2. Uluslararası Basım Teknolojileri Sempozyumu
2nd International Printing Technologies Symposium
2017
11-12 Ekim / October
www.printistanbul.org
Uygulamalı Bilimler Yüksekokulu

NEW INITIATIVE TO EDUCATE THE "LEAN AND GREEN PRINTING" AS ELECTIVE COURSE-UNIT

Csaba Horvath

Institute of Media Technology and Light Industry Engineering
Óbuda University, Budapest, Hungary

horvath.csaba@rkk.uni-obuda.hu

ABSTRACT

This English language online course-unit (lecturing at the Obuda University) assembled by the author, is a primer that serves a dual role for today's students of graphic communication.

The course is an introduction to lean and green management and manufacturing strategy providing for solid base for any printer professional that wants or needs to begin the journey of becoming an efficient and sustainable enterprise.

The knowledge base of the course is founded on the newest publications of Printing Industry of America, Print Process Champions (earlier Web Offset Champion Group) and Printers' National Environmental Assistance Center.

The curriculum contains presentations, videos, tests and tasks for home work. The course is presented during one semester. The credit point value of the course is 2.The students are following the lectures online week by week. They need to pass six tests and complete six home works assignments to monitor their progress.

The main task of the students of this course is to design and virtually create their own future efficient and sustainable enterprise in graphic communication using the lean and green management tool box while also considering the associated social responsibility (CSR) aspects.

This course is designed for the students of Obuda University, who are studying the undergraduate academic course of "Light industry engineering" and their specification is the graphic communication. The fulfilment of this course in English language is criteria to get their degrees.

Keywords: printing education, lean printing, green printing, e-learning

Introduction

This English language online course-unit (lecturing at the Obuda University) assembled by the author, is a primer that serves a dual role for today's students of graphic communication.

The main task of the students in this course is to design and virtually create their own future efficient and sustainable enterprise in graphic communication using the lean and green management tool box while also considering the associated social responsibility (CSR) aspects.

This course is designed for the students of Obuda University, who are studying the undergraduate academic course of "Light industry engineering" and their specification is the graphic communication.

The fulfilment of this course in English language is criteria to get their degrees.

University, faculty – the place of education

Obuda University is a dynamic and thriving institution located in Budapest, heart of Hungary, heart of Europe. For 132 years of existence, the educational excellence has remained paramount. The history of our institution is spanning over three centuries. Obuda University was established as of 1 January 2010, as a legal successor of Budapest Tech – and its legal predecessors, namely Donat Banki Technical College, Kalman Kando Technical College, and the Technical College of Light Industry. The fundamental mission of the University is to serve science and the future by transferring and developing knowledge at high standards and by research and innovation.

Obuda University constantly builds and develops a competitive institution of higher education meeting the criteria and regulations of the European Higher Education Area (Figure 1).

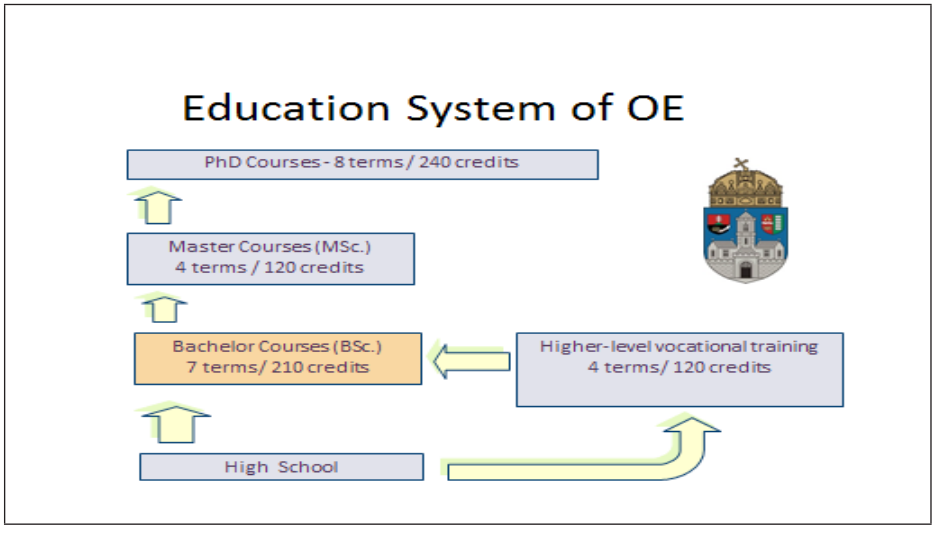

Figure 1: Education system of Obuda University

The high level education is going on in various faculties and centres. These faculties are found in the most beautiful parts of Budapest and Szekesfehervar.

