such as the emergence of enterprise networks.

The course will create graduates that will be equipped to use in practical application the range of theories and concepts that form the supply chain management body of knowledge. The programme is a grounded development of the participant's socio-technical skill as they relate to Supply Chain Management.

Learning Outcomes

1. Equip participants to use in practical application the range of theories and concepts that form the supply chain management body of knowledge.
2. Explore how supply chain management has developed, its impact organisation and control for both the individual and the organisation.
3. Introduce the Supply Chain Operations Reference Model which places operations planning and control centrally in a way that prior implicit framings did not and so provides a basis for the strongly conceptual navigations that supply-chain managers face in their everyday work.
4. Address the key issues of strategy for managing and nurturing a company's interactions with customers, clients and sales prospects and using data and technology to gain competitive advantage.

5. Develop participant's technical skills in simulation and modelling to increase their ability to process information and make decision based on accurate data and models.

Knowledge – breadth & kind:

- Apply the fundamental concepts and practices of supply chain management to explaining the functioning of extended enterprises in the modern business environment.

Know-how and Skills – range and selectivity:

- Identify the fundamental principles underpinning socio-technical factors, (relationship networking, modelling, and simulation) to manage, problems solve and make decisions with in a supply chain context.

Competence – context and role:

- Develop and apply modelling & simulation skills to managing, decision- making and problem solving in the development operation and maintenance of the enterprises supply chains
- Develop and apply relationship marketing to managing, decision-making and problem solving in interactions, relationships and networks in a supply chain environment.

Competence – learning to learn:

- Search for information and methods to address leading questions, including application of concepts in their work contexts, and
- Develop of personal capabilities in competitive collective activities

Competence – insight:

- Frame and assess situations, including contextual goals and constraints based on quantitative and qualitative mental models, and to propose and evaluate alternative solutions within context of competing objectives and minimal variation, where knowledge is distributed and uncertain and contexts change.

Structure

5 Modules (4 Taught Modules 4 x 6 ECTS, 1 Project 1 x 12 ECTS)
36 ECTS
Duration 2 semesters

Semester One	***Semester Two***
PT5001 Supply Chain Frameworks	*AU5032 Marketing Technology Products*
MF5001 Mathematical Modelling in Supply	*IE5002 Simulation within Supply Chains*
PT5092 Project Part 1	*PT5092 Project Part 2*

Entry Qualifications

A minimum 2.2 honours NFQ level 8 degree in any discipline. Or
Equivalent qualification.

And

A minimum of 3 years working within a service/manufacturing/supply chain environment.

And

The Course Board reserves the right to interview candidates as it deems necessary.

Successful completion of PT4900 Professional Skills module may be required by the Course Board upon reviewing a candidate's application

The recognition of prior learning and prior experiential learning as per university policy will be applied to this course.

Module Outlines
PT5001 – Frameworks for Supply Chain Management

Rationale and Purpose of the Module:
To introduce students to a wide range of frameworks to inform systematic thinking on the alignment, design, implementation and operation supply chains to promote their agility, adaptability and growth.
To support the lean pursuit of key strategic performance dimensions delivery, quality, and economy in the context of a dynamic, uncertain and competitive operating environment.
To consider frameworks appropriate at micro, meso and macro levels of operation.
To promote a quantitative approach to supply chain operations analysis.
To include a strong human context in addressing diagnosis and design questions.

Syllabus:
Supply Chain Context
Positioning, competitive priorities and capabilities. Role of operations and associated decision areas. Comparison of services versus manufacturing, supply-chain structures, identification of supply-chains. Operations reference models, Supply-Chain Operations Reference Model SCOR, Design Chain DCOR, Customer Chain CCOR, performance framework.

Sourcing: Sub-contracting of production and logistics, outsourcing, off-shoring, in-sourcing, globalisation.

Product control: New product and service development activities (e.g. Urban-Hauser; Stage-Gate, spiral models), product life-cycle., underpinning concepts such as continuous/radical/ disruptive innovation, customer experience, sustainability. Analysis tools e.g. customer-choice analysis, quality function deployment. Product validation.