Obuda University has six faculties:

- Banki Donat Faculty of Mechanical and Safety Engineering,
- Kando Kalman Faculty of Electrical Engineering,
- Keleti Karoly Faculty of Economics,
- John von Neumann Faculty of Information Technology,
- *Rejto Sandor Faculty of Light Industry and Environmental Engineering,*
- Alba Regia Faculty of Engineering (Szekesfehervar).

Rejtő Sándor Faculty of Light Indrustry and Environmental Engineering offers three BSc programs: Light Industry Engineering, Industrial Design Engineering, Environmental Engineering, and a MSc program in Light Industry Engineering.

- The bachelor's program in Light Industry Engineering prepares students for the control and supervision of manufacturing processes related to their specialisation. After completing the fundamental courses in engineering, with basic technical and engineering skills they can choose from the following specialisations: Creative products and technologies, Quality Control System Developer, Printing and Media, Packaging and Paper Technologies.

- Engineers, with a BSc degree in Industrial Design Engineering will be able to initiate, compile and implement projects, to carry out analyses using relevant design methods and to professionally justify the implemented work procedures. They will have competence in comprehensive product design, taking into consideration aesthetic, usability, market, safety, and implementation aspects, as well as historic, cultural, social, economic, industrial and natural environmental factors related to industrial design and product development. Specialisations: Product Design and Product Management.

- BSc Environmental Engineers will possess the necessary up-to-date vocational and technological skills needed to reduce and prevent environmental damage and pollution. They are trained to be capable of making environmental studies. We offer the Light Industry specialisation.

- Those who earned the BSc degree can continue their studies on the Light Industry Engineering MSc program. The training is organised in cooperation with the Faculty of Wood Sciences of University of West Hungary. Graduates of the BSc program may also continue their studies in the Engineering Teacher Master program in cooperation with Trefort Ágoston Centre for Engineering Education.

Criteria subject

By the regulation of Obuda University the undergraduate students have to cover four credits from the criteria subjects to get their degrees. An example can be seen on the Table 1.

The criteria lectures units are optional presented in English or German languages.

Table 1: Curriculum of Light Industry Engineering course (BSc.) for full time students

No.	Main fields of study	Credit [Pts]
1	Natural Science Fundamentals	41
2	Economics and Human Studies	20
3	Technical Fundamentals	75
4	Specializations ❑ Print media technologies ❑ Packaging and Paper technologies ❑ Fashion product technologies ❑ Industrial system development	69
5	Optional course-units	6
6	Criteria Subjects (English or German) - optional	4
7	Thesis	15
Sum:		**210**

Course unit of 'Lean and green printing'

The course is an introduction to lean and green management and manufacturing strategy providing for solid base for any printer professional that wants or needs to begin the journey of becoming an efficient and sustainable enterprise.

Why lean and green?

Lean manufacturing reduces waste to minimise costs and time while simultaneously improving Green performance because any waste reduction provides direct environmental benefits as well as economic efficiency. Reduction of energy consumption and greenhouse gas emissions also takes a value chain approach. There is a direct correlation between CO2 fossil emissions, energy generation and consumption.

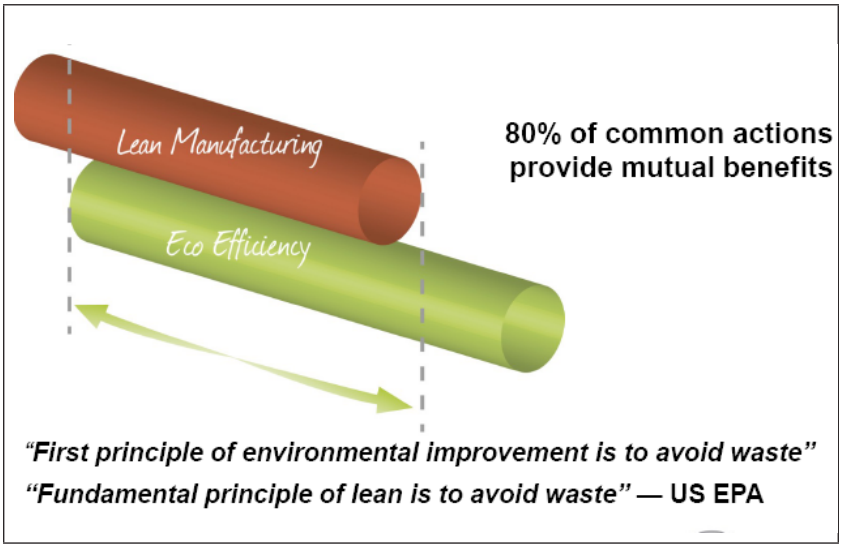

Figure 2: Lean and green strategy[1]

The knowledge base of the course is founded on the newest publications of Printing Industry of America[1-2], Print Process - Champions[3-6] (earlier Web Offset Champion Group) and Printers' National Environmental Assistance Center.

It is an English language online course unit, managed by the E-learning system of Obuda University.

This optional criteria subject is educated by credit-based (2 credit points).

The length of the programme is one semester (14 weeks), opened for all undergraduate students (not only for OE students).

The curriculum contains presentations, videos, tests and tasks for home work. The course is presented during one semester. The credit point value of the course is 2.The students are following the lectures online week by week. They need to pass six tests and complete six homework assignments to monitor their progress. They finish the course unit with a closing test. The description, brief curriculum and the requirements are on the Table 2.

Table 2: Lean and green printing – brief curriculum and requirements

Óbuda University					
Rejtő Sándor Faculty of Light Industry and Environmental Engineering	Faculty	Media Technology and Light Industry	Institute		
Hungarian title of the course:	Hatékony és környezetbarát nyomtatás	Neptun code:	RMTLGANVNC		
English title of the course:	Lean and Green Printing	Credit:	2		
Type (compulsory/obligatory:)	optional, criteria	Education Type	online	Semester :	5-7
Study field:	Light Industry engineering, Environmental engineering				
Lecturer:	Dr. Csaba Horváth				
Required preliminary knowledge:	-				
Weekly teaching hours:	Lecture: 2	Practical work: 0		Laboratory work: 0	
Exam type: f		Language of course: English		In timetable: Tuesday 13:30-15:10	

Curriculum
Abstract:
The course is a primer that serves a dual role for today's students of graphic communication. It's an introduction to lean, a bridge to that world of abstract theories. It's also a first pass – a necessary first coat – that will provide a solid base for any printer who wants or needs to begin the journey of becoming lean and green enterprise.

Requirements		
Attendance at lectures:		
It is online subject. The rules of education and exam directory (TVSZ) are the guidelines.		
Exams and tests (types, data)		
Test	6 pcs	6 x 5 points
Home work	6 pcs	6 x 8 points
Closing test	on 14th week	32 points
Improver closing test	15th week	
Requirements for qualification:		
The students have to write min. 6 tests, and outline min. 6 home works. Closing test is obligatory. 0 - 49 (1) fail 50 - 59 (2) pass 60 - 69 (3) satisfactory 70 - 84 (4) good 85 - 100 (5) excellent In the latter case: re-take examination paper in week 14 or/and once more within the first 14 days of the examination period.		

The detailed curriculum can be followed on the Table 3 and Table 4.

All the files (marked ■) are loaded to the platform of E-learning system .

The students load up their home works and closing test to this platform. The six tests are passed by the students on the platform of E-learning system (https://elearning.uni-obuda.hu/).