Quantity control: micro: process mapping, inventory, job sequencing, push/pull order release, model of human scheduling, queuing, littles law, flow factor. meso: forecasting, aggregate planning, routing and network planning, production-inventory system dynamics. Macro: capacity decisions, location.

Quality control: micro: controllable/uncontrollable variation, sampling for variables and attributes, control charts. Meso: specification capture (QFD), fitness for purpose, reliability and risk analysis, fitness for society. Macro: strategy deployment (Hoshin), quality frameworks ISO, Baldridge, EFQM.

Production economy: Cost of doing: cost estimation, asset investment cost, capital recovery, activity based costing, unit costing, rate of return on investment, intangibles.
Cost of not doing: Feigenbaum quality cost model.

Information Systems: Hierarchical planning and control systems. GRAI grid and levels of decision and analysis. Enterprise Resource Planning. Operations reference models, ARIS and enterprise integration views. Interoperability at technical and organisational levels.

Human factors: Micro: planning cycle for individuals - McKay-Wiers planning cycle and supporting social networks. Meso: interfacing role between organisations, planner-schedulers mediation role at

supply chain interface (Berglund-Guinery). Co-ordination in enterprise networks, organisational interoperability. Macro: Technology acceptance model and software implementation. Waefler socio-technical model of planner-scheduler engagement and structural impact.

Process Improvement: Continuous improvement philosophy, commonalities of Lean and 6-Sigma, PDSA, forms of waste, problem seeking, focusing tools, design of experiments, engagement with people, implementation and control, kaizen, DMAIC framework. Capturing the soft side: Qualitative analysis and mixed methods. Project planning and control, specific project methodologies e.g. PERA. SCOR implementation framework (SCE).

Semester project work: Reflection on SCOR model and its relation with the framework above. Application in depth of a focused set drawing on the frameworks listed above to solving or analysing specific supply-chain questions in a substantial semester project. The work is to be collaborative, and carried out in project teams using computer mediated communications. The results are to be presented in written and verbal form.
Qualitative enquiry should inform the project development path, but the work should be primarily related to quality- and quantity-control processes.

Learning Outcomes:
Cognitive (Knowledge, Understanding, Application, Analysis, Evaluation, Synthesis)

- On successful completion of this module students will be able to:
- Describe the context for supply-chain design and discuss key consequences.
- Describe the nature of sourcing in the context of globalisation
- Describe the nature of operations management techniques for quantity and quality control, and discuss key associated operating characteristics (e.g. curves)
- Describe principles of production economy including costing and estimation of potential benefits from lost opportunities and failure of control, and discuss key consequences.
- Describe important aspects of information-systems architectures in the enterprise resource planning model, including aspects such as decision hierarchy and interoperability that are relevant to interfacing between companies, and discuss key consequences.
- Describe important human activity considerations at individual level, at interface level, and at the level of technology acceptance in relation to computer mediation of activities at inter-organisational interfaces, and discuss key consequences.
- Describe important aspects of process improvement methodology relating to all aspects of supply-chain structures, processes, and discuss key obstacles they are designed to overcome.
- To describe and discuss the implementation of major supply-chain con/re-configuration such as SCOR through the SCE project template.
- To apply a small number of the above areas to analysing particular supply-chain questions in greater detail.

Affective (Attitudes and Values)

- On successful completion of this module students will be able to:
- To establish a commitment to the value of operations analysis and systems thinking in thinking about supply-chain structure, process and performance outcomes.
- To value both technical and human dimensions in design, implementation and operation.
- To anticipate and respond to the need for change in supply-chain structure and processes and outcomes.

- To adopt a stance on the philosophy of continuous improvement.

Psychomotor (Physical Skills)

- On successful completion of this module students will be able to:
- Use of computers to mediate project communications.
- To act in project teams.