Table 3: Lean and green printing – the detailed curriculum of Lecture No. 1-6

Lecture	**Subject**	**Test/Homework**
No.1	*Introduction* The course "Lean & green printing" is an on-line course. The education is organized by the E-learning system of Óbuda University. The tests, the home works, the valuating are managed trough the E-learning system. Lecturer: Dr. Csaba Horvath ▪ Europass CV Sources to learn, required ▪ SEEN: Lean & green, Book 1 [1] ▪ SEEN: Lean & green, Book 2 [2] ▪ Print and Paper, Myths and facts[7] ▪ Sustainable printing plants[6] Source to learn, proposed ▪ Sustainability, Energy & Environment [5] ▪ Road to Succes - Lean in the Printing Industry[8]	*Students cv's* Students are needed to create and submit their CV's in English. Format: Europass

No.2	*What is the lean printing?* ▪ Presentation No.1 ▪ What is Lean Printing? Interview Prof. Malcolm Kief and Prof. Kevin Cooper (video) ▪ Presentation with Malcolm Keif and Kevin Cooper - Basics of lean printing (video)	▪ *Test No.1*
No.3	*Lean and 5S* ▪ Presentation No2. ▪ 5S / Visual Workplace Handbook ▪ 5S training Introduction (video)	▪ *Test No.2*
No.4	*Printing processes* ▪ Presentation No.3 ▪ Four colour printing process (video) ▪ Print technology (video) ▪ Sheet-fed offset printing (video) Web offset printing (video) ▪ Flexography (video) ▪ Digital printing (video)	▪ *Homework No.1* The students should find other kind of traditional or digital printing method what was not on the videos. Make an essay about this print technology! (Min. 300 and max. 500 words)
No.5	*Printed media trends* ▪ Presentation No.4 ▪ Print media (pdf) ▪ Interactive printing by Canon (video) ▪ Canon bubble jet technology (video) ▪ Landa Nanographic Printing Process official (video)	▪ *Homework No.2* How can you imagine the future of the printed media? What is your opinion? Make an essay about your opinion! (Min. 300 and max. 500 words)

No.6	*Sustainable green printing partnership* ▪ Presentation No.5 ▪ SGP Fast facts (pdf) ▪ What is the Sustainable Green Printing partnership? (videos)	▪ *Homework No.3* Students can find several solutions about the green printing certification in the different countries. They should choose one of them! Make an essay to describe your chosen green printing confirmation! (Min. 300 and max. 500 words)

Table 4: Lean and green printing – the detailed curriculum of Lecture No. 7-14

Lecture	**Subject**	**Test/Homework**
No.7	*Leaner & greener value chain* ▪ Presentation No.6 ▪ The Lean and Green Supply Chain by EPA (pdf) ▪ A practical guide for materials managers and supply chain managers to reduce costs and improve environmental performance (pdf)	▪ Test No.3
	Mith and facts about the print paper ▪ Presentation No. 7 ▪ Mith & Facts - Two Sides publication (leaflet - pdf) ▪ The value of print - Printing Industry of America publication (pdf)	▪ Test No.4

No.9	*Lean & Green -Economic & Environmental Benefits of Lean* ▪ Presentation No.8 ▪ The Lean and Environ-ment Toolkit by EPA (pdf) Improve Environmental Result Reduce Business Costs and Risk Identify and Eliminate Waste	▪ Test No. 5
No.10	ELLE Case Study ▪ Presentation No.9 ▪ ELLE magazin - URL Visit the ELLE magazine's website, please!	▪ Test No.6
No.11	*Lean & green printing in practice (PIRA)* ▪ Presentation No.10 (PIRA presentation) ▪ Lean manufacturing tour (video) A printing company's example ▪ www.pneac.org - URL Visit and study the website of the Printers' National Environmental Assistance Center!	▪ Homework No.4 Students should create their own green printing companies! Describe it in an essay! (Min. 1000 and max. 1500 words).
No.12	*Calculate the carbon footprint of the printed products, Energy reduction* ▪ Presentation No.11 ▪ Carbon footprint & energy reduction (pdf)	▪ Home work No.5 Calculate (estimate!) the carbon footprint of your imagined printing shop!