Prime Texts:

- Boyer, K and Verma, R. (2009) Operations and Supply Chain Management for the 21st Century. , Cengage
- Simchi-Levi D, Kaminsky D and Simchi-Levi (2007) Designing and Managing the Supply Chain, Mcgraw-Hill.
- Bolstorff P and Rosenbaum. () Supply-Chain Excellence ,
- Chopra S and Meindl P. (2008) Supply Chain Management , Prentice-Hall/Pearson Education

Other Relevant Texts:

- Evans JR and Lindsay WM. (2005) The management and control of quality. 6th ed. ,
- Sterman, JD. (2000) Business Dynamics: systems thinking and modelling for a complex world. , Irwin McGraw-Hill
- Montgomery DC. (2009) Introduction to Statistical Quality Control. 6th ed. , John Wiley and Son
- Vernadat, F. (1996) Enterprise modelling and integration , Chapman-Hall
- Scheer, A-W. (1994) Business process engineering: reference models for industrial enterprises. 2nd ed. , Berlin, New York: Springer-Verlag
- Fransoo J, Waefler T and Wilson J. (2010) Behavioural operations in planning and scheduling , Springer
- Engestrom Y and Middleton (1995) Communication and cognition at work. ,
- Vicente K. (1999) Cognitive Work Analysis ,
- Creswell JR. (2003) Research Design: quantitative, qualitative, and mixed methods. 2nd ed. , Sage
- Jacobs RB, Chase WR, and Aquilano NJ. (2009) Operations and Supply Management. 12th ed. ,
- Heizer J. and Render B. (2011) Principles of Operations Management 8th ed. ,
- Process Wizard () User's Manual, Xelocity Ltd, Auckland, New Zealand.
- Rother M and Shook J. (2003) Learning to See, The Lean Enterprise Institute, Brookline, MA.
- Francis, McGinnis L and White JA. (1992) Facility Layout and Location. , Prentice-Hall.
- Schniederjans M. (1999) International facility acquisition and location analysis. , London: Quorum Books.
- Shingo, S. (1988) Non-Stock Production , Productivity Press
- Hopp W and Spearman J. (2007) Factory Physics 3rd ed. , McGraw-Hill/Irwin

Module Leader: Ingrid Hunt

MF5001 – Mathematical Modelling in Supply Chain

Rationale and Purpose of the Module:
To provide students with knowledge on mathematical models applicable to supply chains.
To provide students with modelling and software capabilities to apply mathematical models to supply chains.

Syllabus:

- Introduction to Operations Research: Origins of operations research, example applications of mathematical modelling in supply chains, process of applying mathematical models, overview of mathematical model types, overview of software used in mathematical modelling.
- Mathematical Modelling - Software: Introduce and provide students with base skills to use software to solve mathematical models. The focus is primary on introducing the student to spread sheet modelling, but brief introductions to other modelling and optimization software will be given. Students will apply software modelling skills obtained here to subsequent topics.
- Linear programming: Basic definition of linear programming, demonstrate method via graphical method, model formulation applications in supply chains.
- Linear programming solution: Simplex method, artificial starting solution method, interpretation of simplex tableau, sensitivity analysis.
- Network models: Transport model, Assignment model, Shortest Route model, Network Minimisation model, Maximum Flow Model, Transhipment model
- Integer programming: Binary and integer applications in supply chains, solution methods, branch-and-bound, heuristics solution methods, genetic algorithms and simulated annealing.
- Dynamic Programming: Applications in supply chain planning.

Learning Outcomes:
Cognitive (Knowledge, Understanding, Application, Analysis, Evaluation, Synthesis)

- On successful completion of this module students will be able to:
- Identify the difference between linear and non-linear models and understand where they can be applied.
- Given a problem description, develop a linear or integer programming models.
- Apply solution methods for linear, network, dynamic programming and integer-programming models.

Psychomotor (Physical Skills)

- Use of computers.

Prime Texts:

- Hillier, F. S. and Lieberman, G. J. (2005) Introduction to Operations Research (8th edition), McGraw-Hill.
- Ragsdale, C. (2007) Spreadsheet Modelling and Decision Analysis: A Practical Introduction to Management Science, South-Western College Pub.

Module Leader: Cathal Heavey / Pezhman Ghadimi

AU5032 - MARKETING TECHNOLOGY PRODUCTS

Rationale and Purpose of the Module:

1. To develop the key marketing concepts in business generally and technology markets in particular.
2. To develop the student capability to analyse markets for technology products and/or services.
3. To assist the student to analyse and develop a marketing plan for a technology company.