No.13	*Efficient and eco-friendly printing* Visit and study the website of the Print Power and Two Sides! ▪ www.printpower.eu URL ▪ www.twosides.info URL	▪ Homework No.6 Has your opinion been changed about printed media after you have studied more about it during this course unit? Sum it, please! No matter if it has changed or not! (Min. 200 and max. 300 words)
No.14	*Closing test* During the follow week I load up a test to the e-learning system at 08:00, from Monday to Wednesday	The students fill them and load them up to the system till 09:40, on those day. The questions of the tests will change in every day of course.

Conclusion

The 'Lean and green printing' course unit was launched in spring semester of 2016.

It has been become a successful and popular program very soon, supported the marketing of the paper-based communication. The student' number has going up semester by semester.

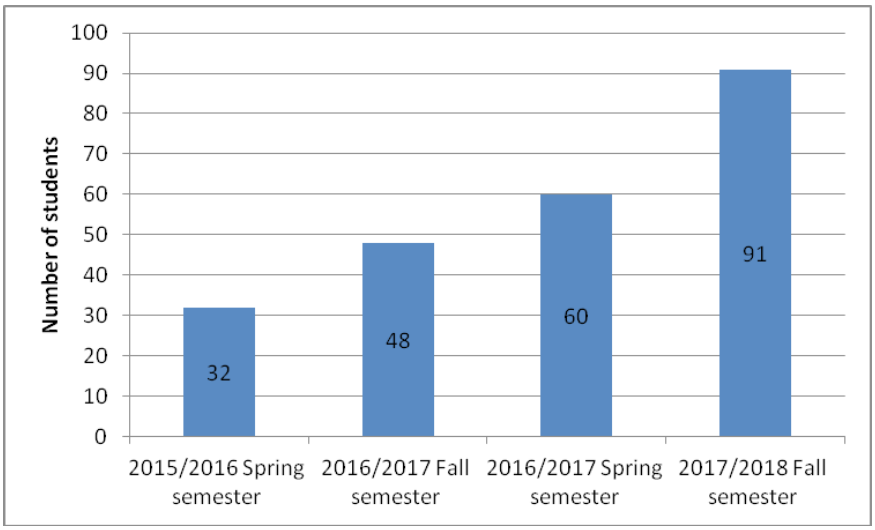

Figure 3: Increasing the number of students learning the 'Lean and green printing' course-unit

The Obuda University is so open to collaborate with other universities

- to split the education of 'Lean and green printing',
- to develop this course-unit together,
- students from other universities are welcome.

In this case you should contact Dr. Csaba Horvath to get login, etc.)

References

1 Cooper, K. - Keif, M. G.- Macro Jr. K. L.: Lean Printing: Pathway to Success, PIA/GATFPress, Pittsburgh (2007) p.145, ISBN: 0-88362-586-5

2 Cooper, K.: Lean Printing: Cultural Imperatives for Success, PIA/GATFPress, Pittsburgh (2010) p.140 ISBN: 9780883626887

3. Wells, N. (ed): Print: seen lean & green! (Book 1), PrintCity GmbH & Co. KG, Gröbenzell, Germany (2012) p.35

4. Wells, N. (ed): Print: seen lean & green! (Book 2), PrintCity GmbH & Co. KG, Gröbenzell, Germany ˙(2012 p.35

5. Wells, N. (ed): Sustainability, Energy & Environment, PrintCity GmbH & Co. KG, Gröbenzell, Germany (2008) p.24

6. Calmy, A. –Moreau, B. – Wells, N.: Lean and green sustainable printing plant, IDEP France & International Centre for Manufacture by Printing (icmPrint) (2015) ISBN N° 978-2-915679-26-7

7. Two Sides leaflet: Print and Paper Myths and Facts, Daventry (UK) (2014) p.26

8. Pan C. – Storm Q.: Road to success –Lean in the printing industry, RIT (2014) http://carolpan.tripod.com/portfolio/411_lean.pdf (accessed date: 18/07/2017)

9. Rothenberg, S. – Cost, F.: Lean Manufacturing in Small- and Medium-sized printers, RIT Printing Industry Center, NY, 2004 (Research monograph)