Syllabus:

Market analysis for high technology companies, Setting up, managing and changing distribution channels, what differentiates high-tech from more traditional markets? Product life cycles in a high technology environment, Acquiring and processing information from the sales force, Information as a strategic weapon for high technology companies, Developing long term customer partnerships and strategic alliances, Integrating customers into the marketing process through involvement in new product development, Telesales and telesupport, Identifying and communicating value in high technology market environments, Strategic platform marketing, Branding technology products, Forming strategic alliances for marketing, Industrial marketing.

Learning Outcomes:

Cognitive (Knowledge, Understanding, Application, Analysis, Evaluation, Synthesis)

- Understand the key marketing concepts in business generally and technology in particular
- Be capable of analysing markets for technology products/services
- Have produced a marketing plan for a technology company (their own or another actual company)

Affective (Attitudes and Values)

- Understand the strategic role of the subject matter in the organisational competitiveness and success

Prime Texts:

- Mohr, J. (2001) *Marketing of High Techology Products and Innovations* ,

Other Relevant Texts:

- Bekkers,Rudi; Duysters,Geert ;Verspagen,Bart (2002) *Intellectual Property Rights, Strategic Technology Agreements And Market Structure, The Case Of GSM* ,
- Paul A. David () *Clio And Economics Of Qwerty* , Encina Hall, Stanford University, Stanford, Ca 94305
- Stabell, C.B., And Fjeldstad O.D (1998) *Configuring Value For Competitive Advantage* , Strategic Management Journal, 19: 413-437
- () *A Case Study Of Palm Computings Introduction Of Personal Data Assistants (Pdas) As An Example Of Innovation Providing A Fundamental Source Of Competitive Advantage* ,
- David J. Teece (1986) *Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy* , Research Policy, Volume 15, Issue 6, Pages 285-305 (December 1986)
- Dan Olofsson (2003) *Radical Product Innovations* , IDP
- Varian H (1995) *Price-Info-Goods* , University of Michigan
- John Carey () *The First 100 Feet For Households, Consumer Adoption Patterns* ,
- Eric Von Hippel, Stefan Thomke And Mary Sonnack () *Creating Breakthrough Innovations At 3m* ,
- Davidow, William H (1986) *Price On Value But Charge What The Market Will Bear* ,

- Dorothy Leonard Jeffrey F Rayport () *Spark Innovation Through Empathic Design* , Harvard Business Review; Boston; Nov/Dec 1997
- Hau L. Lee () *Information Sharing in a Supply Chain* , Research Paper No. 1549, Graduate School Of Business, Stanford University
- Ward, Scott, Larry Light And Jonathan Goldstine (1999) *What High Tech. Managers Need To Know About Brands* , Harvard Business Review, July-August 1999 85-95
- Patricia Nakache (1998) *Secrets Of The New Brand Builders* , Fortune June 22, 1998
- Gary Mcwilliams (2001) *Dell Logistics Profitability* , Wall Street Journal; New York, N.Y
- S. J. Liebowitz and Stephen E. Margolis () *Path Dependence, Lock-In, And History* , University Of Texas At Dallas. North Carolina State University.
- S. J. Liebowitz And Stephen E. Margolis (1990) *The Fable Of The Keys* , Journal of Law & Economics vol. XXXIII (April 1990)
- J. West and J. Dedrick (2001) *Proprietary Vs. Open Standards In The Network Era: An Examination Of The Linux Phenomenon* , 34th Annual Hawaii International Conference On System Sciences (Hicss-34)-Volume 5 January 03 - 06, 2001 Maui, Hawaii
- Vhs Versus Beta" Case [Based On Cusumano, Mylonadis, And Rosenbloom (1992) *Strategic Maneuvering And Mass-Market Dynamics: The Triumph Of Vhs Over* , Beta Business History Review, 66, Spring

Module Leader: Michele O'Dwyer

IE5002 – Simulation Modelling in Supply Chains

Rationale and Purpose of the Module:
To provide students with knowledge on discrete event simulation modelling and its application to supply chains.
To provide students with modelling and software capabilities to apply simulation to supply chains

Syllabus:
Introduction to simulation: Overview of simulation modelling, introduction to the basic concepts of discrete event simulation. The simulation process steps involved in carrying out a simulation project.

Computer simulation packages: Overview of available computer packages, description of representative packages, computer implementation issues. Development of programming skills to apply simulation to supply chains using a generic simulation package. Introduction to dedicated supply chain simulation software.

Statistical aspects of simulation: Input analysis, random number generation, output analysis, experimental design.

Queuing Models: Provide comparison of simulation with stochastic mathematical models through the introduction of basic queuing models.

Application of simulation: Development of simulation case study models for supply chain analysis and design.

Learning Outcomes:
Cognitive (Knowledge, Understanding, Application, Analysis, Evaluation, Synthesis)

- On successful completion of this module students will be able to:
- Understand discrete event simulation.
- Understand the role of simulation modelling in supply chain design and analysis.
- Understand the steps in applying simulation.
- Be able to develop simulation models of supply chains.
- Be able to analysis statistically input data, output data basic experimental design methods used in simulation analysis.
- Understand basic queuing theory and its advantages/disadvantages when compared to discrete event simulation.

Psychomotor (Physical Skills)

- Use of computers.

Prime Texts:

- Law, A. (2006) Simulation modelling and analysis (4nd edition) , McGraw-Hill

- Concannon, K., Elder, M., Hunter, K., Tremble, J. and Tse, S. (2007) Simulation Modelling with SIMUL8, Visual Thinking International Ltd.

Other Relevant Texts:

- Pidd, M. (2010) Tools for Thinking: Modelling in Management Science , Wiley
- Robinson, S. (2004) Simulation: The Practice of Model Development and Use , Wiley

Module Leader: Cathal Heavey / Georgios Dagkakis

PT5092 – Supply Chain Project

Rationale and Purpose of the Module:
Integrate the different aspects of the taught stream and apply the acquired knowledge to a business standard, industry focused project.
Incorporate all module elements on the stream to demonstrate a well-rounded comprehension of tools, techniques and methodologies investigated.

Syllabus:
[Project Management] Students undertaking of this module must implement a project plan outlining various phases of the project. Estimation of goals and task scheduling must analyse, identified and prioritised. The project plan must be revisited throughout all stages of the lifecycle.
[Independent Research] Students must demonstrate ability to research and investigate aspects of the project independently. A proven aptitude in coordination of and active involvement in, information gathering, analysis and formal presentation of findings must be exhibited
[Knowledge Implementation] Implementation of the project must incorporate all modules associated within the project stream. In this manner students are guaranteed to be equipped with the essential tools to acquire further knowledge and insight.
[Documentation Proficiency] As part of the module criteria a report must be completed to support the project. This should include the initial scope, methodologies applied and tools and techniques employed, in addition to the motivations for the project.

Learning Outcomes:
Cognitive (Knowledge, Understanding, Application, Analysis, Evaluation, Synthesis)

- Construct a project plan outlining a schedule for task completion for each stage of the project lifecycle.
- Analyse and identify essential fundamental objectives and requirements relevant to the specific project.
- Employ and exercise judgement and problem-solving techniques.
- Communicate results and findings effectively both orally and in written form.
- Prioritise objectives within technical, time and knowledge constraints.
- Research, analyse, implement and document all stages of the project lifecycle resulting in a substantial overall project.
- Critically evaluate the overall project, proposing recommendations for future development and improvement.

Affective (Attitudes and Values)

- Increase the students understanding and appreciation for the processes involved in supply chain management.

Prime Texts:

- Wolf, J. (2008) The Nature of Supply Chain Management Research: Insights from a Content Analysis of International Supply Chain Management Literature from 1990 to 2006, Gabler, European Business School Oestirich-Winkel.
- Kotzab, H., Seuring, S., Muller, M. and Reiner, G. Editors in Collaboration with Magnus Westhaus (2004) Research Methodologies in Supply Chain Management: Physica-Verlag HD.

Other Relevant Texts:

- Saunders, M., Thornhill, A and Lewis, P. (2006) Research Methods for Business Students, Pearson Publishers, UK.
- Fisher, C. (2004) Researching and Writing A Dissertation for Business Students, Prentice Hall Financial Times.
- Morley, M. (2005) A Guide for Research - Students and Supervisors , Graduate Studies Office: University of Limerick

Module Leader: Ingrid Hunt